ANNUAL REPORT
2002 – 2003

GOVERNMENT OF INDIA
MINISTRY OF WATER RESOURCES

C O N T E N T S

ANNEXURES

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1. FUNCTIONS AND ORGANISATIONAL SET UP OF THE MINISTRY

FUNCTIONS AND SET UP

The Ministry of Water Resources is responsible for laying down policy guidelines and programmes for the development and regulation of country's water resources. The following are its main functions :-

(a) Overall planning, policy formulation, coordination and guidance in the sector of water resources.

(b) Coordination, mediation and facilitation in regard to the resolution of differences or disputes relating to inter-state rivers and overseeing of the implementation of inter-state projects.

(c) Overall planning for the development of ground water resources, assessment of utilisable resources and formulation of policies of exploitation, overseeing of and support to the State level activities in ground water development.

(d) Regulation of ground water and creating mass awareness for artificial recharge in view of depleting resources.

(e) Formulation of the national water development perspective and determination of the water balance of different basins/ sub-basins for possible inter-basin transfers.

(f) Negotiations with the neighbouring countries, like Bangladesh, Bhutan, China, Nepal and Pakistan, in regard to river waters, water resources development projects and the operation of international treaties relating to water.

(g) Technical guidance, scrutiny, clearance and monitoring of the irrigation, flood control and multi-purpose projects (major/ medium) of the States.

(h) Overall policy formulation, planning and guidance in respect of minor irrigation and command area development, and also the administration and monitoring of the centrally sponsored schemes in these areas.

(i) Operation of the central network for flood forecasting and warning on important rivers, the provision of central assistance for some State schemes in special cases and preparation of flood control master plans for the Ganga and the Brahmaputra river systems.

(j) Providing special central financial assistance for specific projects and assistance in obtaining external assistance from the World Bank and other international agencies.

(k) Infrastructural, technical and research support for sectoral development at the State level.

ORGANISATIONAL SET UP

Shri Arjun Charan Sethi is the Union Minister of Water Resources since 29.05.2000. Smt. Bijoya Chakravarty is the Minister of State for Water Resources since 13.10.1999. Shri A.K. Goswami is the Secretary in the Ministry of Water Resources since 02.08.2002. Smt. Radha Singh is Additional Secretary since 01.11.2001.

The Ministry has eight wings namely ; Administration, Finance, Policy and Planning, Project, Eastern Rivers, Indus, Command Area Development, and Water Management. Each Wing is headed by an officer of the level of Joint Secretary. The functions of these wings are as follows :-

ADMINISTRATION WING

The Administration Wing is responsible for personnel and establishment matters of Central Water Commission including cadre management of the Central Water Engineering (Group 'A') Service. It is also responsible for cadre management of CSS/ CSCS/ CSSS posts in the Ministry as well as its attached offices. It also handles matters relating to All India Service officers in the Ministry, and training of officers and staff. The Administration Wing is responsible for all matters relating to Central Ground Water Board, Central Ground Water Authority and personnel matters of these organisations. It is also responsible for preparation of annual report and annual action plan of the Ministry. All matters relating to general administration including Information Technology, Parliamentary Consultative Committee, Implementation of the Official Language Act, vigilance, redressal of public grievances and monitoring the implementation of the reservation policy for Scheduled Castes/ Scheduled Tribes, OBCs and physically handicapped persons, security matters and staff welfare activities are also looked into by the Administration Wing.

FINANCE WING

Finance Wing has four Divisions, viz. Finance Division, Budget Division, Economic Division and Accounts Division. It closely associates itself with formulation/ evaluation of progress/ performance of schemes. The Finance Division advises the Secretary on all matters within the Ministry's

delegated powers. The Budget Division co-ordinates annual budget of the Ministry, monitors expenditure on various plan/ non-plan schemes, compiles Performance Budget, co-ordinates work relating to Parliamentary Standing Committee. It also attends to finance advisory work of Command Area Development Programme. The Economic Division is the latest addition to Finance Wing this year. It aims to actively involve itself in providing economic evaluation of schemes and in providing informed economic advice. The Accounts Division looks after the pay and accounts function, internal audit, O&M and Internal Works Study Unit of the Ministry.

POLICY AND PLANNING WING

All policy matters relating to the development of water resources, benchmarking of irrigation systems, preparation of five year plans, annual plans, Tribal Sub Plan, Special Component Plan, Twenty Point Programme, administrative matters relating to the three research stations namely Central Water and Power Research Station, Pune, Central Soil and Materials Research Station, New Delhi and the National Institute of Hydrology, Roorkee are being handled in the Policy and Planning Wing. It also looks after external assistance for water resources projects from the international funding agencies abroad and foreign training.

PROJECT WING

The Project Wing is responsible for policy matters concerning inter-state issues, disputes about waters of inter-state rivers except Ravi-Beas waters, Sutlej Water and Yamuna Water disputes. Matters relating to irrigation and multi-purpose projects in various States, including release of Central Loan Assistance to States under the Accelerated Irrigation Benefits Programme are also looked after by this wing. It is also responsible for all administrative and technical matters relating to (i) Narmada Control Authority, (ii) Sardar Sarovar Construction Advisory Committee, (iii) Farakka Barrage Project, (iv) Betwa River Board, (v) Bansagar Control Board, (vi) Tungbhadra Board, (vii) M/s National Projects Construction Corporation Limited, (viii) M/s. Water & Power Consultancy Services (India) Limited, (ix) National Water Development Agency.

EASTERN RIVERS WING

The Eastern Rivers Wing deals with matters concerning flood management in the country, all matters relating to Ganga and Brahmaputra basin including the Ganga Flood Control Commission and Brahmaputra Board, international aspects of cooperation and development of Water Resources with Bangladesh, Nepal, Bhutan and China including implementation of the Ganga Waters Sharing Treaty (1996) with

Bangladesh. It also deals with matters relating to sea erosion in the country.

INDUS WING

The Indus Wing is mainly responsible for implementation of the Indus Waters Treaty, 1960 with Pakistan. In addition, matters concerning sharing of Ravi-Beas waters, Ravi-Beas Waters Tribunal, Sutlej-Yamuna Link Canal, Indira Gandhi Canal Project, sharing of Yamuna Waters upto Okhla, and Ganga waters upto Haridwar, Upper Yamuna River Board and Upper Yamuna Review Committee, Raw Water Supply to Delhi and Drought Management in the country are being handled by this Wing.

COMMAND AREA DEVELOPMENT WING

The Command Area Development (CAD) Wing is concerned with the implementation of the centrally sponsored Command Area Development Programme. The responsibilities of the CAD Wing include monitoring the progress of the works under the Programme, release of central assistance to the States, promoting participatory irrigation management, training of farmers and officials in CAD related activities, action research programmes and adaptive trials.

WATER MANAGEMENT WING

The Water Management (WM) Wing of the Ministry of Water Resources is responsible for the implementation of the World Bank assisted Hydrology Project in nine States and five Central agencies. A project Coordination Secretariat for coordinating, monitoring, administrating and managing the implementation of the Project has been set-up in this Wing. The Water Management Wing also monitors the implementation of the World Bank assisted Water Resources Consolidation Projects, currently under implementation in the State of Haryana, Tamilnadu and Orissa. Besides, this wing is also dealing with issues related to Water and Land Management Institutes (WALMIs) in different States, and the Water Quality Assessment Authority (WQAA). It also implements the centrally sponsored scheme of Rationalisation of Minor Irrigation Statistics, including census of minor irrigation structures, with a view to creating a reliable data base.

The website of the Ministry is **http://wrmin.nic.in**

2. NATIONAL WATER POLICY

INTRODUCTION

National Water Policy was adopted for the first time in 1987. The revised National Water Policy has been adopted by the National Water Resources Council in its 5th meeting held on 1st April 2002. The National Water Policy - 2002 recognizes water as a precious national asset. It embodies the Nation's resolve that planning, development and management of water resources would be governed by National Perspectives.

The National Water Policy, 2002 emphasises integrated water resources development and management for optimal and sustainable utilisation of the available surface and groundwater, creation of well-developed information system, use of traditional methods of water conservation, non-conventional methods for water utilisation and demand management. The revised Policy, integrates quantity and quality aspects as well as environmental considerations for water through adequate institutional arrangements. Besides, 'ecological needs' have been assigned due priority in water allocation. Greater emphasis has been laid on water quality aspects. The policy also stresses involvement of people in project planning and participatory approach in water resources management.

NATIONAL WATER POLICY – 2002

The salient features of the National Water Policy –2002 are as under:

- Water is a precious national resource and its planning, development and management should be governed by national perspectives.
- A well developed information system for water related data at national/state level should be established with a net-work of data banks and data bases integrating and strengthening the existing central and state level agencies.
- Planning for water resources to be on the basis of the hydrological unit such as a river basin or sub-basin. Appropriate river basin organisations should be established for the planned development and management of the river basins.
- Water should be made available to water short areas by transfer from other areas including transfer from one river basin to another, after taking into account the requirements of the areas/basins.
- Planning of water resources development projects should, as far as possible, be for multi-purpose projects with an integrated and multi-disciplinary approach having regard to human and ecological aspects including those of disadvantaged sections of the society.

- ?? Drinking water has been assigned the first priority in allocation of water.
- ?? The exploitation of groundwater should be regulated with reference to recharge possibilities and consideration of social equity. The detrimental environmental consequences of over-exploitation of ground water need to be effectively prevented.
- ?? Careful planning is necessary to ensure that construction and rehabilitation activities proceed simultaneously. A skeletal national policy on resettlement & rehabilitation needs to be formulated so that project affected persons share the benefits through proper rehabilitation.
- ?? Adequate emphasis needs to be given to the physical and financial sustainability of existing water resources facilities. There is need to ensure that the water charges for various uses should be fixed such as to cover at least the operation and maintenance charges initially and a part of the capital costs subsequently.
- ?? Management of the water resources for diverse uses should incorporate a participatory approach by involving users and other stakeholders alongwith various governmental agencies, in an effective and decisive manner.
- ?? Both surface water and ground water should be regularly monitored for quality. Effluents should be treated to acceptable levels and standards before discharging them into natural streams. Minimum flow should be ensured in the perennial streams for maintaining ecology.
- ?? Efficiency of utilization should be improved in all the diverse uses of water and conservation consciousness promoted through education, regulation, incentives and disincentives.
- ?? There should be a Master Plan for flood control and management for each flood prone basin. In flood control and management, the strategy should be to reduce the intensity of floods.
- ?? Land erosion by sea or river should be minimized by suitable cost-effective measures. Indiscriminate occupation of, and economic activity in coastal areas and flood plain zones should be regulated.
- ?? Needs of drought-prone areas should be given priority in the planning of project for development of water resources. These areas should be made less vulnerable through various measures.
- ?? The water sharing/distribution amongst the states should be guided by a national perspective with due regard to water resources availability and needs within the river basin.
- ?? Training and research efforts should be intensified as an integral part of water resources development.

IMPLEMENTATION OF NATIONAL WATER POLICY, 2002

Action Plan

The Prime Minister of India who is the Chairman of the Council directed the Ministry of Water Resources to prepare an Action Plan to facilitate implementation of the Policy by the State Governments. The Ministry of Water Resources formulated a Draft Action Plan for implementation of the National Water Policy – 2002. The Draft Action Plan was prepared in consultation with the State Governments and Union Territories and with inputs from the Non-Governmental/Voluntary Organisations and Experts through deliberations in a series of seven Workshops organised at Bangalore, Bhubaneswar, Delhi, Guwahati, Jaipur, Lucknow and Pune during August – October, 2002. Action Plan, as finalised after these consultations has been adopted in National Conference of Water Resources and Irrigation Ministers of States/Union Territories Administrations held on 5th February, 2003.

State Water Policy

The National Water Policy-2002 envisages that each State shall formulate its own State Water Policy backed with an Operational Action Plan in a time bound manner say in two years to achieve the desired objectives of the Policy. Prior to adoption of the National Water Policy-2002 various Governments had formulated a State Water Policy or initiated action in this direction. The State Water Policy is either to be revised in line with the National Water Policy, wherever the same exist, or to be formulated by the States not having such Policy.

NATIONAL WATER RESOURCES COUNCIL

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

The Functions of the Council are as follows:

- To lay down the national water policy and to review it from time to time.
- To consider and review water development plans submitted to it (including alternative plans) by the National Water Development Agency, the River Basin Commissions, etc.
- To recommend acceptance of water plans with such modifications as may be considered appropriate and necessary.

?? To give directions for carrying out such further studies as may be necessary for full consideration of the plans or components thereof.

?? To advise on the modalities of resolving inter-State differences with regard to specific elements of water plans and such other issues that arise during planning or implementation of the projects.

?? To advise practices and procedures, administrative arrangements and regulations for the fair distribution and utilization of water resources by different beneficiaries keeping in view optimum development and the maximum benefits to the people.

?? To make such other recommendations as would foster expeditious and environmentally sound and economical development of water resources in various regions.

The Council has held five meetings so far. The fifth meeting was held on 1st April, 2002 wherein a Resolution adopting the National Water Policy- 2002 was also unanimously passed by 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, Environment & Forests, Surface Transport, Planning and Science & Technology, Chairman, Central Water Commission, Chief Secretaries of all States/Union Territories are its Members and Member (Water Planning & Projects), Central Water Commission is the Member Secretary.

The Board has held eleven regular and one special meeting so far. The 11th meeting of the National Water Board was held on 14th August, 2002 wherein the following main items were deliberated upon :

?? Draft Action Plan for implementation of the National Water Policy-2002;

?? Draft National Policy Guidelines for Sharing/Distribution of Waters of Inter-State Rivers amongst the States;

?? Setting up of River Basin Organisations (RBOs).

The decisions taken in this meeting are as follows :

?? The National Water Board discussed and agreed the Draft Action Plan which has been later adopted in the National Conference of Water Resources and Irrigation Ministers of States and Union Territories held in Fe bruary, 2003.

?? Working Group for bringing out a consensus draft of National Policy Guidelines for Sharing/Distribution of Waters of Inter-State Rivers amongst States after taking into consideration views of all States has been constituted under the chairmanship of the Chairman, Central Water Commission. The members of the Group include representatives from the States of Andhra Pradesh, Bihar, Chhattisgarh, Karnataka, Madhya Pradesh, Punjab, Rajasthan and Tamil Nadu. The Working Group has started functioning.

?? A Committee under the chairmanship of Additional Secretary, Ministry of Water Resources, with members from the States of Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal and Commissioner (Policy & Planning), Ministry of Water Resources as Member Secretary has been set up to recommend detailed model(s) of River Basin Organisations for sustainable and optimal development of water resources of the country. The Committee has started functioning.

12TH NATIONAL CONFERENCE OF WATER RESOURCES AND IRRIGATION MINISTERS OF STATES AND UNION TERRITORIES

The 12th National Conference of Water Resources and Irrigation Ministers was held on 5th February 2003 at New Delhi. The Prime Minister released the Document on "Vision for Integrated Water Resources Development and Management" in the Curtain Raiser of Launching the Freshwater Year, 2003 held prior to the Conference. The important decisions/recommendations of the Conference are:

(i) Adoption of Action Plan for Implementation of the National Water Policy-2002.

(ii) Each State to formulate their State Water Policy backed with an operational action plan within two years in line with the National Water Policy - 2002.

(iii) All out efforts to be made by all concerned to meet the targets set for the Water Resources Sector in the Tenth Plan document adopted by National Development Council.

(iv) Reforms required in the water sector are key to sustainable development and the stability of the irrigation systems. Initiatives towards sector reforms as discussed in the conference and those detailed in the Tenth Plan document will be taken up in the right earnest. Reform measures viz. rationalisation of water rates are also important aspects of Accelerated Irrigation Benefits Programme through incentives provided for such measures for funding of schemes.

(v) The Restructured Programme of the Command Area Development will be pursued further. The States will make all out efforts in the implementation of the restructured programme. Participatory Irrigation Management is central to the sustainable management of irrigation systems as also for improving their efficiency. Recognising this, the implementation of the Command Area Development Programme is closely linked with Participatory Irrigation Management, wherein beneficiaries are required to bear a small part of the overall costs.

3. DEVELOPMENT OF IRRIGATION FACILITIES

WATER RESOURCES SITUATION

At present the average annual flow in the rivers of India is 1869 Billion Cubic Meter (BCM) and the per capita availability per annum is 1820 Cu.m. The level of per capita availability at which economic activity and health is affected is 1000 Cu.m. per head per year and 25% area and 21% of population is under such condition. About 5.5% of the Geographical Area and 7.6% of population of the country is under absolute scarcity condition at present i.e., water availability is less than 500 Cu.m. per head per year. The per capita availability is likely to decline to about 1341 Cu.m. by 2025 AD due to increase in population.

MONSOON RAINFALL

During June to September 2002, the rainfall in the country was 19% below normal. As much as 29% area of the country experienced drought conditions with 10% area under severe drought. July had the worst rainfall deficiency of 49%. The pronounced lack of rainfall activity however, did not continue into August and September.

RESERVOIR STORAGE

The storage position in 70 important reservoirs in different parts of the country monitored by the Central Water Commission shows a decline at the peak level attained after the monsoon season when compared with the same position last year as can be seen from the Table 3.1.

Compared to the average of last 10 years, this year's storage was 68% in these reservoirs against 76% in the last year.

Table 3.1

Important Reservoirs Monitored by CWC		End of September	
		2001	2002
1	Reservoirs (Numbers)	70	70
2	Designed live storage capacity at full reservoir (TMC)	130.55	130.55
3	Total live storage (TMC)	77.1	69.4
4	Average of last 10 years (TMC)	101.01	97.75
5	Current year's storage as per cent of the designed capacity	59	51
6	Per cent of this year's live storage to last year	95	86
7	Per cent of this year's storage to average of last 10 years	76	68

IRRIGATION POTENTIAL

The reassessed Ultimate Irrigation Potential (UIP) from major & medium irrigation and minor irrigation is 139.89 million hectare (m.ha.). The break up of state-wise assessed potential is in Table 3.2.

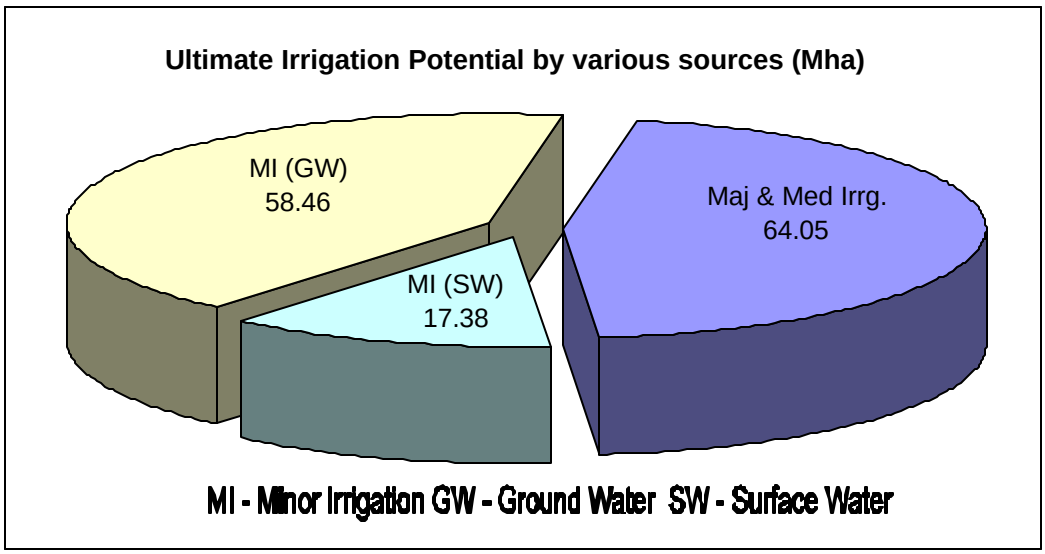


Table 3.2

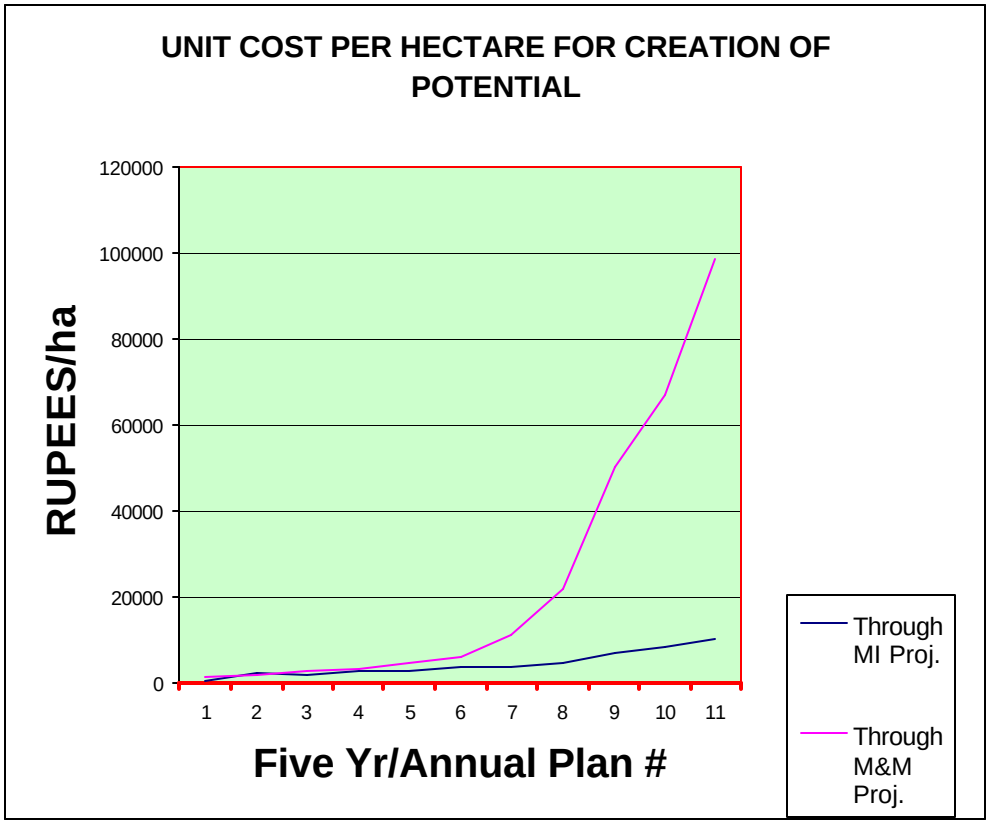
STATEWISE ULTIMATE IRRIGATION POTENTIAL FROM MAJOR, MEDIUM AND MINOR IRRIGATION

(In thousand hectares)

Sl. No.	States/UTs	Ultimate Irrigation Potential				
		Major & Medium Irrigation	Minor Irrigation			TOTAL
			Surface water	Ground Water	Total	
1	Andhra Pradesh	5000.00	2300.00	3960.00	6260.00	11260.00
2	Arunachal Pradesh	0.00	150.00	18.00	168.00	168.00
3	Assam	970.00	1000.00	900.00	1900.00	2870.00
4	Bihar *	6500.00	1900.00	4947.00	6847.00	13347.00
5	Goa	62.00	25.00	29.00	54.00	116.00
6	Gujarat	3000.00	347.00	2756.00	3103.00	6103.00
7	Haryana	3000.00	50.00	1462.00	1512.00	4512.00
8	Himachal Pradesh	50.00	235.00	68.00	303.00	353.00
9	Jammu & Kashmir	250.00	400.00	708.00	1108.00	1358.00
10	Karnataka	2500.00	900.00	2574.00	3474.00	5974.00
11	Kerala	1000.00	800.00	879.00	1679.00	2679.00
12	Madhya Pradesh *	6000.00	2200.00	9732.00	11932.00	17932.00
13	Maharashtra	4100.00	1200.00	3652.00	4852.00	8952.00
14	Manipur	135.00	100.00	369.00	469.00	604.00
15	Meghalaya	20.00	85.00	63.00	148.00	168.00
16	Mizoram	0.00	70.00	0.00	70.00	70.00
17	Nagaland	10.00	75.00	0.00	75.00	85.00
18	Orissa	3600.00	1000.00	4203.00	5203.00	8803.00
19	Punjab	3000.00	50.00	2917.00	2967.00	5967.00
20	Rajasthan	2750.00	600.00	1778.00	2378.00	5128.00
21	Sikkim	20.00	50.00	0.00	50.00	70.00
22	Tamil Nadu	1500.00	1200.00	2832.00	4032.00	5532.00
23	Tripura	100.00	100.00	81.00	181.00	281.00
24	Uttar Pradesh *	12500.00	1200.00	16799.00	17999.00	30499.00
25	West Bengal	2300.00	1300.00	3318.00	4618.00	6918.00
	Total STATES	58367.00	17337.00	64045.00	81382.00	139749.00
	Total UTs	98.00	41.00	5.00	46.00	144.00
	GRAND TOTAL	58465.00	17378.00	64050.00	81428.00	139893.00

Note- *Figures include the Ultimate Irrigation Potential (UIP) for Jharkhand, Chhatisgarh, Uttaranchal in the UIP of Bihar, Madhya Pradesh and Uttar Pradesh respectively .

The created irrigation potential in 1951 was 22.60 m.ha. As per the assessment of Planning Commission by the end of Ninth Plan (1997-2002), it is likely to be 95.40 m.ha (provisional). Thus, about 68% of the UIP of the country is expected to be harnessed by the end of March 2002.



Plan number including Rolling Annual Plans during 1966-69, 1978-80 and 1990-92.

MAJOR AND MEDIUM IRRIGATION

Projects with a culturable command area of more than two thousand hectares are grouped as Major and Medium Irrigation Projects. The Ultimate Irrigation Potential of the country from Major and Medium irrigation projects has been assessed as 58.46 m.ha. Against a target of 9.81 m.ha set for creation of additional potential through Major & Medium projects during the Ninth Plan (1997-2002), irrigation potential of about 2.04 m.ha. is likely to have been created during this period, thereby raising the cumulative total of created potential from Major and Medium projects to around 34.99 m.ha (provisional) at the end of the Ninth Plan as per Planning Commission's assessment. Details of number of projects taken up, projects completed and projects spilled over into the Tenth Plan are given in Table 3.3 below:

Table-3.3

Status of Projects	Number of Projects		
	Major	Medium	Total
Completed in Pre-Plan period	74	143	217
Projects taken up during Plan era till the end of IX Plan	301	966	1267
Projects completed during Plan era till the end of IX Plan (1951-2002)	142	724	866
Projects Spilling over to X Plan (2002-2007)	159	242	401

The State-wise details of ongoing projects spilling over to X Plan is given in Table 3.5.

The Plan-wise progress of creation of irrigation potential through major and medium irrigation projects and the expenditure incurred is given in Table 3.4 below:

Table 3.4

Period	Outlay/ Expenditure (Rs. crore)	Potential Created (m. ha)	
		During	Cumulative
Pre-Plan Period	Not available	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)	1242	2.60	20.70
Fifth Plan (1974-78)	2516	4.02	24.72
Annual Plans (1978-80)	2079	1.89	26.61
Sixth Plan (1980-85)	7369	1.09	27.70
Seventh Plan (1985-90)	11107	2.22	29.92
Annual Plans (1990-92)	5459	0.82	30.74
Eighth Plan (1992-97)	21072	2.21	32.95
Ninth Plan (1997-2002)	**48259	**2.04	**34.99

** **Anticipated**

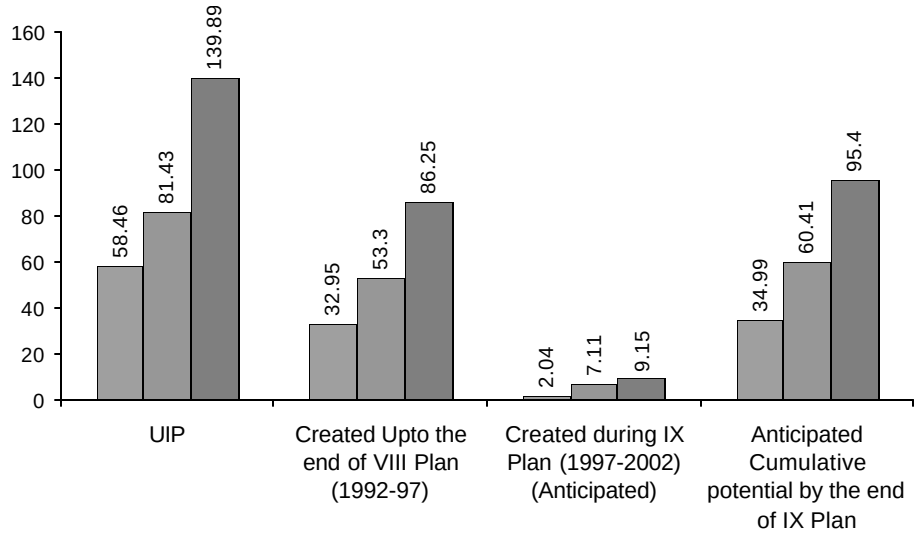
MINOR IRRIGATION

Minor Irrigation Schemes are those Ground Water and Surface Water schemes, which have a Culturable Command Area (CCA) up to 2000 hectare individually. Ground Water development is primarily done through individual and cooperative efforts of the farmers with the help of institutional finance and their own savings. Surface water Minor Irrigation schemes are generally funded from the Public Sector outlay. The ultimate irrigation potential from Minor Irrigation Schemes has been assessed as 81.43 M.ha. As per census of minor irrigation schemes conducted by the Ministry for the year 1993-94, the irrigation capacity created in the Minor irrigation sector covers about 2/3rd of the country's total irrigation capacity.

RATIONALISATION OF MINOR IRRIGATION STATISTICS (RMIS) SCHEME

A Centrally Sponsored Plan Scheme "Rationalisation of Minor Irrigation Statistics (RMIS)" is under implementation. Under the RMIS scheme a Census of the Minor Irrigation Projects is conducted every five years to create a reliable database for planning the development of the Minor Irrigation Sector. Under the RMIS scheme, Statistical Cells have been created in the nodal departments of 23 States/ 3 UTs. These Cells are responsible for collection of Quarterly Progress Reports on development of Minor Irrigation concerned Departments and furnish the same to this Ministry. The Officers/ Staff posted in the Statistical Cells also help in conduct of Census as well as Sample Survey pertaining to Minor Irrigation Schemes. The data received from the Statistical Cells from States and UTs is consolidated by this Ministry. A sample survey on Status of Minor Irrigation Schemes with reference year 1998-99 is being conducted in all the States / UTs. Up to November, 2002, 28 States/ UTs have completed the sample survey work. In the remaining States/ UTs, the work is in progress. The 3d Census of Minor Irrigation Projects with reference year 2000-2001 is being conducted in all the States/ UTs. So far, 5 States/ 1 UT have completed the Census work. In addition to this, 12 States/ 2 UTs have completed the field work relating to Census. The Census work in remaining States/ UTs is in progress.

Progress in creation of Irrigation Potential (M.Ha)



Expenditure / Outlay for Irrigation Sector (Rs. in crores)

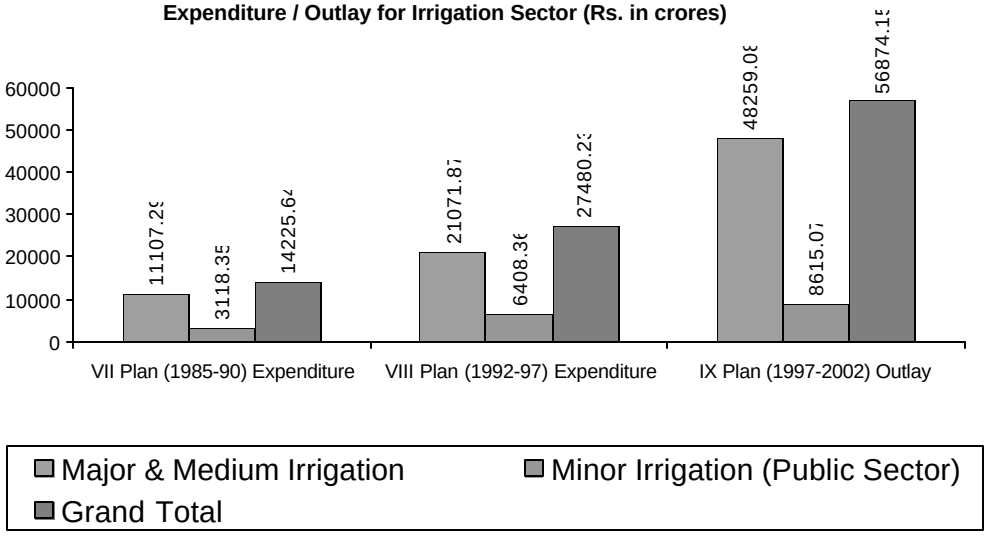


Table 3.5
State-wise number of Ongoing Irrigation Projects of X Plan
(Spillover from previous Plans)
No. of Ongoing Projects

Name of State	Major	Medium
Andhra Pradesh	14	12
Arunachal Pradesh	-	-
Assam	4	5
Bihar	8	7
Jharkhand	7	22
Goa	1	-
Gujarat	3	18
Haryana	5	0
Himachal Pradesh	1	2
Jammu & Kashmir	-	7
Karnataka	15	17
Kerala	4	4
Madhya Pradesh	16	10
Chhattisgarh	3	7
Maharashtra	45	94
Manipur	2	2
Meghalaya	-	1
Mizoram	-	-
Nagaland	0	1
Orissa	10	4
Punjab	-	2
Rajasthan	5	4
Sikkim	-	-
Tamil Nadu	1	2
Tripura	-	3
U.P.	9	1
Uttaranchal	3	-
West Bengal	3	17
Total	**159**	**242**

Table 3.6
State-wise details of Net Irrigated Area (NIA), Net Sown Area (NSA) and percentage of NIA to NSA

(In Thousand Hectares)

Sl. No.	States	Net Sown Area (NSA)	Net Irrigated Area (NIA)	% of NIA to NSA
(1)	(2)	(3)	(4)	(5)
1	Andhra Pradesh	10978.00	4538.00	41.34
2	Arunachal Pradesh	185.00	36.00	19.46
3	Assam	2701.00	572.00	21.28
4	Bihar	7431.00	3682.00	49.55
5	Goa	142.00	22.00	15.49
6	Gujarat	9674.00	3058.00	31.61
7	Haryana	3628.00	2842.00	78.34
8	Himachal Pradesh	549.00	103.00	18.76
9	Jammu & Kashmir	733.00	309.00	42.16
10	Karnataka	10489.00	2492.00	23.76
11	Kerala	2259.00	375.00	16.60
12	Madhya Pradesh	19839.00	6560.00	33.07
13	Maharashtra	17732.00	2946.00	16.61
14	Manipur	140.00	65.00	46.43
15	Meghalaya	221.00	48.00	21.72
16	Mizoram	109.00	9.00	8.26
17	Nagaland	261.00	63.00	24.14
18	Orissa	6048.00	2090.00	34.56
19	Punjab	4238.00	4004.00	94.48
20	Rajasthan	16073.00	5499.00	34.21
21	Sikkim	95.00	16.00	16.84
22	Tamil Nadu	5635.00	3019.00	53.58
23	Tripura	277.00	35.00	12.64
24	Uttar Pradesh	17585.00	12691.00	72.17
25	West Bengal	5440.00	1911.00	35.13
	Total of all States	**142462.00**	**56985.00**	**40.00**
	Total UTs	**136.00**	**70.00**	**51.47**
	All India Grand Total	**142598.00**	**57055.00**	**40.01**
Note :	**Figures are as per Land Use Statistics brought out by the Ministry of Agriculture for the year 1998-99 and are Provisional.**			

4. ACCELERATED IRRIGATION BENEFITS PROGRAMME (AIBP)

INTRODUCTION

A large number of river valley projects, both multipurpose and irrigation, have spilled over from Plan to Plan mainly because of financial constraints faced by the State Governments. As a result of this, despite a huge investment having already been made on these projects, the country is not able to derive the desired benefits. There were 171 Major, 259 Medium and 72 Extension Renovation Modernisation (ERM) on-going Irrigation projects in the country at various stages of construction at the end of the VIII Plan (i.e. end of 1996-97) with spillover cost of Rs.75,690 crore. This was a matter of grave concern for the Union Government and remedial measures for expeditious completion of some of the projects which were in advanced stage of completion became necessary.

With this end in view, the Government of India launched the Accelerated Irrigation Benefits Programme (AIBP) during 1996-97 for accelerating implementation of on-going Irrigation/multi-purpose projects on which substantial progress have been made and which are beyond the resource capability of the State Governments and for other major and medium Irrigation projects which are in advanced stage of construction and could yield irrigation benefits in the next four agricultural seasons. Thus the twin objectives of AIBP are (i) to accelerate ongoing irrigation projects and (ii) to realize bulk benefits from completed irrigation projects.

GUIDELINES OF THE EXISTING PROGRAMME

The present norms being followed are as under:-

(i) Projects which are in the advanced stage of completion which are beyond the resource capability of the States and having investment clearance from the Planning Commission are considered .

(ii) Central Loan Assistance(CLA) is released in two equal instalments and 2nd instalment is released when the expenditure reaches 70% of the first instalment together with the State's share.

(iii) The Projects which are already receiving assistance from domestic agencies, such as National Bank for Agriculture and Rural Development (NABARD), are not considered. However, the components of such projects which are not covered under such assistance are considered for inclusion under the programme.

(iv) CLA is provided to the special category States of North-East and hilly States of J&K, Himachal Pradesh, Uttaranchal and Sikkim in the ratio of 3:1 (Centre : State) and to other States in the ratio of 2:1 (Centre : State).

(v) Drought prone Kalahandi, Bolangir and Koraput (KBK) districts of Orissa are treated at par with special category States of North-East region, J&K, Himachal Pradesh, Uttaranchal & Sikkim for consideration of CLA.

(vi) In order to introduce reforms in the irrigation sector, CLA for the projects in the 'Reforming States' under General Category will be provided in the ratio of 4 : 1 (Centre : State) in case they rationalize their water rates in such a way as to recover full O & M cost of irrigation projects in 5 years. The "Reforming States" in special category will be provided central assistance in full without any State's share. Concerned State Government will be given an undertaking in this regard.

(vii) This Ministry has launched Fast Track Programme from 1st February, 2002. The approved major and medium irrigation projects which can be completed in one year(two working seasons) will be fully funded by the Centre by providing 100% loan in equal instalments of 50% each for which the States have to enter into a memorandum of under standing with the Ministry of Water Resources.

(viii) Major and Medium irrigation projects benefiting KBK districts of Orissa even if in initial stage of construction are included under the programme.

(ix) Surface Minor Irrigation Schemes (both new and ongoing) of special category States and KBK districts of Orissa are included under the programme.

(x) No CLA is provided for establishment cost.

FORM OF ASSISTANCE & MODE OF DISBURSEMENT

Central Loan Assistance under the Programme is given in the form of loan at the rate of interest prescribed by the Ministry of Finance from time to time (11.5% at present). The loan under the Programme is repayable in 20 equal instalments together with interest on the outstanding balance commencing from the following year. However, 50% of the loan enjoys 5 years' initial grace period after which repayment of the loans is affected in 15 equal instalments. The loans actually payable in a year are recovered in 10 equal monthly instalments commencing from June every year. The

Central Loan Assistance (CLA) under the AIBP is released on a year-to-year basis for those on-going Irrigation Projects which satisfy the AIBP criteria and are proposed by the States, subject to availability of funds and the budget outlays made by the States for these projects in their respective annual plans. The CLA to the States is released in two equal instalments of 50% each. The second/subsequent instalment is released when the State's expenditure reaches 70% of the first instalment including their share.

MONITORING MECHANISM

A comprehensive physical and financial periodical monitoring of the projects covered under the AIBP are done by the Central Water Commission with the help of its regional offices situated all over the country and the releases of funds are based upon their reports. The Ministry of Programme Implementation also conducts monitoring.

CENTRAL LOAN ASSISTANCE

The funds are released by the Ministry of Finance on the recommendations of the Ministry of Water Resources. Since inception of this programme in 1996-97 an amount of Rs.5878.048 crore was released for various major/medium/minor irrigation projects as CLA upto 2000-2001. For the year 2001-2002, an amount of Rs.2601.981 crore was released to various major/medium/Surface Minor Irrigation Schemes out of which Rs.472.86 crore was released under Fast Track Programme. The State-wise details of (CLA) release under (AIBP) during 2001-2002 are at Table 4.1.

During 2002-2003 there is a budget provision of Rs.2800 crore in the Union Budget for Accelerated Irrigation Benefits Programme (AIBP). Upto January, 2003 an amount of Rs.1110.3838 crore has been released to various major/medium/minor projects as Central Loan Assistance (CLA) under Accelerated Irrigation Benefits Programme(AIBP). The State - wise details of CLA released under (AIBP) are at Table 4.2. The total CLA released from 1996-97 to 2002-2003 (January, 2003) to each State is at Table 4.3.

OVERALL CUMULATIVE RELEASE & BENEFITS

Since inception of the programme in 1996-97 a total amount of about Rs. 9590.413 crore has been released as Central Loan Assistance by the Central Government to the States. This has expedited the creation of additional irrigation potential to the tune of 1974 th. ha. upto March 2002 through major/medium schemes and 21 Major/Medium Projects have since been completed with the help of this programme. The State wise details are at Table 4.4. The ultimate irrigation potential of the projects covered under the AIBP is about 13773 th. ha., out of which about 5346 th. ha. had been created before these projects were covered under the AIBP.

Table 4.1

The Statewise details of CLA released under AIBP during 2001-2002

SL. No	Name of the State	No. of projects		Amount of CLA released (Rs. in Crores)		
		Major/ Medium	Minor	Major/ Medium	Minor	Total
1.	Andhra Pradesh	4	0	281.66	0	281.66
2.	Arunachal Pradesh	-	385	-	15.00	15.00
3.	Assam	6	5	13.416	1.105	14.521
4.	Bihar	2	0	3.42	0.00	3.42
5.	Chhattisgarh	3	0	48.20	0.00	48.20
6.	Goa	2	0	58.00	0.00	58.00
7.	Gujarat	3	0	581.69	0.00	581.69
8.	Himachal Pradesh	1	0	3.244	0.00	3.244
9.	J & K	9	0	11.07	0.00	11.07
10.	Jharkhand	3	0	10.82	0.00	10.82
11.	Karnataka	7	0	492.50	0.00	492.50
12.	Kerala	1	0	11.275	0.00	11.275
13.	Madhya Pradesh	6	0	215.41	0.00	215.41
14.	Maharashtra	4	0	39.10	0.00	39.10
15.	Manipur	2	0	9.36	0.00	9.36
16.	Meghalaya	1	34	1.22	3.25	4.47
17	Mizoram	0	7	0.00	2.00	2.00
18.	Nagaland	0	74	0.00	5.00	5.00
19.	Orissa	9	0	168.475	0.00	168.475
20.	Punjab	3	0	113.69	0.00	113.69
21.	Rajasthan	7	0	96.315	0.00	96.315
22.	Tripura	3	335	2.063	19.00	21.063
23.	Uttar Pradesh	8	0	354.69	0.00	354.69
24.	West Bengal	5	0	38.608	0.00	38.608
25.	Sikkim	-	76	-	2.40	2.40
	Total	89	916	2554.226 *	47.755	2601.981*

*** Includes Rs. 472.86 crore released under Fast Track Programme**

Table 4.2

The Statewise details of CLA released under AIBP during 2002-2003 (upto January, 2003)

S. No	Name of the State	No. of projects		Amount of CLA released (Rs. in Crores)		
		Major/ Medium	Minor	Major/ Medium	Minor	Total
1.	Andhra Pradesh	1		20.30		20.300
2.	Arunachal Pradesh					
3.	Assam	5	43	5.650	2.543	8.193
4.	Bihar					
5.	Chhattisgarh	3		32.100		32.100
6.	Goa					
7.	Gujarat	4		290.110		290.110
8.	Haryana	1		6.677		6.677
9.	Himachal Pradesh	3		4.200		4.200
10.	J & K	9		5.497		5.497
11.	Jharkhand					
12.	Karnataka	8		185.00		185.00
13.	Kerala					
14.	Madhya Pradesh	8		130.770		130.770
15.	Maharashtra	2		38.0196		38.0196
16.	Manipur	3		13.000		13.000
17.	Meghalaya	1		1.500		1.50-
18.	Mizoram					
19.	Nagaland					
20.	Orissa	2		8.250		8.250
21.	Punjab	3		36.660		36.660
22.	Rajasthan	5		92.060		92.060
23.	Tripura	3	268	2.6246	10.770	13.3947
24.	Uttar Pradesh	7		194.970		194.970
25.	Uttaranchal		185		12.0375	12.0375
26.	West Bengal	3		16.895		16.895
27.	Sikkim		62 (new)		0.750	0.750
	Total	**70**	**558**	**1084.2833**	**26.1005**	**1110.3838**

Table 4.3

Central Loan Assistance (Cumulative State-wise) Released under AIBP from 1996 -97 to 2002-2003 (upto January, 2003)

(Rs. in crores)

Sl. No.	State	Total CLA Released
1.	Andhra Pradesh	650.915
2.	Arunachal Pradesh	30.000
3.	Assam	92.911
4.	Bihar	336.390
5.	Chhattisgarh	118.750
6.	Goa	128.400
7.	Gujarat	2261.843
8.	Haryana	51.177
9.	Himachal Pradesh	48.006
10.	Jammu & Kashmir	33.07
11.	Jharkhand	54.745
12.	Karnataka	1251.890
13.	Kerala	52.425
14.	Madhya Pradesh	847.333
15.	Maharashtra	343.875
16.	Manipur	86.750
17.	Meghalaya	14.176
18.	Mizoram	4.866
19.	Nagaland	12.730
20.	Orissa	572.245
21.	Punjab	415.470
22.	Rjasthan	558.232
23.	Sikkim	4.510
24.	Tripura	95.842
25.	Tamilnadu	20.000
26.	Uttar Pradesh	1349.560
27.	Uttranchal	12.038
28.	West Bengal	142.328
	Total :	**9590.413**

Table 4.4

Major / Medium Projects which have been completed

Sl. No.	Name of State/ Project	Total
	Assam	**2**
1.	Rupahi	
2.	Kallong	
	Bihar	**1**
3.	Bilasi Reservoir	
	Jharkhand	**3**
4.	Tapkara Reservoir	
5.	Latratu	
6.	Kansjore	
	Gujarat	**9**
7.	Jhuj	
8.	Sipu	
9.	Damanganga	
10.	Karjan	
11.	Sukhi	
12.	Deo	
13.	Watrak	
14.	Harnav-II	
15.	Umaria	
	Rajasthan	**2**
16.	Jaismand	
17.	Gambhiri	
	Punjab	**1**
18.	Ranjit Sagar Dam	
	Uttar Pradesh	**3**
19.	Rajghat Dam	
20.	Gunta Nala Dam	
21.	Sarda Sahayak	
	Total	**21**

5. COMMAND AREA DEVELOPMENT PROGRAMME

A Centrally Sponsored Command Area Development Programme (CADP) was started in 1974-75 for systematic development and management of command areas of irrigation projects to optimise agricultural production and productivity.

COMPONENTS OF THE PROGRAMME

The existing components of the CAD programme are :

1. On-Farm Development (OFD) works i.e. development of field channels and field drains within the command of each outlet ; land leveling on an outlet command basis ; reclamation of waterlogged areas ; enforcement of a proper system of "Warabandi" (rotational water supply) and fair distribution of water to individual fields ; realignment of field boundaries, wherever necessary (where possible, consolidation of holding are also combined) ; supply of all inputs and services - including credit ; strengthening of extension services ; and, encouraging farmers for Participatory Irrigation Management (PIM).
2. Selection and introduction of suitable cropping patterns.
3. Development of ground water to supplement surface irrigation (conjunctive use under Minor Irrigation sector).
4. Development and maintenance of the main and intermediate drainage system (irrigation sector).
5. Modernisation, maintenance and efficient operation of the irrigation system upto the outlet of one cusec capacity (irrigation sector).

Based on suggestions received from beneficiaries and implementing agencies and recommendations of the Working Groups of the Planning Commission on 'Command Area Development Programme', the CAD Programme is being restructured. In the restructured Command Area Development Programme some of the existing components are proposed to be deleted and new components added.

PROGRAMME COVERAGE

Since its inception 276 Irrigation Projects from various States have been included under the CAD Programme from time to time. On completion of these projects, a Cultural Command Area of 27.03 million hectares is likely to be benefited. The details of the projects are as follows :

Total Projects	**276**
Completed	40
Ongoing	236
Ongoing projects (likely to be completed by by 31.03.2003)	141
Projects yet to be implemented	95

Out of 236 on-going projects, 141 projects are likely to be completed by 31st March, 2003 and withdrawn from CAD Programme thereafter. Of the remaining 95, some projects are being clubbed and the number of ongoing projects would be reduced to 80. Another 16 new projects shall be included from those States where all the on-going projects will have been completed by 31st March, 2003 or only marginal activities remain to be completed. Thus in all 96 projects will be implemented during the remaining 4 years of X Plan.

PROGRAMME IMPLEMENTATION

The Command Area Development Wing of the Ministry of Water Resources coordinates and monitors the implementation of the Command Area Development Programme at the National level. Proposals received from the States for inclusion of new projects under the Programme are examined and, if found techno-economically feasible, are included under the Programme. Progress of the projects is measured through physical and financial progress reports of the programme received from the States. The quality of work is ensured through monitoring, including field visits. Moreover, technical guidelines and manuals have been circulated to the States in this regard. Functionaries are trained on specific subjects from time to time, besides holding various meetings, workshops, seminars on different technical and managerial aspects.

The programme is being implemented by the State Governments through Command Area Development Authorities (CADAs) set up by them. However, in some States, namely Arunachal Pradesh, Himachal Pradesh, Meghalaya, Nagaland, Tamil Nadu and Tripura, CAD Authorities have not been constituted and the Programme is being administered through the line Departments concerned.

FINANCING PATTERN

Under the existing Command Area Development Programme Grants are admissible on matching basis to the State Governments for 'establishment', topographical and soil surveys, planning and design of on-farm development (OFD) works, supervision of OFD works, construction of field channels and field drains, enforcement of Warabandi, adaptive trials, demonstration and training, crop compensation, subsidy to small and

marginal farmers on identified items, evaluation studies sponsored by the States, reclamation of waterlogged areas and one-time functional grants to the Water Users' Associations. Hundred percent grant from the Central Government is given for orientation training for senior level officers that is sponsored by the Central Government and also for evaluation studies, if they are sponsored by the Central Government.

FINANCIAL ACHIEVEMENTS

An amount of Rs. 2452.53 crores has been released to States as Central Assistance under the CAD Programme upto March, 2002 since its inception. During the year 2001-2002, an amount of Rs.148.27 crores was spent. An outlay of Rs.202 crores has been provided under the Central Sector for implementation of the Programme during 2002-2003 of which an amount of Rs. 93.60 crores has been released to the States till February, 2002. The revised estimates for the programme for the year 2002-2003 are Rs.153.05 crores.

PHYSICAL ACHIEVEMENTS

The core components of physical works are construction of field channels and field drains, implementation of warabandi (rotational water supply) and land levelling and shaping. Cumulative achievements in respect of these components since inception upto March, 2002 are given in Table 5.1.

Table 5.1

(In lakh ha.)

Activity	Progress during 2001-02		Progress during Ninth Plan (1997-2002)		Cumulative Progress up to March 2002	Target during 2002-03
	Target	Achie-vement	Target	Achie-vement	Achieve-ment	Target
Field channels	5.17	4.12	0.95	1.80	157.5	6.27
Field drains	0.5	0.24	0.509	0.351	11.2	0.55
Warabandi	3.62	2.62	1.996	1.537	101.8	3.05
Land leveling and shaping	0.16	0.13	0.06	0.03	21.86	0.25

Targets for the remaining years of X plan (2003-07) are in Table 5.2 below :

Table 5.2

(Million hectares)

Item	Target	
	X Plan (2003-2007)	(2003-2004)
Field channel	0.55	0.14
Field Drains	0.16	0.04
Warabandi	1.80	0.45
Reclamation of waterlogged areas	0.05	0.012

TRAINING PROGRAMMES

Orientation training programmes meant for the senior level officers are fully funded by the Central Government, while the cost of training other functionaries and farmers is shared equally by the Centre and the State Governments. The training programmes for farmers are either being organised by the CAD authorities or through Water and Power Consultancy Services (India) Ltd., Water and Land Management Institutes (WALMIS), or other institutions. During this year (upto February, 2003), 25 National Level and Seven State Level Training programmes have been sanctioned by the Ministry on different aspects of the CAD Programme.

RECLAMATION OF WATER LOGGED AREAS

Water logging, soil salinity and alkalinity are mainly caused by unscientific management of soil, water and crops in the irrigation projects. Obstruction of natural drainage, improper upkeep of irrigation network and sluggish drainage are some of the other causes. To tackle this problem, a new component "Reclamation of Waterlogged Areas in Irrigation Commands" has been included under the CAD Programme since 01.04.1996, under which 50 per cent of the cost of reclamation or Rs. 6,000.00 per hectare is admissible as Central assistance to the State Governments in the form of grant. Four Hundred forty one proposals at an estimated cost of Rs. 44.45 crores, covering an area of 57,123 hectares for reclamation of water logged areas in the irrigation commands in eight States namely, Bihar, Gujarat, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa and Uttar Pradesh have been approved and are currently under various stages of implementation by the State Governments. In addition to mechanical measures for reclamation of waterlogged area, bio-drainage is also being considered feasible for certain situations. The Ministry has formed a Committee to look at the feasibility of combining bio-drainage and mechanical measures. The

Committee has identified certain institutions for conducting pilot studies on various aspects of bio-drainage.

PARTICIPATORY IRRIGATION MANAGEMENT (PIM)

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 rates from the areas under the jurisdiction of the Water Users' Associations of concerned hydraulic level. Under the CAD Programme, presently a provision exists for a one-time functional grant to farmers' Associations @ Rs. 500.00 per hectare - of which, Rs. 225.00 per hectare is provided by the Central Government and the State Governments each, and Rs. 50.00 per hectare is to be contributed by the Farmers' Association.

The Governments of Andhra Pradesh, Goa, Karnataka, Tamil Nadu, Rajasthan and Madhya Pradesh have enacted legislations for the establishment of the Water Users' Associations. Other States are also in the process of taking steps in this direction.

The number of Water Users' Associations formed in various States in 2002-2003 has gone up t0 41,247 covering an area of about 86.82 lakh hectares under different irrigation projects as against 39,000 Associations covering an area of about 77,000 lakh hectares in 2001-2002.

6. EXTERNAL ASSISTANCE FOR DEVELOPMENT OF WATER RESOURCES

INTRODUCTION

The Ministry of Water Resources assists the State Governments in tying up external assistance from different funding agencies to fill up the resource gaps both in terms of funds and technological update for rapid development of country's water resources. The World Bank continues to be the primary source of external assistance in the water resources sector. Multilateral assistance is also being availed from European Economic Community. Bilateral assistance is being availed from Japanese Bank for International Cooperation (JBIC) Kreditanstalt fur Wiederausban (KfW)-Germany, Netherlands and France etc.

EXTERNALLY AIDED PROJECTS

There are 17 on-going externally aided projects in various States. Details of the projects are given below in Table 6.1 :

Table 6.1

A. MULTILATERAL ASSISTANCE

(I) WORLD BANK SUPPORTED PROJECTS

Sl No	Name of the Project	State	Amount of Assistance (SDR in Million)	Type of Assistance Credit/ Loan*	Utilisation of assistance upto 31.12.2002 (SDR/USD in Million)
1	Andhra Pradesh Economic Restructuring Project (Irrigation Component)	Andhra Pradesh	170.000(USD)	Loan	78.500 (USD)
2	Andhra Pradesh III Irrigation Project	Andhra Pradesh	108.100 SDR/ 175.000(USD)	Credit/ Loan	108.100 SDR/ 45.802(USD)
3	Hydrology Project	Multi-State	75.100	Credit	60.737
4	Karnataka Community Based Tank Management Project	Karnataka	80.000	Credit	1.674
5	Orissa Water	Orissa	194.800	Credit	145.169

	Resources Consolidation Project				
6	Rajasthan Water Sector Restructuring Project	Rajasthan	110.000	Credit	4.010
7	Tamil Nadu Water Resources Consolidation Project	Tamil Nadu	161.900	Credit	128.420
8	Uttar Pradesh Water Sector Restructuring Project	Uttar Pradesh	117.000	Credit	4.007

(II) ASSISTANCE FROM EUROPEAN ECONOMIC COMMUNITY

Sl No	Name of the Project	State	Amount of Assistance (in Million EUR)	Type of Assistance	Utilisation of assistance upto 31.12.2002 (in Million EUR)**
9	Minor Irrigation Project	Orissa	10.70	Grant	1.108
10	Tank Rehabilita - tion Project	Pondicherry	6.65	Grant	1.742
11	Maharashtra Saline Land reclamation Project (Phase-II)	Maharashtra	15.50	Grant	1.229
		Total	**32.85**		**4.079**

*** Credit – expressed in SDRs Loan - expressed in US Dollars**

**** EUR - Eur**

(B) BILATERAL ASSISTANCE

Sl No	Name of the Project	State	Amount of Assistance (in Million Donor Currency)	Type of Assistance	Utilisation of assistance upto 31.12.2002 (In Million Donor Currency)
(i)	**JAPAN**				
12	Modernisation of Kurnool-Cuddapha canal	Andhra Pradesh	Yen 16049	Loan	Yen 8064.21
13	Rajghat canal Major Irrigation Project	Madhya Pradesh	Yen 16049	Loan	Yen 5935.53
14	Rengali Irrigation Project	Orissa	Yen 7760	Loan	Yen 4604.85
		Total	**Yen 37031**		**Yen 18604.59**
(ii)	**NETHERLANDS**				
15	Andhra Pradesh Ground Water Project (APWELL)	Andhra Pradesh	EUR 10.72	Grant	EUR 5.88
	Total		EUR 3.05		EUR 7.46
(iii)	**GERMANY**				
16	Maharashtra Minor Irrigation Project	Maharashtra	EUR 23.00	Loan	EUR 1.37
17	Lift Irrigation Project	Orissa	EUR 28.12	Loan	EUR 21.79
	Total		**EUR 51.12**		**EUR 23.16**

ACHIEVEMENTS IN 2002-2003

During the financial year 2002-2003 (upto December, 2002) disbursement of an amount of Rs. 796.973 Crore has been received from the World Bank, EEC and other Bilateral agencies and utilized by the State Governments and Government of India for implementation of various externally aided Projects in the Water Resources Sector.

Two externally aided projects were completed during 2002-2003. The details are given in Table 6.2.

Table 6.2
PROJECTS COMPLETED DURING THE YEAR 2002-2003

(In Million EUR)

Sl No.	Name of the Project	State	Name of Funding agency	Amount of Assistance	Utilization of assistance
1	Sidmukh & Nahar Project	Rajasthan	European Economic Commission	45.00	38.455
2.	Hydropuls Fuse Gate	Gujarat	France	5.30	5.18

MAJOR EXTERNALLY AIDED PROJECTS

Hydrology Project and the Water Resources Consolidation Projects – both projects assisted by World Bank and major projects. The details are given below :

HYDROLOGY PROJECT

The Hydrology Project is being implemented with International Development Association (World Bank) assistance of SDR 75.1 million under a credit agreement with Government of India. The credit effectiveness of the project began on 20.12.95 and the extended closing date is 31st December, 2003. The Government of Netherlands is also providing a grant-in-aid of Euro 14.64 million in the form of technical assistance under a bilateral Indo-Dutch agreement.

The Project is being implemented by nine States viz., Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa and Tamil Nadu and six Central agencies viz., MOWR (proper), CWC, CGWB, IMD, NIH and CWPRS.

The project will establish a functional Hydrological Information System (HIS) and an improved institutional capacity of implementing agencies to build, operate and utilize the HIS to the benefit of different user groups. The development of data bases would support major aspects of National Water Policy, particularly with regard to water allocation and planning and management of water resources development at the national, state, basin and project level. To realize the objective, the hydrology project supports :-

- ?? Upgrading and expanding physical infrastructure for all aspects of data, viz. collection, collation, processing, storage and dissemination.
- ?? Provision of equipment and material.

?? Institutional strengthening including technical assistance and training.
?? New buildings, laboratories, computer hardware and incremental, operating and maintenance costs.

Financial progress

The total expenditure upto June 30, 2002 is Rs. 474.98 crores which is 77% of the revised total project cost (Rs.611.66 crores). The overall component-wise financial progress is as given in Table 6.3.

Table 6.3

Sl. No.	Component	Allotment	Expen-diture	Financial progress as on 30.06.02 in %age
1	Civil works	161.63	151.50	94
2	Equipment and materials (goods)	229.88	168.32	73
3	Training and studies	12.40	9.62	78
4	Incremental staff salaries and recurrent costs	158.44	144.74	92
	Sub-total	**562.35**	**474.98**	**85**
5	Contingencies @ 8.8%	49.31	-	-
	TOTAL	**611.66**	**474.98**	**77**

The reimbursement received upto 31.12.2002 is 60.74 million SDR out of total credit of 75.1 million SDR which is about 81%.

Physical progress

Physical progress of the infrastructure development upto June 30, 2002 of the major components of the project is given in Table 6.4.

Table 6.4

Sl. No.	Item	Target	Achieved	Achievement percentage
1	River gauging sites	916	908	99
2	Meteorological stations	436	431	99
3	Observation wells	7912	7457	94
4	Water quality	274	247	90
5	Buildings	1587	1476	93
6	Computer	668	563	84
7	Vehicles	578	503	87
8	Training	39866	21862	55
9	Incremental staffing	3214	2439	76

Achievements of Hydrology Project

Monitoring network – The noteworthy gains in the area of data collection surface water, and ground water and water quality have been (a) optimization of network within the agency and integration of monitoring networks between different agencies operating in the same domain; (b) upgrading of domain specific monitoring networks; (c) introduction and operationalization of high frequency, error free data collection mechanisms; (d) establishment of time-specific and location-specific water quality monitoring network and (e) uniform and standardized measurement methodologies and techniques.

Certified software for data entry, processing, analysis and storage – Uniform and certified software have been adopted in Hydrology Project. Surface Water Data Entry System (SWDES) and Ground Water Data Entry System (GWDES) are being used for data entry. Similarly for data processing, Hydrological Modeling System (HYMOS) has been adopted and Ground Water Data Processing Software is under advance stage of preparation.

Establishment of permanent data centre in the participating States, CWC and CGWB and inter-agency data exchange – Establishment of active links between various field level data collection units and multi location data processing centres has been one of the key contributions of the Hydrology Project. In total the Hydrology Project has established 390 data entry and processing centres at various levels and 31 data storage centres at the apex levels.

Standard procedures for data collection, analysis and storage – Hydrology Project has formalized standard procedures for data collection, analysis and storage and framed them in the form of HIS protocols. These procedures have been accepted and translated into uniform institutional

practices across the States and agencies which is a clear and crucial gain from Hydrology Project.

Training – One of the major gains from the Hydrology Project has been extensive skill building of HIS staff across levels. Over 9000 people at the top, middle and field levels have been trained in HIS concepts.

Reference manual for HIS operations – The HIS reference manual for surface water domain covering various operational, maintenance and management aspects of HIS has been documented and circulated to all the agencies for use at all the levels. The reference manual for Ground Water Domain is under preparation.

R&D Projects – The Hydrology Project has initiated Some innovative R&D projects like Integrated River Basin Planning and Management in Sabarmati and Godavari basin, solute transport modeling studies in Kerala etc. have been initiated under the 'Hydrology Project'.

Computerized historical data – Before the present hydrology project, the implementing agencies had a large store house of historical data which has been converted into computer compatible formats following several stages of validation.

WATER RESOURCES CONSOLIDATION PROJECTS (WRCP)

The Water Resources Consolidation Project (WRCPs) are the new generation irrigation projects assisted by the World Bank. The WRCP projects cover three States namely Haryana, Tamil Nadu and Orissa, the WRCP project in Haryana is already completed. The project in Tamil Nadu and Orissa are ongoing. (Details of assistance are in Table 6.I – Serial 7 & 5 respectively.) The WRCPs deal with the irrigation sector in its entirety and State as a whole to realize the basic objective postulated in the National Water Policy. The main objectives of WRCP are: improving institutional and technical capability of managing the State's water resources, planning of water resources by river basin across all uses of water, improving agricultural productivity through rehabilitation and completion of irrigation schemes and farmers' participation, assuring sustainability of infrastructure and the environment etc. The expenditure incurred by these States of WRCPs is reimbursed by the World Bank.

7. INTERNATIONAL CO-OPERATION

INTRODUCTION

The three major river systems of India namely Ganga, Brahmaputra and Indus cross international borders. This Ministry is responsible for strengthening international cooperation on matters relating to these rivers by way of negotiations with neighbouring countries in regard to river waters, water resources development projects and operation of international treaties relating to water.

INDIA-BANGLADESH JOINT RIVERS COMMISSION

A new chapter in the Indo-Bangladesh relations opened up with the signing of the Indo-Bangladesh Treaty by the Prime Ministers of India and Bangladesh on 12th December, 1996 on the sharing of Ganga waters for a period of thirty years. As a follow up of the Treaty, a Joint Committee has been set up for monitoring its implementation. During 2002-2003 two meetings of this Committee have been held. Joint measurements on Ganga at Farakka and Ganges at Hardinge Bridge during lean season (Jan-May 2002) were conducted to the satisfaction of both the countries.

5th meeting of Joint Committee of Experts (JCE) on sharing of waters of the Teesta and other common rivers between India and Bangladesh was held at Dhaka on 21st & 22nd January, 2003. The matter will be further discussed in the next meeting, which is likely to be held in April, 2003.

The existing system of transmission of flood forecasting data on major rivers like Ganga, Teesta, Brahmaputra and Barak during the monsoon season from India to Bangladesh was continued. The transmission of flood forecasting information from India during the monsoon has enabled the Civil and Military authorities in Bangladesh to shift the population affected by flood to safer places.

INDIA-BHUTAN COOPERATION

The cooperation with Royal Government of Bhutan continued in respect of the works for hydro-power development and establishment of hydro-meteorological and flood forecasting network on rivers common in India and Bhutan. A scheme titled "Comprehensive Scheme for Establishment of Hydro-meteorological and Flood Forecasting Network on rivers common to India and Bhutan" is in operation. A joint Experts Team (JET) consisting of officials from the Government of India and Royal Government of Bhutan meets at regular intervals every year alternatively in India and Bhutan to review the progress and other requirements of the scheme. So far 17 meetings of the JET have been held. The last meeting in this regard was

held at Mirik(Darjeeling) in February 2003. The scheme is fully funded by the Government of India.

The matter relating to problem of floods created by rivers originating from Bhutan and coming to India has also been taken up with the Ministry of External Affairs. The Ministry of Water Resources has proposed to set up a High Level Technical Committee for this purpose. The Ministry of External Affairs has intimated that this issue is under process with Royal Government of Bhutan.

INDIA-CHINA COOPERATION

Following the flash floods in Siang/ Brahmaputra river in Arunachal Pradesh in June, 2000 and thereafter in Sutlej in Himachal Pradesh in August, 2000, the issue was taken up with the Government of China. As a follow up of discussions, a Memorandum of Understanding between the Ministry of Water Resources, the Republic of India and the Ministry of Water Resources, the People's Republic of China has been signed on 14th January, 2002 for sharing of Hydrological information on Yaluzangbu/ Brahmaputra river in flood season by China to India. In accordance with the provisions contained therein, the Implementation Plan on the MOU has also been signed by both Governments on 24th April, 2002. Under this, the Chinese side is to provide hydrological information (Water level, discharge and rain fall) in respect of three station viz. Nugesha, Yangcun and Nuxia located on river Yaluzangbu/ Brahmaputra from 1st June to 15th October every year. In pursuance of the Implementation Plan, the Chinese side started transmitting data to India for the above stations since 1st June, 2002. The matter has been taken up through MEA with the Chinese authorities for setting up of additional hydrological stations on Langqinzangbu (Sutlej) and Palongzangbu (Tributary of Yaluzangbu i.e. Brahmaputra) at the earliest.

INDIA-NEPAL COOPERATION

There is considerable scope for cooperation between India and Nepal in the field of Water Resources, particularly in the field of hydropower development, by utilizing the abundant potential of northern tributaries of the Ganga flowing from Nepal to India. Several projects have been identified and negotiations have been going on.

The Treaty on Integrated Development of Mahakali River including Sharda Barrage, Tanakpur Barrage and Pancheshwar Multipurpose Project was 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 is the centre piece of Mahakali Treaty. The Joint Project Office which was set up in December, 1999 has

completed the additional investigations required for planning Pancheshwar Multipurpose Project having installed capacity of 5600 MW at Pancheshwar with irrigation and incidental flood control benefits and a regulating structure to primarily meet the irrigation requirements downstream of Benbasa in Uttar Pradesh. The Detailed Project Report (DPR) is under finalisation jointly with HMG Nepal.

The Government of India has also been discussing with Nepal the taking up of Joint Investigation of Sapta Kosi High Dam Multipurpose Project and Sun Kosi Storage cum Diversion scheme. The Joint Inception Report of the Sapta Kosi High Dam Multipurpose Project and Sunkosi Storage cum Diversion scheme was finalized in the 4th meeting of Joint Team of Experts held in October, 2001 wherein it was decided to setup a Joint Project Office (JPO) to take up field investigations and preparation of Joint Detailed Project Report. An amount of Rs.30 crore has been provided in the 10th Plan for setting up of the JPO, which is to be located in Nepal. The project besides irrigation and power benefits will also have major flood control benefits particularly in the north Bihar.

Other initiatives taken with regard to cooperation with Nepal are as under:-

- With a view to discuss important issues pertaining to cooperation in the filed of Water Resources, including implementation of existing agreements and understanding a Nepal-India Joint Committee on Water Resources (JCWR) headed by Water Resources Secretaries of both the countries is also functioning with the mandate to act as an Umbrella Committee of all committee and groups. First meeting of JCWR was held at Kathmandu, Nepal on October 1-3, 2000. The JCWR in its meeting held in October, 2000 had suggested that the Joint Team of Experts (JTE) on extension of embankments and the Joint Committee on Embankments construction shall be merged and reconstituted as a Sub-Committee on embankment construction. This Committee is to look into planning, design and construction of embankments. Accordingly, the Sub-committee on embankment construction (Indian side) was constituted on 3.1.2001. This Joint Sub-Committee on embankment construction has so far held three meetings, last meeting (3rd reconvened) was held during 4-8 October, 2002 at Kathmandu, Nepal.
- An India-Nepal Joint Committee on Flood Forecasting (CFF) also constituted as a follow up of the decision taken in the 1st meeting of the JCWR to review the existing flood forecasting system on rivers common to India and Nepal and prepare a comprehensive flood forecasting Master Plan. The CFF held its 2nd meeting at Kathmandu in May, 2002 which decided to increase the number of stations from 42 to 47. During the meeting the Nepalese side agreed to transmit real time data in respect of the 5 key hydro metric stations located on

Gandak, Kosi, Rapti, Bagmati and Mahananda rivers which has resulted in increased warning time for Gandak from 7 hrs to 12 hrs and for Kosi from 16 hrs to 24 hrs. The Joint Task Force set up to prepare the comprehensive Flood Forecasting Master Plan (CFFMP) has held two meetings besides meeting and interaction between the leaders on the JTF from both the sides. The draft CFFMP was completed by the JTF during the year and is to be considered by the CFF in its next meeting.

?? The Standing Committee on Inundation problems constituted in 1986 to go into the problem of inundation due to construction of various works in the border rivers between India and Nepal, with a view to identify the problem areas and suggest possible solutions on a continuing basis held its 12th reconvened meeting at Kathmandu on 4-8 October, 2002. In pursuance to the mandate given at para 23 of the India Nepal Joint Press Statement issued on March 23, 2002 on the occasion of the visit of Prime Minister of Nepal to India, a High Level Nepal – India Technical Committee on Inundation problems on Rupandehi (Nepal),/ Siddharth Nagar (India) and Banke (Nepal)/ Shravasti districts (India) was constituted and the Committee held its first meeting in May 2002.

?? As regards the issue of inundation problem in Rupandehi (Nepal)/ Siddharath Nagar (India) on account of construction of Lotun – Raisiaswal Khurd embankment, as raised by Nepal, the joint surveys have been completed and are to be further discussed in the 2nd meeting of the Committee proposed to be held shortly. The problem of inundation in the Banke district (Nepal)/ Shravasti district (India) on account of construction of embankment on river Rapti is also under examination by the Committee and a field visit to the site is proposed to be made during the 2nd meeting of the Committee.

INDO-PAKISTAN COOPERATION

Under the Indus Waters Treaty, 1960 India and Pakistan have created two permanent posts of Commissioner for Indus Waters, one each in India and Pakistan. Each Commissioner is representative of his Government for all matters arising out of the Treaty and serves as the regular channel of communication on all matters relating to implementation of the treaty. The two Commissioners together form the Permanent Indus Commission. The 87th meeting of the Permanent Indus Commission was held at New Delhi during May/June 2002 to finalise its report for the year ending 31.03.2002 for submission to respective Governments of India and Pakistan. While the 88th meeting was held at Islamabad in February, 2003 to discuss on issues related to Baglihar Hydro Electric Plant, being constructed by the State of J&K on river Chenab.

Flood warning arrangements were made by India through priority Telegrams, Telephones and Radio Broadcasts for the benefit of Pakistan during the period from 1st July to 10th October, 2002 for Indus system of rivers.

8. INTER-STATE WATER DISPUTES TRIBUNAL

INTRODUCTION

Majority of the rivers in the country are inter-state rivers. This Ministry has a key responsibility of coordination, mediation and facilitation in regard to resolution of the differences or disputes relating to inter-state rivers and overse eing implementation of inter-state projects.

INTER-STATE WATER DISPUTES (AMENDMENT) ACT, 2002

Inter-State Water Disputes Act was originally enacted by the Parliament in 1956 for adjudication of disputes relating to waters of inter-state rivers and river valleys. In view of Sarkaria Commission recommendations, Inter-State Disputes Act 1956 has been amended and "The Inter-State Water Disputes (Amendment) Act, 2002" (No. 14 of 2002 dated 28th March, 2002) has been enacted. The Act has come into force from 6th August, 2002. The amendments include time frame for constitution of the Inter-State Water Disputes Tribunal and also prescribes time limit for the tribunals to give their awards. As per the amendment, Central Government will have to constitute a Water dispute Tribunal within a period of one year from the date of receipt of a request from any State Government. The award of the Tribunal shall have the force of decree of Supreme Court.

CAUVERY WATER DISPUTE

Progress in Adjudication of the Dispute before the CWDT:

The dispute relating to sharing of Cauvery water among States of Karnataka, Kerala, Tamil Nadu and Pondicherry was referred to the Cauvery Water Disputes Tribunal (CWDT) constituted on June 2, 1990. During the last 12 years, the Tribunal has taken on records statement of State Governments who are party in the dispute and Experts. From January 1994 to December 2001 the Tribunal has conducted the cross examination of witnesses of one party State by other party States. As from January, 2002, the Tribunal is taking up arguments on the issues framed by it. In the meantime, one of the Members of the Tribunal expired on November 26, 2002 thus creating a vacancy in the CWDT. The vacancy has since been filled by a Judge from Allahabad High Court nominated by Chief Justice of India. The Gazette Notification for the purpose has been published on 7.1.2003. The Tribunal has since restarted the arguments on the issues framed by it.

Monitoring of the Implementation of Interim Order of CWDT

The CWDT passed an Order in June 1991directing the State of Karnataka for releasing water from its reservoirs so as to ensure 205 Thousand Million Cubic Ft.(TMC) of water in Mettur reservoir of Tamil Nadu in a water year. The 205 TMC of water is to be ensured in a fixed monthly and weekly pattern. The Tribunal has also given certain clarifications in April, 1992 and December, 1995 on its Order of June, 1991.

The Central Government has published the Order of the Tribunal under Section 6 of the Inter State Water Disputes (ISWD) Act, 1956 in 1991, thus, making the Order final and binding on the parties to the dispute. The Order of the Tribunal is to be given effect by the party States. Further, under the provisions of Section 6 A of the ISWD Act, 1956, the Central Government has notified a Scheme called Cauvery Water (implementation of the Order of 1991 and all subsequent Related Orders of the Tribunal) Scheme, 1998, consisting of Cauvery River Authority and Monitoring Committee. The Cauvery River Authority consists of the Prime Minister as Chairperson and Chief Ministers of the basin States as members. The Monitoring Committee consists of Secretary, Ministry of Water Resources as Chairperson, Chief Secretaries and Chief Engineers of the basin States as Members and Chairman, Central Water Commission as Member. The Authority is required to give effect to the implementation of the Interim Order dated 25th June 1991 of the Tribunal and its related subsequent orders.

Cauvery River Authority (CRA)

During the year 2002-2003, the Cauvery River Authority held 3 meetings for monitoring the implementation of Interim Order of CWDT. The 4th Meeting of the Authority was held on 27th August 2002. During the 4th meeting of the Authority, it was decided that the Monitoring Committee of the Authority should work out the details of distress sharing formula in view of the consensus that distress would need to be shared amongst all the basin States. The 5th (Emergency) Meeting of the Authority was held on 8th September 2002 there was difference of opinion among the Member States. Keeping this in view the Chairperson of the Authority decided that the State of Karnataka was required to release 9000 cusec of water amounting to 0.8 TMC accounted on weekly average basis for the month of September and October, 2002. Subsequently, the Supreme Court upheld the decision dated 8.9.02 of CRA. The 6th (Emergency) meeting was earlier convened on 29th November, 2002 and subsequently on 13th January, 2003 but the same had to be postponed for want of quorum. However, the Prime Minister held separate informal meetings with Chief Ministers of Tamil Nadu and Karnataka. After these meetings, the Prime Minister felt that Karnataka should ensure release of a substantial quantity of water immediately in view of the poor water storage at Mettur reservoir

keeping in view the Interim Award of CWDT, the distress situation in the Cauvery basin and also considering the circumstances prevailing in both the States.

The 6th meeting of CRA was held on 10.2.03 where it was decided that Karnataka shall continue ensuring 4500 cusec at Mettur for another three days.

CASE IN SUPREME COURT OF INDIA

With regard to implementation of Interim Order of CWDT, the State of Tamil Nadu has also filed an Original Suit before the Supreme Court of India in July, 2002 in which Union of India was the Respondent. This Ministry informed the apex court present status of the implementation of Interim Order of CWDT and action being taken by the Cauvery River Authority. The Supreme Court on September 3, 2002 directed the State of Karnataka to release water from its reservoirs so as to ensure 1.25 TMC of water per day at Mettur from 4.9.02. The Supreme Court in its subsequent hearing on February 6, 2003, directed the State of Karnataka to release water from its reservoirs so as to ensure an average of 4500 cusec of water at Mettur reservoir till the matter is finally decided by CRA.

MANDOVI RIVER WATER DISPUTE

Mandovi river also known as Madei/Mahadayi is a small west-flowing inter-State river on the western coast of India. The main river Madei originates in the western ghats in Karnataka and runs for 35 km. in that State and then enters Goa territory. It flows for another 52 km through Goa before devouching into the Arabian Sea near Panaji. A few small tributaries of the Mandovi river basin drain areas in Maharashtra State also. Thus, the States of Maharashtra, Goa and Karnataka are the basin states of the Mandovi river.

For the last 30 years, the State of Karnataka and Goa had disagreement over Karnataka's constant and persistent attempts to divert the limited Mandovi river waters generated from the basins in its tributaries to outside the basin. In July, 2002, the State of Goa made a request under Section 3 of the Inter-State River Water Disputes Act, 1956 (as amended) for constitution of the Tribunal under the said Act and refer the matter for adjudication and decision of dispute relating to Mandovi river. The issues mentioned in the request included the assessment of available utilisable water resources in the basin at various points and allocation of this water to the 3 basin States keeping in view priority of the use of water within basin as also to decide the machinery to implement the decision of the tribunal etc.

As required under the Act, an Inter-State Meeting on Mandovi river water dispute was convened by the Minister for Water Resources on 20.12.2002 for finding a negotiated settlement of the dispute before referring the matter to the Tribunal. After discussions, it was decided that an attempt be made by Government of Goa and Central Water Commission to assess the yield of the basin.

KRISHNA RIVER WATER DISPUTE

A Writ Petition was filed in 2002 before the Supreme Court by the Farmers Association abutting the river Bheema in the State of Karnataka for supplying 1000 cusec of water at the inter-State border of Karnataka and Maharashtra by the State of Maharashtra from the Ujjaini Dam on Bheema river in Maharashtra for meeting the drinking water needs of the villagers. The Union of India and the State of Karnataka were made Respondents while the State of Maharashtra was deleted as Respondent. The Writ Petition was heard a number of times and the Ministry of Water Resources also filed its response to the Writ Petition indicating the reasons for non-availability of water during summer months in the Bheema river at inter-State border and suggested remedial measures.

In the meanwhile, the State of Karnataka in September, 2002 made a complaint under Section 3 of the Inter-State River Water Disputes Act, 1956 to the Government of India for constitution of a water disputes tribunal and referring to the tribunal the dispute relating to sharing of surplus water of Krishna river between the basin States, raising of the height of the Almatti dam upto 524.256 m. by the State of Karnataka and maintaining adequate summer flow in Bheema river in the Krishna valley at the Inter-State border during the months of November to May in every water year. The Government of Maharashtra also made a complaint under the said Section of the Inter State River Water Disputes(ISRWD) Act, 1956 for constitution of and referring to the tribunal the dispute relating to sharing of surplus water of Krishna river, issues relating to submergence of territory of Maharashtra by Almatti dam, Hippargi barrage project, construction of Bheema barrage project and review and reassessment of available water in the Krishna river. Similarly, the Government of Andhra Pradesh also made a request under the said Section for constitution of Krishna Water Disputes Tribunal and referring to the Tribunal the dispute relating to unauthorized construction of the Almatti Dam by Karnataka, wrongful utilisation of waters of Tungabhadra river and from Tungabhadra dam by Karnataka and violations of the award in Bheema sub-basin by Maharastra. Ministry of Water Resources has initiated action in accordance with the provisions of the ISRWD Act, 1956 for constitution of the Krishna Water Disputes Tribunal.

RAVI & BEAS WATERS TRIBUNAL

The Ravi & Beas Tribunal which was constituted on 2nd April, 1986 had submitted its report on 30th January, 1987. The report was circulated in May, 1987. A suo-moto reference was made to the Tribunal comprising references from the Central Govt. and references received from Governments of Punjab, Haryana and Rajasthan seeking explanation/ guidance on certain points in the report. The last hearing of the Tribunal was held on 18th July, 1998. Further report of the Tribunal clarifying the observations made by the aforesaid beneficiary States is yet to be received.

In the meanwhile one of the Members of the Tribunal had resigned on 04.01.1999. The matter regarding filling up of the resultant vacancy is under process.

UPPER YAMUNA RIVER BOARD

Yamuna water dispute regarding allocation of the utilisable surface flows of Yamuna among the co-basin States upto Okhla was resolved by way of a Memorandum of Understanding (MoU) signed by the Chief Ministers of Himachal Pradesh, Haryana, Uttar Pradesh, Rajasthan and the National Capital Territory of Delhi on 12th May, 1994. Subsequently, separate agreement on construction of Hathnikund Barrage on Yamuna was signed on 2nd November, 1994 and agreements on Kishau Dam on Tons river and Renuka Dam on Giri river were signed on 6th November, 1994 by all co-basin States except Rajasthan.

As per the provision in the MoU, the Upper Yamuna River Board (UYRB) with its Headquarters in the National Capital Region was constituted by the Ministry of Water Resources as a subordinate office of the Ministry. The Upper Yamuna Review Committee (UYRC) was also constituted under the Chairmanship of the Union Minister of Water Resources and the Chief Ministers of Co-basin States as Members 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 and management of the upper reaches of the Yamuna River Basin upto Okhla. The newly created State of Uttaranchal has also been made a Member of the Upper Yamuna River Board and Upper Yamuna Review Committee.

The Upper Yamuna River Board with representatives from the aforesaid basin States and the concerned Central Government Departments has held twenty three meetings so far, under the Chairmanship of Member (WP&P), Central Water Commission, with the last meeting having been held on 18th December 2002.

9. FRESHWATER YEAR-2003

INTRODUCTION

India has declared the year 2003 as "Freshwater Year", to focus on creating mass awareness on the importance of freshwater and its management. This declaration is in line with the United Nations resolution adopted during the 55th Session of General Assembly declaring the year 2003 as "International Year of Freshwater". The Curtain Raiser to launch Freshwater Year – 2003 was inaugurated by the Prime Minister of India on 5th February, 2003 at Vigyan Bhawan, New Delhi. The main objectives of the Freshwater Year 2003 are:

- Increase Awareness among stakeholders regarding scarcity value of freshwater
- Conservation and efficient use of Freshwater
- Freshwater Preservation- quality and its ecosystem
- Augmentation of freshwater resources
- Community partnership for informed decision making

ACTIVITIES

The Ministry of Water Resources is the nodal agency for initiating and coordinating activities relating to the Freshwater Year among various central ministries and state governments. In order to achieve the above objectives various activities are proposed to be taken up under the Freshwater year :

I. Freshwater Conservation Campaign
II. Initiatives for preserving Freshwater Ecosystem
III. Initiating New Programs on freshwater

The outline of each activity is as under :

I. FRESH WATER CONSERVATION CAMPAIGN

Water conservation has three dimensions :

a. Water resources conservation – efficient management of rainwater through storage, allocation and transfer for use and preservation of the quality of the resource including its supporting ecosystems.
b. Water use conservation, water supply and distribution with minimal losses and consumption through prevention of wastage.
c. Efficient use of water through adoption of water saving technologies & cropping patterns ;

While creating awareness, the main thrust of the program shall be "Water Conservation". Therefore the Water Conservation Campaign forms the most important component of the Year of the Freshwater observation program. The target groups proposed to be reached are :

- ?? Youth and Children,
- ?? Women,
- ?? Farmers and Villagers
- ?? Policy and Opinion Makers.

II. PRESERVATION OF FRESHWATER ECOSYSTEM

A number of water bodies, be that rivers or lakes or tanks are going out of use mainly because of abuse of these water bodies as garbage dumps or are being encroached upon due to pressure on land. This has resulted in fast depletion of the ground water tables and also deterioration of quality of ground as well as surface water. There is need to bring awareness among all about the necessity and usefulness of maintaining water quality and assuring its pristine environment. Preservation and restoration of the water bodies is essentially an activity within the purview of the State Governments. Organizing the community, especially the school and college children to clean the existing water bodies with the help of the Voluntary Organization would be undertaken in close coordination with the Ministry of Environment, the City Municipal Corporations and other local self-government organisations. Mass mobilisation campaigns could be launched for cleaning and upgrading our water bodies.

III. INITIATING NEW PROGRAMS

Various new programs have been identified for celebration of the Fresh Water Year-2003.

- ?? Implementing the Action Plan for operationalising National Water Policy 2002
- ?? Launching Benchmarking of Irrigation Systems for performance improvement and improving efficiency. Capacity Building of Communities through awareness and partnership
- ?? Comparative study on water rights, water laws and attendant provisions
- ?? Gramin Jal Samwardhan Yojana
- ?? Institutionalisation of Participatory Irrigation Management (PIM) and Water Users' Associations (WUAs)
- ?? Freshwater website – Launch
- ?? Water profile and Groundwater Maps for all the Districts of the country
- ?? Augmentation of Freshwater Resources through rainwater harvesting, artificial recharge, roof water harvesting

COUNTRY WIDE EVENTS

Freshwater Year 2003 will be observed throughout the whole country. A multi media campaign by way of Fresh Water conservation campaign spots in radio and T.V and print media at national level has already been launched. Efforts are being made to maximise participation of target groups to optimise the outcome of campaigns. A dedicated website has been launched in February 2003.

Website : www.freshwaterindia.org

CALENDAR OF ACTIVITIES

Freshwater Year – 2003

FRESHWATER CONSERVATION CAMPAIGN

March – December 2003	?? Mass Awareness Campaign ?? Capacity Building ?? Training Programmes ?? Performance Evaluation and Benchmarking of Irrigation System ?? Preparation of Groundwater Profile, District wise ?? Augmentation of Water through Rainwater Harvesting ?? Institutionalisation of Participative Irrigation Management

FRESHWATER PRESERVATION – QUALITY & ITS ECO-SYSTEM

February – June 2003	?? Mass Awareness through Traditional and Modern Media ?? Community Mobilisation for Cleaning Degraded Water Bodies, Lakes and River Stretches – Jal Yatra/ River Darshan
July – December 2003	?? Monitoring/ Publishing Water Quality of Major Rivers ?? Ensuring Minimum Lean Season Flows in Selected River Systems – Guidelines

AUGMENTATION OF FRESHWATER

February-September 2003	?? Mass Awareness Campaign ?? Rainwater Harvesting Structures in Rural and Urban Areas ?? Artificial Recharge Campaign/ Scheme in Water Deficit Areas ?? Drought Proofing Measures in Water Scarce Areas

10. OTHER IMPORTANT ISSUES RELATED TO WATER RESOURCES DEVELOPMENT & MANAGEMENT

INTRODUCTION

Apart from the normal activities related to planning and development of water resources for various purposes, the Ministry is actively associated with other issues like water quality, flood control, drought proofing etc. which play vital role for sustainable development and preservation of quality. Some of the important issues are discussed here under :

WATER QUALITY

The all round development of various resources has affected the quality of water which is used for various purposes. In view of considerable deterioration of the quality of water, the Ministry has taken up appropriate measures for close monitoring of the quality of both surface and ground water through a network of stations being maintained by Central Water Commission and Central Ground Water Board.

Water Quality Assessment Authority

The problem of pollution of national water resources has become a matter of serious concern in our country. To address the situation on the advice of this Ministry, the Ministry of Environment & Forests (MOEF), constituted the "Water Quality Assessment Authority(WQAA)" with effect from 29th May, 2001 with a view to monitor and take appropriate action for protecting the quality of National Water Resources. The 12-member Authority is headed by the Secretary, Ministry of Environment & Forests as the Chairman and the Commissioner (Water Management), Ministry or Water Resources as the Member Secretary.

The Extraordinary Gazette notification issued on 22nd June 2001 by the Ministry of Environment & Forests for the constitution of WQAA inter-alia recognizes the need for constitution of State level "Water Quality Review Committees", and the importance of water quality monitoring through an extensive network at national and state levels, keeping in view the contribution of the Hydrology Project (HP) initiated in 1996 by the Ministry in 9 States in the peninsular region of the country, in standardizing and unifying the process of monitoring to bring the concerned agencies under one umbrella. The notification empowers the Authority to issue directions to agencies under sub section 2 of Section 3 of the Environment Protection Act 1986.

This Ministry is assisting the Authority to carry out and coordinate the functions of WQAA. The Ministry of Environment and Forests, Govt. of India

has requested the Chief Secretaries to constitute the State Level Water Quality Review Committee(WQRC) in their States to improve co-ordination amongst the Central and State agencies in the respective States, assess the quality of water bodies and identify areas requiring immediate actions for the quality of the Water Resources. So far, WQRCs are constituted in 17 States/UTs. The Ministry of Environment and Forests, has also constituted an Expert Group on Water Quality Monitoring Systems with a view to unifying and streamlining the widely varying Water Quality Monitoring Systems being followed at present by various Central and State agencies. The Expert Group has submitted the report after reviewing the present status of Surface Water and Ground Water Monitoring Programmes of the concerned Central and State agencies. A Work plan is also prepared to carry out and co-ordinate the functions of the authority. An outlay of Rs. 5 crores has been proposed during X Five Year Plan for the scheme. Budget provision in the financial year 2003-04 is 50 lakhs.

FLOOD CONTROL

Critical anti erosion works in Ganga Basin States

A Centrally Sponsored Scheme, namely, "Critical anti-erosion works in Ganga Basin States" was approved in January, 2001 with a central share of Rs.110 crore for implementation during IX Plan for providing Central assistance to the States of Uttar Pradesh including Uttaranchal, Bihar and West Bengal as well as to the Farakka Barrage Project Authority (FBPA) for undertaking anti-erosion works of critical nature. Central assistance under this scheme is in the form of grant to the concerned States in the ratio of 75:25 between the Centre and the State and 100% funding for FBPA. During 2001-2002 an amount of Rs.31.85 Crore has been released as grant-in-aid to Government of Uttar Pradesh, Uttaranchal, West Bengal and Bihar for taking up critical anti-erosion works in Ganga Basin making a total release of Rs.51.85 crore to these States during the IX Plan against the central share of Rs.110 crore under the scheme. The balance spillover portion of the scheme amounting to Rs. 58.15 crore is being continued in the X Plan against the 10th Plan outlay of Rs.192 crore and is programmed to be completed in the first two years of the plan. For the year 2003-04 an amount of Rs.25.00 crore has been kept in the budget estimate. A Committee has also been set up under the Chairmanship of Chairman, Ganga Flood Control Commission (GFCC) to identify the individual schemes for formulating the scheme for the balance amount of Rs.133.85 crore (Rs.192 crore – Rs.58.15 crore) for taking up critical anti-erosion works in the Ganga basin States during the X plan.

Other Schemes

Central Assistance was also provided against other Centrally Sponsored Schemes namely (i) Flood Proofing Programme in North Bihar, (ii) Flood

Protection Works of Kosi and Gandak Projects, (iii) Extension of embankments of Lalbakeya, Kamla, Bagmati and Khando rivers, etc. These schemes are being continued in the X Plan with increase in the scope of the Flood Proofing Programme which is now proposed to include the States of Bihar, Uttar Pradesh, West Bengal, Orissa, Assam and Andhra Pradesh.

A scheme on improvement of drainage in the country including Mokama Tal area is proposed to be taken up for which an outlay of Rs.50 crores has been provided in the X Plan. The scheme is under formulation in CWC.

DROUGHT MANAGEMENT

In view of the severe drought conditions prevailing in the country, a Task Force has been constituted under the chairmanship of Secretary (Water Resources) to assist the drought affected States to meet the acute water shortage conditions. Chief Secretaries of the 18 drought affected States and Secretaries of Ministry of Agriculture, Rural Development, Urban Development, Finance, Petroleum & Natural Gas; Chairman, Central Water Commission; Chairman, Central Ground Water Board; Member Traffic Railway Board; DG, GSI and Director General, IMD are the Members of the Task Force. First meeting of the Task Force was held on January 9 – 10, 2003 in which representatives from the drought affected States were present.

NATIONAL COMMISSION FOR INTEGRATED WATER RESOURCES DEVELOPMENT PLAN (NCIWRDP)

Ministry of Water Resources, Government of India had set up a National Commission for Integrated Water Resourc es Development Plan (NCIWRDP) in September 1996 for preparation of an Integrated Water Resources Development Plan for the development of water resources for drinking, irrigation, industrial, flood control and other uses. The National Commission had submitted its report to the Ministry of Water Resources in December 1999. An implementation Cell in the National Water Development Agency in February, 2000 was constituted to take further action on the recommendations i.e. examine actionable recommendations and suggest modalities for implementation.

An Advisory Committee was also constituted under the chairmanship of Chairman, Central Water Commission for assisting the Implementation Cell in examining the recommendations of the National Commission. The Advisory Committee has given its report in August, 2000. A total of 209 recommendations have been identified for action which include 153 recommendations of the National Commission and 56 additional recommendations identified from various parts of the report.

Action on 74 recommendations which have been classified as implementable by the Central Government without the consultation of the State Governments has been initiated. So far, 24 recommendations have been accepted by the Government. Processing of the remaining recommendations is under progress. The States/ UTs are being consulted in this regard.

Third Irrigation Commission

The need for setting up Third Irrigation Commission keeping in view the experience gained in irrigation development during the last 30 years is under review. For this purpose, Irrigation Acts are being collected from States/ UTs.

WATER AND LAND MANAGEMENT INSTITUTES (WALMIS)

A number of Water and Land Management Institutes (WALMIS/ IMTI etc.) were established in various States during 80s through technical and financial collaboration between the concerned State and USAID. It was envisaged that these WALMIs could help irrigation departments to train Irrigation System Managers and to improve the efficiency of water use in irrigated commands but canal commands in particular.

Ministry has co-ordinated with Ministry of Agriculture for involvement of Water and Land Management Institutes in the country in the National Watershed Development Project for Rainfed Areas (NWDPRA).

11. PROGRESSIVE USE OF HINDI

INTRODUCTION

During the year effective measures were taken in the Ministry, its attached and subordinate offices, public sector undertakings, autonomous bodies, boards and societies under the administrative control of the Ministry to ensure compliance of various orders/ instructions issued by the Department of Official Language.

PARLIAMENTARY COMMITTEE ON OFFICIAL LANGUAGE

The second sub-Committee of the Parliamentary Committee on Official Language inspected the Ministry of Water Resources on 05.07.2002 and suggested measures for the progressive use of Hindi. The Official Language Implementation Committee of the Ministry under the Chairmanship of Joint Secretary (Admn.) has been meeting regularly.

RAJBHASHA VAIJAYANTI SHIELD

To encourage healthy competition among the organizations under the Ministry for doing maximum work in Hindi, the Rajbhasha Vaijayanti Shield has been introduced. Under this scheme, this year, first and second prizes were awarded to WAPCOS(I) Ltd., Gurgaon and National Institute of Hydrology, Roorkee respectively.

HINDI FORTNIGHT

Hindi Fortnight was organized in the Ministry during September, 2002 during which various competitions for the staff members were held and the winners were awarded cash prizes.

WORKSHOPS & INSPECTION

Hindi workshops were also organized with a view to promote Hindi in official work. Information regarding Official Language Act/ Regulations was provided and participants were trained to do official work in Hindi during these workshops. Deputy Secretary (Admn.) inspected four offices of the Ministry of Water Resources situated outside Delhi and gave suggestions to overcome the shortcomings found during the inspections. Deputy Director (O.L.) inspected sections of the Ministry and oversaw the compliance of Official Language Policy, and instructions were given for rectification of the deficiencies pointed out during such inspections. Regular monitoring of the work being done in Hindi in the Ministry and its attached/ subordinate offices was done through quarterly reports.

12. ADMINISTRATION, WELFARE AND VIGILANCE

The Ministry has a total 16476 staff and officers in Group A, B, C and D including the personnel in various organisations of the Ministry. Administration Wing is responsible for cadre control functions for specific organisations, ensuring implementation of the policies of the government with regard to reservation and welfare. Vigilance administration is another important function of the Administration Wing. Besides, a number of other mandatory functions are attended to.

COMPUTERISATION IN THE MINISTRY

A provision of Rs. 55.00 lakh has been made available in the budget grant under information technology development (Plan) under the Ministry of Water Resources for the year 2002-2003. The proposal for purchase of 45 Personal Computers (PCs) with related peripherals in respect of various offices/ wings/ sections (PC Deficient Pockets of the Ministry) etc. of the Ministry of Water Resources housed in Shram Shakti Bhavan, Shastri Bhavan, Lok Nayak Bhavan, CGO Complex and Krishi Bhavan has been approved and necessary action for procurement of the same is being taken.

REDRESSAL OF STAFF GRIEVANCES

A Grievances Redress Cell is in existence in the Ministry of Water Resources which entertains the grievances of staff of all the organisations under the Ministry. Joint Secretary (Admn.) and Director (Establishment) have been designated as Director of Public Grievances and Director of Staff Grievances respectively. Due attention is paid for disposal of grievances within a reasonable period. Most of the grievances received are related to service matters, payment of pensionary benefits etc. Out of 46 staff grievances received during the year, 19 have been disposed off.

MINORITY WELFARE

In accordance with the guidelines issued by the Ministry of Welfare (present Ministry of Social Justice & Empowerment) in March, 1990, the Ministry is monitoring the recruitment of minority communities and representation of minorities in Selection Commissions/ Boards in the Ministry and the organisations under it.

MONITORING OF RESERVATION FOR PHYSICALLY HANDICAPPED

Monitoring of the recruitment of physically handicapped is being done to ensure fulfilment of three per cent quota for this category by the Ministry as well as various organisations under it. Periodic reports on the progress made are being sent regularly to the Ministry of Social Justice & Empowerment.

MONITORING OF RESERVATION FOR SC/ ST/ OBC

The Scheduled Caste/ Scheduled Tribe & Other Backward Classes (SC/ ST & OBC)s Cell also forms part of the Administration Section. It renders secretariat assistance to Liaision Officers for SC/ ST and for OBC in discharging their functions on various matters relating to reservation for SC/ ST/ OBC in Government services and carrying out inspections of reservation rosters. It also advises on allied matters in respect of various organisations of the Ministry.

VIGILANCE ACTIVITIES

The Vigilance Division of this Ministry functions under the supervision and control of the Chief Vigilance Officer of the Ministry. It looks after various aspects of vigilance and disciplinary matters of all employees of the Ministry of Water Resources (proper) and Group-A officers of all the Organizations under the administrative control of this Ministry in whose cases President is the Appointing/ Disciplinary Authority.

All pending vigilance cases are regularly reviewed and appropriate action taken to minimise delays. The status of the inquiries/ Investigations being conducted by various inquiring/ investigating authorities, were reviewed from time to time. Action was also taken to engage a few retired CVC-empanelled officers as the Inquiring Authorities with a view to completing the inquiries within the time schedule. Special attention was also paid to the expeditious disposal of the complaints received through the Prime Minister's Office, Central Vigilance Commission and VIPs. The position of the various cases dealt in Vigilance Wing is given in Table 12.1 below.

Table 12.1

Cases	Number of cases
Previous year's balance	48
New references/ complaints	36
Total	84
Cases closed	29

Preventive Vigilance Inspections are undertaken as a regular vigilance activity. In 2002-2003, such inspections of the Chief Engineer's office of Water & Power Consultancy Services (I) Limited at Hyderabad, Central Ground Water Board, Divisional IX at Hyderabad, Chief Engineer's office of Central Water Commission at Shillong and Zonal office of National Projects Construction Corporation at Bhubaneshwar were conducted. Reports containing recommendations as approved by Secretary (Water Resources) have been sent to the Heads of Organisations for necessary

compliance. The compliance is being followed up. Apart from carrying out such preventive vigilance inspections, a team from the Vigilance and Administration Section had conducted an inspection of the Headquarters office of the Central Ground Water Board at Faridabad under the overall supervision of the Chief Vigilance Officer and submitted its report to the Minister for Water Resources.

The Chief Technical Examiner's Organization of the Central Vigilance Commission in the month of November, 2002 had instructed that Chief Vigilance Officers should conduct inspections of works / contracts being undertaken by the Organizations under it. The Inspections of the works of the Administrative-cum-office-cum-Laboratory Building of the National Research Centre for Women in Agriculture, at Bhubaneshwar and the construction of Internal Road, Drainage System etc. at Siliguri being undertaken by the National Projects Construction Corporation, were conducted by a team of the Vigilance Wing of the Ministry, in December 2002 and February 2003 respectively.

As per the instructions of the CVC / Ministry of Home Affairs, the Vigilance Division of the Ministry has been maintaining "List of Officers of Gazetted Status of Doubtful Integrity" in consultation with the Central Bureau of Investigation. Similarly, a separate consolidated "Agreed List " is also being prepared in consultation with the respective Heads of the Organizations and Local branches of the CBI and will be finalized shortly.

The week beginning from 31st October, 2002 was observed as "Vigilance Awareness Week" this year also. During the financial year 2002, all the information about the movable properties submitted by the officers/ officials of the Ministry were also examined and incorporated in the records being maintained by the Vigilance Wing.

All out efforts are being continuously made to streamline of external functioning of vigilance activities.

COMMITTEE FOR COMPLAINTS ON SEXUAL HARASSMENT OF WOMEN EMPLOYEES

In accordance with the guidelines laid down by Supreme Court to deal with complaints of sexual harassment of women employees, a Committee has been constituted to look into the complaints of the women working in the Ministry of Water Resources. The Committee was reconstituted on 18.07.2001 with Director (Establishment), Ministry of Water Resources as the Chairperson. It has two members. The Committee submits its finding to the Joint Secretary (Admn.) for necessary action. The Committee has held its meetings from time to time and met the women employees in the main Ministry and its organisations in Delhi to find out if they have any complaints regarding sexual harassment. During the year no formal complaints were received by the Committee. Similar Committees have already been constituted in the organisations under this Ministry and as per information available, no formal complaint has been received by them.

13. ROLE OF WOMEN IN WATER RESOURCES MANAGEMENT AND CONSERVATION

INTRODUCTION

Women in particular contribute significantly in agricultural production. The women workforce time is estimated to be around 70 to 80% of the total work force time in the agriculture sector. Role of women in water resources management and conservation has been duly recognised. The National Water Policy 2002 while stressing on participatory approach in water resources management, specifically provides for necessary legal and institutional changes to be made at various levels for the purpose of ensuring appropriate role for women.

PARTICIPATORY MANAGEMENT – ROLE OF WOMEN

In pursuance of the provisions in National Water Policy 2002 (and also 1987) efforts are to be made to involve farmers progressively in various aspects of management of irrigation systems, particularly in water distribution and collection of water rates. Water Users Association is one of the most important way of encouraging participatory management. The Ministry of Water Resources, while issuing guidelines in April, 1987, specifically emphasised the States to consider representation of women in Water Users Associations at all levels. As a consequence, many State Governments have amended their Irrigation Acts or have come out with specific Acts on the Participatory Programme in Irrigation. Some of the States have gone further and have made specific provisions for women. "Madhya Pradesh Sinchai Prabandhan Me Krishkon ki Bhagidari Adhiniyam, 1999" enacted in September, 1999 ensures all farmer owners, be it men or women to be a rightful member to the outlet committee. It goes further to ensure that where there are no women members, atleast one woman from the area must be taken even if she is not a land owner. Further it ensures that atleast one woman shall be nominated to the Governing Body of the Association. While "Andhra Pradesh Farmers' Management of Irrigation Systems Act" of March 1997 has not made any specific provisions for the women to be represented in the managing committee of Water Users Associations, it is encouraging to note that quite a few women members have been elected as Presidents and Managing Committee members. Similar is the story in other States. Despite the awareness in the matter, the marginal representation of women is not adequate in view of the magnitude of the problem. There is need to encourage participation of more women into Water Users Associations by strengthening the Acts or by bringing in a new culture among the Water Users Associations themselves. Efforts in this regard are continuing.

FRESHWATER YEAR – 2003 AND WOMEN PARTICIPATION

The theme of Freshwater Year 2003 is freshwater for all. It focusses on making water everybody's business i.e., on increasing awareness among stakeholders regarding scarcity value of freshwater, conservation and efficient use of freshwater and community partnership for informed decision making. Women have been identified as one of the major target groups for water conservation campaign. The issues in focus for women include efficient use of water including recycling in domestic sector, purification of drinking water, health aspects of water and sanitation and maintenance of drinking water infrastructure. Mass awareness campaigns for women is one of the important activities of Freshwater Year 2003.

14. INITIATIVES IN THE NORTH EAST REGION

INTRODUCTION

The northeast region consists of seven sister states having geographical area of 2,55,158 sq. km. Of which 90,573 sq.km. is plain. The region has two main river basins namely, Brahmaputra and the Barak, which form a part of Ganga-Brahmaputra-Meghna river systsem. Northeast India is endowed with enormous water resources. The combined annual flow of Brahmaputra & Barak rivers, before entering into Bangladesh, is the highest among all river basins in the country. In addition to the normal developments, significant initiatives taken by the Organisations of the Ministry for the development of Northeastern region are detailed below.

CENTRAL WATER COMMISSION (CWC)

Apart from the Hydrological observation and flood forecasting on almost all important rivers of North East region, CWC has been carrying out detailed survey and investigation including preparation of feasibility reports for development of water resources projects in Sikkim, North Eastern States and neighbouring countries of Nepal and Bhutan.

Investigation work of Hydro-Electric Projects in Teesta Basin in Sikkim was initiated in 1974. Survey and Investigation work of Stage II was taken up in 1998 which envisages construction of two separate dams on river Lachenchu and Lachungchu. Survey and investigation works in respect of Stage III, IV, V and VI of Teesta H.E. Project has been completed. Investigation works of Ranjit Hydel Project Stage IV has been taken up in June 2002. Feasibility of undertaking detailed investigation has been taken up with the nodal departments. Besides, 18 major, medium mini and micro hydel schemes, 2 major multipurpose projects, 2 major and medium irrigation schemes and 59 minor irrigation schemes are under investigation in the region.

BRAHMAPUTRA BOARD

Avulsion of River Brahmaputra at Dholla -Hatighuli in Assam

As a part of anti erosion measures, the Standing Finance Committee has accorded approval to the scheme namely "Avulsion of river Brahmaputra at Dholla-Hatighuli in Assam" in December, 2002 at an estimated cost of Rs. 10.47 crore. The scheme has been taken up for execution by the Brahmaputra Board and is scheduled to be completed by March, 2003.

NATIONAL INSTITUTE OF HYDROLOGY (NIH)

The following important studies were carried out by the NIH Centre for Flood Management Studies for Brahmaputra at Guwahati during the year 2002-03:

- **Design Flood Studies for Noa Dihing River** was undertaken with the request from Brahmaputra Board with the objective of estimation of design flood for Noa Dihing River using the Geomorphological Instantaneous Unit Hydrograph (GIUH) approach. Hydrographs for the basin have been derived using the GIUH approach utilising the measurable parameters of the basin and limited number of rainfall-runoff data.
- **Flood Plain Delineation and Risk zoning in Burhi Dihing Basin** in the Brahmaputra basin was undertaken with the objective to delineate the flood plain and map the risk zone using the remote sensing data.
- **SCS Modelling for Runoff Studies for Jadukata River Basin** was undertaken with the objective of development of an SCS-CN based runoff model for computing runoff that may be routed to some discharge point to estimate runoff at that point using satellite imagery, topographic map and limited rainfall-runoff data.

CENTRAL SOILS & MATERIALS RESEARCH STATION (CSMRS)

The following projects in North Eastern States are being investigated by the CSMRS over the past few years:

- Assessment of the construction material for use in concrete dam of **Myntdu Leska Hydro-Electric Project**, located at about 140 Kms from Shillong in Meghalaya which envisages construction of concrete gravity dam with installed capacity of 84 MW power generation was undertaken
- Construction material and mix design surveys of **Greater Shillong Water Supply Schemes** which envisages construction of concrete gravity dam for catering the drinking / domestic water supply of Shillong and adjoining areas in Meghalaya w as undertaken
- Liquefaction potential evaluation of Foundation strata of **Pagladia Dam** has been completed
- Field and laboratory soil investigations for the proposed diversion structure of **Teesta hydro-electric Project Stage II** was undertaken.
- Laboratory soil investigations for borrow areas were carried to ascertain the suitability for construction of **Tuirai Hydro-Electric Project, Mizoram**
- Training was imparted to the officers and staff of **North Eastern Hydraulic and Allied Research Institute (NEHARI) Laboratories,**

Brahmaputra Board, Guwahati in laboratory testing of rock, coarse & fine aggregate samples, analysis of data and report writing.

CENTRAL WATER AND POWER RESEARCH STATION (CWPRS)

- **Morphological studies of river Barahmaputra from Dehingmukh to Dikhowmukh reach, Assam** were been taken up in August 2001 and are in progress.
- **Desk studies to evolve hydraulic design parameters for proposed cargo handling jetty at Pandu** were taken up in August 2002 and are in progress.
- **Model studies for Teesta Hydro-Electric Project (Stage V)** have been undertaken which has helped in improving design.
- Hydraulic studies for spillway and energy dissipater for **Subhanseri hydro Electric Project** have been recently undertaken.

NATIONAL PROJECTS CONSTRUCTION CORPORATION (NPCC)

The total value of works undertaken by NPCC in the North Eastern States is Rs. 307 crores out of which works of about Rs. 87 crores have been completed, inspite of disturbed law & order situation, thereby contributing significantly to the development of this region. Besides, NPCC has also executed Kamakhya Temple Gate at Guwahati, Assam on 'No Profit Basis' from the fund provided by Minister of State for Water Resources.

15. CENTRAL WATER COMMISSION

INTRODUCTION

Central Water Commission is an attached office of Ministry of Water Resources with Head Quarters at New Delhi. It is a premier Technical Organisation in the country in the field of Water Resources since 1945. The Commission is charged with the general responsibility of initiating, coordinating and furthering, in consultation with the State Governments concerned, schemes for control, conservation and utilisation of water resources throughout the country, for purpose of Flood Control, Irrigation, Navigation, Drinking Water Supply and Water Power Development.

ORGANISATIONAL SETUP

The Central Water Commission is headed by a Chairman who is also Ex-officio Secretary to the Government of India. The Commission has three Technical Wings, namely:

- **Designs and Research Wing**
- **Water Planning and Projects Wing**
- **River Management Wing**

Each Wing is headed by Member who is also Ex-officio Additional Secretary to the Government of India. The activities of the wings are carried out by 18 functional units in the headquarters each headed by a Chief Engineer level officer. The National Water Academy located at Pune also functions under the Commission. The Academy conducts training courses for the in-service engineers of Central and State Governments departments.

Central Water Commission has thirteen Regional Field Organisations, each headed by a Chief Engineer.

Central Water Engineering Group 'A' service and Central Water Engineering Group 'B' service form the Engineering cadres. There are other technical personnel from various disciplines and non technical supporting staff.

ACTIVITIES

The activities of CWC may be summarized as follows:

Resource Assessment

a. Observation of hydrological and hydro-meteorological data
b. Analysis and publishing of data related to water resources

Macro Level Planning

a. National Perspective Plan and Basin-wise Master Plan
b. Matters related to Inter-State Water Sharing / Disputes

Project Planning

a. Survey & Investigation
b. Hydrological Studies
c. Planning for Irrigation and other Uses
d. Design
e. Construction Equipment Planning & Plant Layout
f. Environmental & Rehabilitation & Resettlement Issues

Project Evaluation
Techno-economic Appraisal

Execution of Water Resources Development Projects

a. Project Monitoring
b. Advice on various Planning & Design problems encountered during construction

Operation of Water Resources Projects

a. Operational Flood Forecasting
b. Reservoir Inflow Forecast
c. Regulation of Reservoirs
d. Dam Safety Aspects

Research and Development

a. Co-ordination of R&D Activities
b. Application of Modern Techniques
    i) Development & Application of Software & Models for Water Resources related Problems
    ii) Remote Sensing Technology
    iii) Studies on Sedimentation

Standardization and Documentation

a. Preparation of BIS Codes related to Water Resources
b. Preparation of Manuals / Guidelines

c. Mass Awareness
d. Regional Hydrological Studies

Guidance / Advisory Role
a. Organization of Trainings / Workshops
b. Representation on Various Committees / Boards

Technical Support to Ministry of Water Resources and Departments of Govt. of India

MAJOR ACTIVITIES

Hydrological Observations

Central Water Commission maintains a network of 953 Hydrological Observation Stations on various interstate and international rivers. Observations for water level, discharge, silt and water quality are made and stored, after due processing, at the Central Data Bank. The hydrological observation stations of different categories are given in Table 15.1 below.

TABLE 15.1

Sl. No.	Category	Number
1	Gauge Sites (G)	307
2	Gauge and Discharge Sites (GD)	230
3	Gauge, Discharge & Silt Sites (GDS)	45
4	Gauge, Discharge & Water Quality Sites (GD&WQ)	116
5	Gauge, Discharge, Silt and Water Quality Sites (GDS&WQ)	255

In addition, rain gauges are also installed at most of the hydrological observation sites of CWC and observations are made by CWC officials. The implementation of World Bank assisted 'Hydrology Project' has also helped in improvement in the quality of the data and its processing, storage & retrieval.

Water Quality Monitoring

Collection of water samples at hydrological observation sites of CWC for estimation of water quality started during early sixties with a view to assess the suitability of water for irrigation purposes. In 1978, a research scheme under National Committee of Science and Technology (NCST) was launched to study the flow of pollution loads in Ganga river system. Under this scheme, 40 key stations on river Ganga and its tributaries were taken up for collection of samples and their detailed analysis. With implementation of the Plan scheme entitled "Monitoring of Water Quality

in Rivers of India" and the World Bank assisted "Hydrology Project", the number of sites as also the number of parameters for quality assessment increased considerably. CWC monitors water quality at 371 key stations through a network of 287 water quality laboratories of different levels (260 Level I laboratories, 23 Level II laboratories and 4 Level III / II+ laboratories). These are fully equipped with modern equipment. The out put of this monitoring activity is compiled in a Year Book which is a tool for various planning activities.

Survey and Investigation

Survey and investigation of major and medium water resources projects are taken up by Central Water Commission with the concurrence of concerned State Government or the Central Government. So far, 211 major and medium projects have been investigated by CWC and the detailed project reports (DPR) have been prepared and submitted to concerned authorities. At present following 14 projects in the country are under investigation by CWC :

I. Deopani Multipurpose Project (Arunachal Pradesh)
II. Sissiri Multipurpose Project (Arunachal Pradesh)
III. Kundil Irrigation Project (Arunachal Pradesh)
IV. Nyucharong Chu HE Project (Arunachal Pradesh)
V. Micro Water Resources Development Projects (Arunachal Pradesh)
VI. Anti Erosion Project of Left Bank of Brahmaputra (Assam / Meghalaya)
VII. Manas Sankosh Teesta Link Canal (Assam / West Bengal)
VIII. Kirthai HE Project Stage I & II (Jammu & Kashmir)
IX. Lokai Medium Irrigation Project (Meghalaya)
X. Kolodyne HE Project – Stage II (Mizoram)
XI. Tuivawl HE Project – Stage II (Mizoram)
XII. Tuirini HE Project – Stage II (Mizoram)
XIII. Rangit HE Project (Sikkim)
XIV. Teesta HE Project Stage – II (Sikkim)

CWC has also carried out investigation of some of the projects in neighbouring countries as indicated in Table 15.2 below uptil now.

TABLE 15.2

Sl. No.	Country	No. of Projects
1	Bhutan	28
2	Myanmar	2
3	Nepal	7

At present, Detailed Project Report for Pancheshwar Multipurpose Project is under preparation jointly by India and His Majesty's Government of Nepal. A Joint Project Office which undertook field investigations to finalise the location & design of Downstream Regulating Structure and some missing data on Pancheshwar Multipurpose Project has completed its task in June, 2002. Action has already been initiated to take up the investigations for the Sapta Kosi High Dam Project of Nepal.

Hydrological Studies

Detailed hydrological studies are carried out by CWC at various stages of the project for assessment of quantities of available water and its time distribution, estimation of design flood and estimation of the sediment rate and its distribution pattern in reservoir. These details are essentially required to (i) carryout optimum planning for the available water resources; (ii) design the structure from safety consideration; and (iii) estimate the life of reservoir. CWC has carried out hydrological studies in respect of almost all the projects in the country.

At present studies in respect of 37 projects are in hand. CWC has also carried out review of design flood in respect of 62 dams as a part of Dam Safety Appraisal and Rehabilitation Project (DSARP).

A total of of 24 sub-zonal reports for estimating design flood for use in areas with insufficient hydrological and hydro-meteorological data have been brought out by CWC which are extensively used by various State Governments and Central Government Departments / Organizations. These reports are under revision. The report for Sub – zone 3(C), a Upper Narmada and Tapi Sub Zone report has been revised during the year 2002-03. The revised "Manual on Estimation of Design Flood" has been published during this year.

Design

The Central Water Commission is actively associated with design of almost all the major water resources projects in the country by way of design consultancy or during technical appraisal of the projects. A number of projects in the neighbouring countries have also been designed. Four design units have been identified to cater to specific requirements and to attend to special design related problems of different regions. These units have specialised Directorates for Hydel Civil Design, Concrete & Masonry Dam Design, Embankment Design, Gates Design and Barrage & Canal Design.

At present, design units of CWC are carrying out design in respect of 88 projects out of which 70 are at construction stage while the remaining 18

are at investigation and DPR stage. In addition, specific problems in respect of 20 projects have also been referred to CWC. Some of the prestigious projects presently being designed at CWC are :-

- **Tala HE Project (Bhutan),**
- **Pancheshwar Multipurpose Project (Nepal),**
- **Nathpa Jhakri Project (Himachal Pradesh),**
- **Narmada Sagar Complex (Madhya Pradesh),**
- **Sardar Sarovar Project (Gujarat)**
- **Tehri HE Project (Uttaranchal).**

Dam Safety

There are 4050 existing large dams in the country. In addition, 475 large dams are under construction. About 60% of these dams are more than 20 years old. Appropriate measures for the maintenance of such structures is critical for their safety. In pursuance to the recommendations of the "Irrigation Ministers Conference" held in 1975, a Dam Safety Organization was established in CWC in the year 1979. The Dam Safety Organisation was the nodal agency in implementation of the World Bank assisted "Dam Safety Assurance and Rehabilitation Project (DSARP)". Under this Project 33 distressed dams in 4 participating States (Madhya Pradesh, Orissa, Rajasthan and Tamil Nadu) were rehabilitated under the overall guidance of the Commission. "Dam Safety Legislation" has been drafted and circulated to the State Governments for enacting the same. Other notable achievements include preparation of PMP (Probable Maximum Precipitation) Atlas and Guidelines on Dam Safety. Based on the performance and benefits derived from DSARP and to extend the dam safety activities to other States owning significant number of large dams, a proposal for 2nd phase of DSARP for World Bank assistance has been prepared.

Environmental and Rehabilitation & Resettlement Issues

Central Water Commission represents in the Committees set up at National and State level by the Ministry of Environment & Forests for recommending clearance of river valley and hydro electric projects. A National Level Monitoring Committee has been set up by Ministry of Environment & Forests to monitor implementation of Environment Management Plan and observance of environmental safeguards attached at the time of environmental clearance of the Projects. Member (Water Planning & Projects) is the Chairman of the Committee.

Project Appraisal

Techno-economic appraisal of irrigation, flood control and multipurpose projects proposed by State Governments is an important activity of Central Water Commission. Since 1961 Central Water Commission has appraised 1400 projects. The appraisal of the project ensures that the project proposal is in tune with overall development plan; the basic planning of the project is reliable; and investigations are as per established norms. It is also established through the project appraisal that international / interstate agreements or Tribunal awards for utilization of water are duly followed and the layout & design of the project are optimal. After establishment of techno-economic feasibility of the project, the Advisory Committee on irrigation, flood control and multipurpose projects headed by Secretary, Water Resources, considers the project for acceptance and thereafter recommends it for investment clearance by the Planning Commission. Power projects proposed by State Electricity Boards/Private Sector are scrutinized in CWC from hydrology, civil design, inter-state and cost angles in case of Hydel Projects and for establishing water availability for cooling and other purposes in case of Thermal Projects. The process of Project Appraisal involves examination of the various features of project by specialized units simultaneously in order to carry out the work in the shortest possible time to ensure early appraisal and clearance. The suggestions for improvement / modifications are suitably incorporated in consultation with project authorities.

During the year 2002-03, technical examinations of 27 projects were completed and the projects cleared by the Technical Advisory Committee. 86 schemes (33 Major & 53 Medium) are under different stages of appraisal.

External Financial Assistance to Water Resources Projects

The Commission assists the State Governments by providing technical support for preparation of project reports in respect of projects to be posed for external funding. Presently, 49 schemes and 2 Water Sector Re-structuring Projects (one each in Rajasthan and Uttar Pradesh) are under various stages of techno-economic appraisal / investment clearance.

Project Monitoring

A 3-tier system of monitoring of ongoing projects (at Centre, State and Project level) was introduced in 1975. The main objective of monitoring is to ensure achievement of physical & financial targets for timely completion of project. It involves identification of the input required, analysis of the reasons for any shortfall / bottleneck and finding remedial measures with a view to complete the project in time bound manner and to achieve the

targets. At Central level, Central Water Commission monitors the progress of selected ongoing irrigation projects. Each project under general monitoring is visited by the monitoring team at least once in a year and detailed monitoring report is prepared and issued to all concerned for necessary action. At present CWC is carrying out general monitoring of 162 major, medium and Extension Renovation and Modernisation (ERM) projects. Table 15.3 gives state-wise break up.

The major & medium irrigation projects under AIBP are also monitored by Central Water Commission through its field offices. As a part of AIBP monitoring, the projects are inspected twice in a year and monthly expenditure reports are collected. The recommendations of CWC form the basis for release of fund by Ministry of Water Resources / Ministry of Finance. CWC is monitoring 128 projects under AIBP and state wise details are at Table 15.4.

Flood Forecasting and Inflow Forecasting

The Commission has a network of 134 Forecasting Stations to cover most of the interstate flood prone rivers besides inflow forecasts for 25 major reservoirs of the country. On an average, over 6000 forecasts are issued by CWC every year. Close liaison with the local civic authorities is maintained to communicate advance warning for appropriate mitigation measures. 4330 flood forecasts were issued during the monsoon period of 2002 which included 594 inflow forecasts. 97.9% of the flood forecasts were found to be within the prescribed accuracy limit.

Reservoir Regulation

Central Water Commission is directly involved in Damodar Valley Reservoir Regulation and has an office of the Superintending Engineer at Maithon. The Chief Engineer, KGB Organisation, Hyderabad, is the Chairman of the Tungabhadra Board and is responsible for regulation of the Tungabhadra dam. The Commission carries out computer based simulation studies for integrated operation of reservoir systems for optimum utilisation of water resources. It also provides vital input for inter-state Committees constituted for providing guidelines for regulation of reservoirs such as Joint Operation Committee for Rihand Reservoir and Joint Regulation Committees for Subernarekha Multipurpose Project.

Reservoir Level Monitoring

The weekly storage positions in 70 important reservoirs throughout the country are monitored and this forms the important input for the Ministry of Agriculture's Crop Weather Watch Group. CWC also co-ordinates with ICAR, Planning Commission, India Meteorological Department and other

organizations so that the research findings related to crop water requirement and cropping patterns are put to practical use. The storage position during the year 2002-03 is shown in Figure 1.

Modernisation and Research and Development

Efforts to modernize the CWC are continuing for application of modern techniques and technology like use of GIS, QPS, remote sensing techniques. The Commission is actively associated with the research and development activities in the field of water resources development in the country. Chairman, CWC and the Member (Design & Research) supervise and co-ordinate the various research projects which are undertaken by the Ministry of Water Resources through various Indian National Committees. As a part of the professional activities, the officers of Central Water Commission contribute technical papers to various journals and participate in Seminars, Workshops or Symposia.

Hydrographic Survey of Important Reservoirs

The scheme for "Conducting Hydrographic Surveys of 30 Important Reservoirs in the Country" under the R&D Scheme of MoWR has been taken up by Central Water Commission. The main objective of the scheme is to estimate sedimentation behaviour in the reservoirs in different zones, to assess and review life expectancy of reservoirs and to develop Regional Sedimentation Indices. During eighth Five Year Plan, capacity survey of Matatila reservoir was completed and survey work in respect of Konar and Tilaiya reservoirs was also taken up. During the ninth Five Year Plan, capacity surveys of 15 reservoirs (including balance work of partially completed two reservoirs Konar & Tilaiya) viz Balimela, Lingnamakki, Idukki, Kakki, Jayakwadi, Ghataprabha, Dharoi, Tenughat, Emerald Avalance, Gestalsud, Minimata, Mayurakshi and Ukai were completed. Capacity surveys of 3 reservoirs namely Srisailam, Nagarjunasagar and Gandhisagar are likely to be completed by the end of current financial year.

Standardization & Documentation

The Commission is very actively associated with the preparation of Codes on various subjects related to water resources and brought out by the Bureau of Indian Standards. CWC is also actively involved in the formulation of International Standards related to Hydrometric Determinations by the International Organization for Standardization. It also brings out various Guidelines, Manuals and Technical Reports which are extensively used by the officers of Irrigation/ Flood Control/ Water Resources Departments of various State Governments. Some of the Guidelines, Manuals and Technical Reports etc. published by Central

Water Commission which are extensively used by the designers / planners throughout the country are as follows.

- Guidelines for Preparation of Detailed Project Reports of Irrigation and Multipurpose Projects.
- Guidelines for Preparation of River Basin Master Plan.
- Flood Estimation Reports for 24 Sub-Zones of the Country.
- Guidelines for Sustainable Water Resources Development and Management.
- Manual on Flood Forecasting.
- Guidelines for Emergency Action Planning and Safety Inspection of Dams.
- Manual on Irrigation & Power Channel, Canal Falls and Planning & Design of Hydraulic Tunnels.
- Guide Book on Use, Rate, Hire Charges and Transfer Value of Equipment and Spare Parts.

Other

An Engineering Museum fully devoted to water resources development in the country is maintained in Delhi. Various aspects of the development in the field of water resources in India are illustrated through self explanatory working models. Bhagirath, a quarterly technical journal in Hindi and English is a part of these efforts. Central Water Commission Library has an extensive collection of more than 1,04,000 books and journals are widely referred by water resources engineers / organizations. A new Library cum Auditorium Building is being constructed shortly to further modernize and upgrade these facilities.

National Water Academy and other Training activities

So far, 248 Engineers have been trained at National Water Academy, Pune in Integrated River Basin Planning and Management. In addition, the Training Directorate at headquarters has organised about 320 courses on various topics related to Water Resources Development. More than 10,385 officials of various State Governments and Central Government Organisations/ Departments have undergone training through these courses. During the year 2002-2003, CWC has organized 29 courses at NWA, Pune and 21 short term courses at its Headquarters at New Delhi.

Advisory Role of Central Water Commission

CWC officers are represented on various Committees/Boards etc. of different organizations and make valuable contribution. The Chairman, Members and other senior officers of Central Water Commission preside over a number of important Committees dealing with the technical matters. Some of the important Committees / Boards which are chaired by the Chairman, CWC are:

1. Indian National Committee on Hydrology
2. Indian National Committee on Irrigation Drainage (INCID)
3. Technical Advisory Committee of CW&PRS, Pune
4. National Committee on Dam Safety
5. Technical Advisory Committee of National Institute of Hydrology, Roorkee
6. Technical Advisory Committee of NWDA
7. Expert Committee of Bhakra Beas Management Board
8. Executive Committee of Betwa River Board
9. Executive Committee of Bansagar Control Board

Interaction with Ministry of Agriculture

Apart from its active association with the Crop Weather Watch Group, the officers of Central Water Commission actively participates in the Inter-Ministerial Central Teams constituted by the Ministry of Agriculture from time to time for national disaster like flood, cyclone, drought etc. In this year, the officers of CWC have actively participated in various Inter-Ministerial Central Teams.

Table – 15.3

Major, Medium & ERM projects monitored by CWC (Field Units & Head Quarter)

S. No	State	Major Projects	Medium Projects	ERM Projects	Total
1	Andhra Pradesh	6	6	2	14
2	Asam	4	2	-	6
3	Bihar	7	3	1	11
4	Chhatisgarh	3	2	-	5
5	Goa	1	-	-	1
6	Gujarat	1	4	4	9
7	Haryana	4	-	1	5
8	Himachal Pradesh	1	1	-	2
9	Jammu & Kashmir	1	-	-	1
10	Jharkhand	2	5	-	7
11	Karnataka	5	8	1	14
12	Kerala	4	1	-	5
13	Madhya Pradesh	8	1	-	9
14	Maharashtra	24	5	-	29
15	Manipur	2	1	-	3
16	Meghalaya	-	1	-	1
17	Orissa	6	1	1	8
18	Punjab	1	-	2	3
19	Rajasthan	7	4	-	11
20	Tamil Nadu	-	-	1	1
21	Tripura	-	1	-	1
22	Uttar Pradesh	7	1	1	9
23	West Bengal	3	4	-	7
	Total	**97**	**51**	**14**	**162**

Table – 15.4

Major, Medium & ERM projects Under AIBP

S. No	State	No. of Projects
1	Andhra Pradesh	10
2	Asam	9
3	Bihar	7
4	Chhatisgarh	4
5	Goa	2
6	Gujarat	6
7	Haryana	3
8	Himachal Pradesh	3
9	Jammu & Kashmir	9
10	Jharkhand	3
11	Karnataka	7
12	Kerala	2
13	Madhya Pradesh	10
14	Maharashtra	9
15	Manipur	3
16	Meghalaya	1
17	Orissa	10
18	Punjab	4
19	Rajasthan	7
20	Tripura	3
21	Uttar Pradesh/Uttaranchal	9
22	West Bengal	7
	Total	**128**

16. CENTRAL GROUND WATER BOARD

INTRODUCTION

The Central Ground Water Board (CGWB) is a subordinate office of the Ministry of Water Resources with Headquarters at Faridabad. It is responsible for carrying out nation-wide surveys and assessment of ground water resources and guiding the states appropriately in scientific and technical matters relating to ground water. The Central Ground Water Board has generated valuable scientific and technical data through regional hydrogeological surveys, ground water exploration, resource and water quality monitoring and research and development. It assists the States in developing broad policy guidelines for development and management of ground water resources including their conservation, augmentation and protection from pollution, regulation of extraction and conjunctive use of surface water and ground water resources. The Central Ground Water Board organizes Mass Awareness programmes to create awareness on various aspect of ground water investigation, exploration, development and management.

ORGANISATIONAL SET UP

The Central Ground Water Board is headed by a Chairman who is also ex officio Additional Secretary to Government of India. The Board has four wings

- ?? Surveys, Assessment and Monitoring (SAM) Wing;
- ?? Sustainable Management and Liaison (SML) Wing;
- ?? Exploratory Drilling and Materials Management (ED&MM) Wing and
- ?? Training and Technology Transfer (T&TT) Wing.

Each wing is headed by a Member of the Board. The Board has 18 Regional Offices, each headed by a Regional Director with an equal number of supporting Engineering offices and eleven State Unit Offices for undertaking various field activities in the country.

Central Ground Water Authority

The Central Ground Water Authority was constituted on 14th January, 1997 under Environmental (protection) Act, 1986 for the purpose of regulation and control of ground water development and management. The Authority is headed by the Chairman Central Ground Water Board and comprises of the four Members of the Board.

MAIN ACTIVITIES AND PROGRESS (UPTO DECEMBER, 2002) :

DISTRICT GROUND WATER DEVELOPMENT AND MANAGEMENT STUDIES (REAPPRAISAL HYDROGEOLOGICAL SURVEYS)

Ground water being replenishable and dynamic in nature, it becomes essential to conduct periodical surveys to assess the quality and quantitative changes in the ground water re gimes in time and space. These surveys also help in measuring the impact on local ground water regime of various developmental activities like introduction of surface irrigation scheme urbanization and withdrawal of ground water. During 2002-03 total of 1,99,510 Sq. Km (pre monsoon) and 82,317 Sq. Km. (Post monsoon) is covered (up to December, 2002) against the target of 2.02 lakh Sq.Km. Detailed year-wise targets vis-à-vis achievements (upto December, 2002) is shown in Figure 1.

GROUND WATER EXPLORATION PROGRAMME

The exploration of ground water to study the sub-surface geological and hydrogeological setups and evaluate various aquifer parameters is carried out by the Board with a fleet of 91 drilling rigs. During 2002-2003, the Board has drilled 458 exploratory boreholes, 66 observation boreholes , 43 piezometers, 3 slim hole and 56 deposit wells, totaling 626 (including 212 wells drilled in drought and 39 wells drilled in tribal areas) upto December,'2002 against the target of 817 wells(Exploratory Well – 513 , Observation Well – 197, Piezometre – 104 and Deposit Well – 3) in various terrain. Detailed Region-wise targets vis-à-vis achievements during 2002-2003 (upto December, 2002) is shown in Figure 2. Under the programme 27 high yielding aquifer were explored in the State of Andhra Pradesh, Chhattisgarh, Gujarat, J&K, Jharkhand, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan and West Bengal. The yield recorded was as high as 1560 litre per minute.

MONITORING THROUGH THE NATIONAL HYDROGRAPH NETWORK STATIONS FOR GROUND WATER LEVELS AND QUALITY

GROUND WATER LEVEL

The Board is monitoring the ground water levels in the country four times a year(Jan/May/Aug/Nov) through a network of 15700 National Hydrograph Stations. The water samples collected during the pre -monsoon monitoring are analysed for the purpose of ascertaining the changes in chemical quality of ground water. Monitoring of May, August and November 2002 completed in all the Regions and respective reports have been submitted reflecting the fluctuation of water levels compared to monitoring of previous year, Decadal average and pre-monsoon water levels.

Water Quality

The Board has 16 chemical laboratories in the Regional Directorates and one Hydrochemical R&D laboratory at Faridabad to analyze water samples collected from Hydrograph Stations and those collected during surveys, exploration and other investigations (water quality and pollution studies etc.). About 13370 samples have been analysed upto November' 2002 for evaluating and assessing the ground water quality and its suitability for different purposes like drinking, agriculture and irrigation, industrial purposes.

Some regional laboratories have been provided with modern instruments for carrying out analysis of organic compounds to monitor the impact of use of fertilizers, pesticides and insecticides, oil spills, solids wastes disposal/ dumps etc. The Board has acquired sophisticated equipments under the project improvement of equipments for water quality monitoring in India under Japan's grant-in-aid programme.

GEOPHYSICAL STUDIES

As an integral part of its activities, the Board undertakes geophysical studies to support and supplement hydrogeological surveys, ground water exploration and short-term water supply investigations. Besides these studies, geophysical techniques were also undertaken to demarcate bedrock configuration and thickness of overburden and saline -fresh water interface and ultimately help in carrying out hydrogeological studies well construction etc. So far 764 Vertical Electrical sounding and 152 bore hole logging has been completed in the various regions of the country.

STUDIES ON GROUND WATER RECHARGE

The Central Ground Water Board has taken up artificial recharge studies under Central Sector Scheme for Study of Recharge to Ground Water .The pilot scheme is being implemented in "Over-Exploited", "Dark" and "Grey" blocks, potential areas having surplus monsoon runoff and sufficient sub surface storage, areas having saline water ingress etc. The objective of the scheme is to evolve standard and economic designs of artificial recharge structures for various types of hydrogeological set ups. Implementation of these schemes is expected to arrest declining trend in ground water table and provide additional irrigation benefits to the farmers. The scheme will also help in upgrading technical competence and skills of the personnel in the state Govt. organizations which are taking up civil work for construction of artificial recharge structures to replicate successful schemes in similar hydrogeological environs.

During 2002-2003, the civil work for construction of artificial recharge structures under 123 projects and monitoring for impact assessment in 49 completed projects were taken up. Constructions of artificial recharge structures under 58 projects were completed. In other 65 projects, construction work is under various stages of progress. The impact assessment of completed recharge projects have indicated increase in rise in water levels and sustainability of dug wells/tube wells, decrease in soil erosion and improvement in socio-economic status of farmers of benefited zone due to increase in crop production.

SHORT TERM WATER SUPPLY INVESTIGATIONS

These investigations are carried out for locating sites for ground water structures and designing of tube wells and water lifting devices to provide a dependable water supply system in rural and urban areas, Railway and industrial establishments with priority being given to Defence Organizations. During 2002-2003, upto December, 2002, 221 short term investigations were carried out.

GROUND WATER POLLUTION STUDIES

22 Studies to assess nature of pollution, sources of pollution and measures to control ground water pollution had been taken up during 2002-2003. These studies cover areas –Bhatinda, Barnala (Punjab), Yamunanagar (Haryana), Nalagadh Badli(H.P), Bhiwadi (Rajashthan), Dhar (M.P.), Thane, Ahmednagar and Nanded (Maharashtra), two tehsil of Lucknow and one of Barabanki.(U.P.), Karbi Anglong and Guwahati (Assam), Korba (Chattisgarh), Sahebganj (Bihar), Durgapur (West Bengal), Cuttak(Orissa), two areas of Hyderabad (A.P.), Manglore (Karnataka), Ambatur Industrial area(T.N.), Palghat distt.(Kerala)and Delhi. Data collection and analysis is under progress.

URBAN HYDROGEOLOGICAL STUDIES

Special studies on urban hydrogeology are being undertaken with an objective to have sustainable water supply to the major cities strained with water supply and pollution problems. During 2002-2003, a total of 15 studies out of 16 studies were initiated in the cities of Mandi town(H.P.), Barnala(Punjab), Ambala (Haryana), Dewas City (M.P.), Bilaspur City (Chhattisgarh), Sholapur (Maharashtra), Agra(U.P.), Bardhman (W.B.), Maugaldoi, Sibsagar (Assam), Pasighat, (Arunanchal Pradesh), Agartala(Tripura), Cuttak (Orissa), Manglore City (Karnataka) and Delhi upto November, 2002. The study for Srinagar and Leh could not be taken up due to law and order problem. Pre-monsoon water level, monitoring with data collection, preparations of hydrogeological maps, collection of water samples is under progress for above studies.

RESEARCH & DEVELOPMENT SCHEMES

Central Ground Water Board has a scheme on Research and Development. Under this scheme projects are being sanctioned to be implemented by Research and Development Organizations. Ten number of R & D schemes covering themes of ground water pollution, artificial recharge and ground water management were scrutinized and submitted for clearance of which administrative approval of one scheme has been received. Beside interim report of three schemes have been received and four new schemes have been sent to the experts for their comments.

CENTRAL GROUND WATER AUTHORITY

Central Ground Water Authority is entrusted with the regulation and control of ground water development and its management throughout the country. Achievements of the Authority are as follows-

- **Mass awareness programme:** Three mass awareness programmes were organised with participation of the local administration, political leaders, NGO's and VO's, students and the users in the affected areas. Besides these, 31 more such mass awareness programmes and 34 one day training courses on rain water harvesting are proposed to be conducted in critical areas in 2002-03.
- **Regulation of ground water development in NCT, Delhi**: Central Ground Water Authority is regulating the ground water development in the notified areas, in South and South-west districts of NCT, Delhi. Permission was accorded for construction of tubewells for drinking & domestic purposes to schools/institutions, Government organizations, Delhi Jal Board, Municipal Corporation of Delhi, hospital.
- **Adoption of Roof top rain water harvesting systems:** CGWA has directed Group housing societies / institutions/ schools/ hotels/ industrial establishments/ farm houses in notified areas of Delhi, Haryana and U.P and all Group housing societies in NCT Delhi except those which are located in Yamuna Flood Plain area or where water level are within 8 m. b. g.l. and who are exploiting ground water, to adopt rain water harvesting system in their premises. The last date has now been extended to 31st May, 2003.
- **Registration of persons/agencies engaged in construction of water well:** During this period, approximately 100 no. of agencies engaged in construction of water wells were registered.
- **Evaluation of proposals of industries and projects seeking clearance of Central Ground Water Authority:** During this period 14 industries/firms were accorded clearance for withdrawal of ground w ater for industrial purposes.

- **Meetings of the Central Ground Water Authority:** Fifteenth and Sixteenth meetings of the Authority were held on 6.5.2002 and 15.11.2002 respectively.
- **Ground water flow modeling studies in NOIDA area:** A study has been initiated to study the impact of urbanization on ground water regime through development of a mathematical model to simulate hydrogeological conditions and ground water flow systems in the area bordering Delhi in the eastern border, falling in Noida of Gautam Budh District in Uttar Pradesh and generate alternate management scenario and evolve planning strategies.

RAJIV GANDHI NATIONAL GROUND WATER RESEARCH AND TRAINING INSTITUTE

The Rajiv Gandhi National Ground Water Research and Training Institute (RGNGWR & TI) started functioning from Raipur (Chattisgarh) in May 1996. The Institute is being established with the aim of starting training courses, seminars, symposia etc., at national as well as international level and provide research facilities in the field of ground water in India. In accordance with the directives of the Ministry of Water Resources, the buildings or RGNGWTRI at Raipur were handed over, to the Chhatisgarh government. However, efforts were made to conduct few courses like Induction Level Training Course for the Engineers and the Scientists of the department, Short course On management and drillers training course at different regions of the Central Ground Water Board.

- One week Administrative training for the staff of CGWB was held at Kolkata in April 2002 in which 15 trainees were trained from the department.
- Two training courses of one week with 30 trainees were conducted at Bhubaneshwar on “Refresher courses for Chemist in data coordination, quality control and quality assurance and heavy metal analysis”.
- Sixteen week long Induction level training courses on Ground water survey, exploration and assessment and management commenced in November, 2002. 22 trainees will be trained under this course.
- Dialogue with United States Geological Survey for technical collaboration in emerging area of ground water has been taken up.

HYDROLOGY PROJECT

The Board is the nodal agency for the ground water sub-sector of World Bank assisted Projects. The details of the project are given in Chapter 6 of the Report.

During the Current Annual Action Plan 2002-2003 the following work has been carried out upto December,2002

- Dedicated Software for Data Entry, Validation and Data Processing developed by M/S Tata Infotech Ltd., was installed at National Data Centre, Faridabad and State Ground Water Agency, Hyderabad for pilot testing.
- 400 Digital Water Level Recorders procured during the current year (2002-03), were installed.
- Protocol for data entry, validation, analysis, and dissemination is under implementation by the various regional offices of CGWB.
- Hardware for the Data Storage Centers for 10 sites were procured and is under installation.
- Total 119 officers from CGWB and 142 from states governments have undergone training on various training courses.
- R&D studies in Kuttanad area of Kerala were completed. Final report submitted to Ministry of Water Resources. The R&D studies in Chennai is under progress.
- HIS help desk has been established at CGWB, National Data Centre, Faridabad.

ESTIMATION OF GROUND WATER RESOURCE BASED ON GEC'97 METHODOLOGY

Following guidelines of National Water Policy, the ground water resource estimation is being revised based on GEC'97 methodology. Meeting are being held with State Government Organizations to make joint assessment of ground water resource. The States of Uttar Pradesh, Rajasthan, Andhra Pradesh, Assam, Tamil Nadu, and Kerala have completed the exercise for the entire state. The states of Maharashtra and Orissa and NCT Delhi are in the final stages of completion of the exercise.

Present estimation of ground water resource of the entire country is based on GEC'84. The ground water resources and its stage of development (state-wise) as on 1.4.98 is Table 16.1 and the categorization of blocks is given as Table 16.2. The summary of ground water resources estimate carried out by Kerala, Uttar Pradesh, Rajasthan and Andhra Pradesh using GEC' 97 methodology is given as Table 16.3.

SPECIFIC STUDIES IN PROBLEMATIC AREAS

R & D PROJECT STUDIES IN RESPECT OF HIGH INCIDENCE OF ARSENIC IN GROUND WATER OF WEST BENGAL

- R&D Studies on arsenic at Joypur village, Barasat - I block, North 24 Parganas district: During the study Arsenic concentration was found to increase to the tune of 0.01 mg/l to 0.19 mg/l as compared to the samples of November 2001. In the north of the area from Barbaria to Joypo,l arsenic concentration within the depth span of 20 - 55 mbgl ranges below desired level to 1.99 mg/l, while the concentration ranges below desired level to maximum of 0.04 mg/l in the depth span of 90 - 220 mbgl in Barasat - I block. In the south from Gopal Nonapara to Tehatta aquifers within the depth span of 134 - 193 mbgl are safe. Based on section drawn along northwest - southeast from Babpur in Barasat-I block to Tehatta in Barasat-II block aquifers within the depth span of 120 - 203 mbgl are arsenic free/ safe and aquifers within 20 - 110 mbgl contain arsenic more than the permissible limit of 0.05 mg/l.
- Under the Exploration in arsenic infested area of West Bengal 6 nos. of exploratory wells (EW) were constructed in three arsenic affected districts viz. Nadia, 24 Parganas and Murshidabad districts, screening arsenic free aquifers. One well was handed over to the user agency and the remaining are under the process of handing over.
- Arsenic Atlas for graphical presentation of arsenic pollution in ground water and related problems in affected blocks of 8 districts using is under preparation.

MATHEMATICAL MODELLING STUDIES

The Board conducts mathematical modeling studies to simulate existing ground water conditions in command areas and other problematic areas. For development of the models MODFLOW (PM3) package has been used by invoking various modules/ facilities as given in the package. For prognostic runs the models have been used to predict the ground water scenarios. The results of the prognostic runs have been used to recommend optimal utilization pattern and management approach for future development and management. The mathematical modeling works in IGNP –II, Rajashthan and Kosi canal command area was completed in year 2000-2001 and Nagarjuna Sagar Irrigation Command, Andhra Pradesh, and Gandak Canal Command Area, Bihar, were completed 2002-03 Reports are under final stages of completion.

MAPPING OF WATER LOGGED AREA AND FEASIBILITY STUDY FOR ANTI WATER LOGGING MEASURES

During 2002-2003, Central Ground Water Board proposed to take up special studies aimed at delineating the water logged and feasibility study for anti water logging measures. 6 out of 10 studies in canal command area of IGNP stage I (Rajashthan), Raibarelly and Sultanpur (U.P.), Purnea (Bihar), Vamsadhra Irrigation project area of Sirkakulam district (A.P) and Dharamshala (H.P.) have been undertaken upto December, 2002. Pre-monsoon work, collection of data, key well monitoring and collection of water samples have been initiated.

SEA WATER INGRESS STUDIES

The Project studies envisaging mapping of sea water ingress through multidisciplinary approach including geophysical, hydrochemical and remote sensing studies were proposed to be carried out. Feasibility of appropriate measures to arrest the ingress through controlled pumpage and artificial recharge were proposed to be evaluated to push back the sea water/fresh water interface. 3 studies have been taken up during 2002-2003 in Manrur chorwar area, (Gujrat), Coastal stretch in part of Udipi (Karnataka), and coastal tract of Tamilnadu.

ISOTOPIC STUDIES

During 2002-2003, till December, 2002 studies were undertaken namely, Ganga Basin, (by NR, Lucknow), Chennai (TN) and two in Yamuna flood plain areas of Gazipur, Bhalswa and Okhla in Delhi. In Chennai study results from BARC is awaited. Three studies are water balance studies to be taken up as per the recommendation of National Commission for Integrated Water Resources Development Plan in Maharashtra, Tamil Nadu, Chattisgarh and one study in Karnataka is proposed to be taken up in association with National Institute of Hydrology.

CONJUNCTIVE USE OF SURFACE AND GROUND WATER

Three new schemes for feasibility studies has been taken up in West Jamuna Canal command area (Haryana), Rasikulya command area Orissa and Sri Ram Sagar project, Andhra Pradesh. Final reports of IGNP stage-II, Rajasthan and Kosi Command Area, Bihar were submitted for scrutinization. Reports of Nagarjuna Sagar, Irrigation Command , Andhra Pradesh and Gandak Command Area are under finalization.

GROUND WATER EXPLORATION IN GANGA BASIN

The areas suitable for deep drilling i.e.1000 to 1500 m in Ganga Basin have been demarcated based on the exploratory borehole's data of ONGC. The area suitable for 1000 m deep exploratory drilling in Uttaranchal, Uttar Pradesh and North Bihar is 12924 sq. km. An area of about 4756 sq. km. has been demarcated for 1500 m deep Exploratory drilling. In this regard a

clear MOU between ONGC and CGWB is being worked out for smooth exchange of relevant scientific data for taking up the Deep Exploratory Drilling programme in Ganga Basin.

APPLICATION OF REMOTE SENSING AND G.I.S. TECHNIQUES TO GROUND WATER STUDIES

The role of remote sensing in the field of hydrogeological studies is very important., there are many indirect imprints about their availability are present as surface features in certain area which if picked up, can give valuable clues for siting ground water potential zones and ground water management activities. During the year 2002-2003, up to December,2002, the regional offices of the Central Ground Water Board have taken up remote sensing studies in Mandusar area (M.P.), Bundelkhand area (U.P.), Western Gandak canal Command (Bihar), Darjeeling (West Bengal), Ganjam district (Orissa), Tumkur district (Karnataka), Hilly area of Salem and Dharmapuri distt (Tamil Nadu), and Kerala state for ground water targeting, preparation of hydro-geomorphological maps, salinity identification mapping of water logged area and ground water management studies. The data interpreted through the satellite images is very vital information, which are being utilized to narrow down the targeting zones.

DATA STORAGE AND RETRIEVAL

The Central Ground Water Board is collecting voluminous data on various aspects of ground water investigation, development and management. The task of design, analysis and development of software for organization, management and analysis of the data generated by Board is being under taken by the Data Storage and Retrieval cell of the Board. The data of ground water level from the National Hydrograph Network Stations has been computerized. Personnel computers along with MS office software have been provided at Head Quarter, Faridabad, Regional, divisional and Unit offices of the Board. NICNET connection has also been provided at Central Head Quarters, Faridabad and all the Regional Offices. During 2002-2003, design of a Management Information System (MIS) has been initiated and it is proposed to complete financial management Module of MIS.

REPORTS, MAPS AND ATLASES

The results of the investigations undertaken by the Board are suitably documented in the form of technical reports. These reports have been categorized as project reports, survey reports, district reports, state reports, basic data reports, maps and atlases.

- During 2002-2003, 44 District Reports, 43 district Hydrogeological maps (1:250,000 scale) are under preparation.
- The Hydrogeological atlas of Delhi is under modification.
- Atlases of Kerala, Uttar Pradesh and Madhya Pradesh under process for printing.
- Atlas of Haryana is under the process of defence clearance.
- Atlas of Punjab cartographic corrections are under progress.
- Board has published Hydrogeological Map of India on 1:5 million scale. The new edition Hydrogelogical Map of India on 1:2 million scale is also prepared and printed.
- Board has prepared and published ground water maps for 15 districts of various states of the country, on the occasion of inaugural function of Fresh Water year –2003 for users.

TECHNICAL EXAMINATION OF MAJOR AND MEDIUM IRRIGATION SCHEMES

The Board is scrutinizing the major and medium irrigation project water balance studies etc. sent by the State Governments and other agencies. Recommendations are being made for including programme for the development of the ground water component in these projects so as to bring an integrated development of the total water resources of the command. Under AAP-2002-03, ten proposal/ schemes has been scrutinized till December, 2002.

OTHER ACTIVITIES

The Board brings out a quarterly journal, 'BHU-JAL NEWS". The journal contains various technical notes, news items, list of published papers and unpublished reports of the Board etc. Central Ground Water Board participates in various International and other Exhibitions It also organises Mass Awareness programmes to create awareness on various aspect of ground water investigation, exploration, development and management. During such programmes activities of CGWB are explained to masses through working models on hydrogeological cycle, resistivity investigation, drilling rig, bore well logging, artificial recharge, rain water harvesting, conjunctive use of surface and ground water, translite on roof top rainwater harvesting and panels on activities and achievements of CGWB. In addition to this on the spot chemical analysis of water to check its suitability for drinking and domestic use, testing kit, effect of major pollutants on human health and treatment techniques for high fluoride were also displayed during different exhibition.

Table 16.1

GROUND WATER RESOURCE OF INDIA [As on 01.04.98]

Sl. No.	States	Total Replenishable Ground Water Resource MHaM/Yr	Provision for Domestic Industrial & Other uses MHaM/Yr	Available Ground Water Resource for Irrigation in Net terms MHaM/Yr	Utilizable Ground Water Resource for Irrigation in Net terms MHaM/Yr	Gross draft Estimated on Prorata basis MHaM/Yr	Net Draft MHaM/ Yr	Balance Ground Water Resource for future use in net terms MHaM/Yr	Level of Ground Water Development [%]
1	Andhra Pradesh	3.52909	0.52936	2.99973	2.69975	1.11863	0.78304	2.21668	26.10
2	Arunachal Pradesh	0.14385	0.02158	0.12227	0.11005	-	-	0.12227	-
3	Assam	2.24786	0.33718	1.91068	1.71962	0.20356	0.14249	1.76819	7.46
4	Bihar	2.69796	0.4047	2.29327	2.06394	1.17895	0.82527	1.46800	35.99
5	Chattisgarh	1.60705	0.24106	1.36599	1.22939	0.10925	0.07647	1.28952	5.60
6	Goa	0.02182	0.00327	0.01855	0.01669	0.00219	0.00154	0.01701	8.30
7	Gujarat	2.03767	0.30566	1.73199	1.55881	1.21895	0.85327	0.87872	49.27
8	Haryana	1.11794	0.16769	0.95025	0.85523	1.02637	0.71846	0.23179	75.61
9	Himachal Pradesh	0.02926	0.00439	0.02487	0.02238	0.00591	0.00413	0.02073	16.63
10	Jammu & Kashmir	0.44257	0.06640	0.37620	0.33860	0.00586	0.00403	0.37217	1.07
11	Jharkhand	0.66045	0.09907	0.56138	0.50525	0.17352	0.12146	0.43992	21.64
12	Karnataka	1.61750	0.24186	1.37564	1.23665	0.64973	0.45481	0.92083	33.06
13	Kerala	0.79003	0.13135	0.65869	0.59281	0.17887	0.12509	0.53360	18.99
14	Madhya Pradesh	3.48186	0.52228	2.95958	2.66362	1.05494	0.73846	2.22112	24.95
15	Maharashtra	3.78677	1.23973	2.54704	2.29233	1.26243	0.8837	1.66334	34.70
16	Manipur	0.31540	0.04730	0.26810	0.24129	Neg.	Neg.	0.26810	Neg.
17	Meghalaya	0.05397	0.00810	0.04587	0.04128	0.00260	0.00182	0.04405	Neg.
18	Mizoram	Not Assessed							
19	Nagaland	0.07240	0.01090	0.06150	0.05535	Neg.	Neg.	0.06150	Neg.

20	Orissa	2.01287	0.30193	1.71094	1.53984	0.37196	0.26037	1.45057	15.22
21	Punjab	1.81923	0.18192	1.63730	1.47357	2.30028	1.61020	0.02710	98.34
22	Rajasthan	1.26021	0.19977	1.06044	0.95440	1.10350	0.77245	0.28799	72.84
23	Sikkim	Not Assessed							
24	Tamil Nadu	2.64069	0.39610	2.24458	2.02013	2.00569	1.40398	0.84060	62.55
25	Tripura	0.06634	0.00995	0.05639	0.05075	0.02692	0.01885	0.03754	33.43
26	Uttar Pradesh	8.25459	1.23819	7.01640	6.31476	4.25171	2.97619	4.04021	42.42
27	Uttaranchal	0.28411	0.04262	0.24149	0.21734	0.09776	0.06843	0.17306	28.34
28	West Bengal	2.30914	0.34637	1.96277	1.76649	0.9025	0.63175	1.33102	32.19
	Total States	**43.30063**	**7.09873**	**36.20191**	**32.58033**	**19.25207**	**13.47627**	**22.72564**	**37.23**
	Union Territories								
1	Andaman & Nicobar	Not Assessed							
2	Chandigarh	0.00297	0.00044	0.00252	0.00227	0.00351	0.00245	0.00007	-
3	Dadar & Nagar Haveli	0.00422	0.00063	0.00359	0.00323	0.00065	0.00046	0.00313	12.81
4	Daman	0.00071	0.00011	0.00060	0.00054	0.00069	0.00048	0.00012	80.00
5	Diu	0.00037	0.00006	0.00031	0.00028	0.00042	0.00029	0.00002	94.84
6	NCT Delhi	0.02916	0.01939	0.00977	0.00879	0.01684	0.01180	-0.00203	120.78
7	Lakshdweep	0.03042	0.00456	0.00195	0.00176	0.00109	0.00076	0.00119	39.12
8	Pondicherry	0.01746	0.00262	0.01484	0.01335	0.01645	0.01152	0.00332	77.63
	Total Uts	**0.08530**	**0.02782**	**0.03358**	**0.03022**	**0.03966**	**0.02777**	**0.00581**	
	Grand Total	**43.38593**	**7.12655**	**36.25938**	**32.63345**	**19.29173**	**13.50404**	**22.73145**	**37.24**

Table 16.2

CATEGORISATION OF BLOCKS/MANDALS/TALUKS/WATERSHEDS AS OVER EXPLOITED AND DARK ON ALL INDIA BASIS

Sl. No.	States	Number of Districts	Number of Blocks/ Mandals/ Taluks/ Watersheds	No. of Blocks/Taluks/Mandals/Watersheds Over-exploited		Dark	
				No.	%	No.	%
	States						
1	Andhra Pradesh	22	1104	12	1.09	14	1.27
2	Arunachal Pradesh	3		0	0.00	0	0.00
3	Assam	23	134	0	0.00	0	0.00
4	Bihar	42	589	3	0.51	9	1.53
5	Goa	3	12	0	0.00	0	0.00
6	Gujarat	19	184	13	7.07	15	8.15
7	Haryana	17	108	33	30.56	8	7.41
8	Himachal Pradesh	12	69	0	0.00	0	0.00
9	Jammu & Kashmir	14	123	0	0.00	0	0.00
10	Karnataka	19	175	7	4.00	9	5.14
11	Kerala	14	154	0	0.00	0	0.00
12	Madhya Pradesh	45	459	2	0.44	1	0.22
13	Maharashtra	29	231	2	0.87	6	2.60
14	Manipur	6	26	0	0.00	0	0.00
15	Meghalaya	5	29	0	0.00	0	0.00
16	Mizoram	3	20	Not Assessed			
17	Nagaland	7	21	0	0.00	0	0.00
18	Orissa	30	314	4	1.27	4	1.27
19	Punjab	17	138	72	52.17	11	7.97
20	Rajasthan	32	236	74	31.36	20	8.47
21	Sikkim	4	4	Not Assessed			
22	Tamil Nadu	27	384	64	16.67	39	10.16
23	Tripura	3	17	0	0.00	0	0.00
24	Uttar Pradesh	58	819	19	2.32	21	2.56
25	West Bengal	16	341	0	0.00	1	0.29
	Total States	**470**	**5691**	**305**		**158**	

Sl. No.	States	Number of Districts	Number of Blocks/ Mandals/ Taluks/ Watersheds	No. of Blocks/Taluks/Mandals/Watersheds Over-exploited		Dark	
				No.	%	No.	%
	Union Territories						
1	Andaman & Nicobar						
2	Chandigarh						
3	Dadar & Nagar Haveli						
4	Daman & Diu		2	1	50.00	1	50.00
5	NCT Delhi		5	3	60.00	1	20.00
6	Lakshdweep		9	0	0.00	0	0.00
7	Pondicherry		4	1	25.00	-	0.00
	Total Uts		**20**	**5**		**2**	
	Grand Total		**5711**	**310**		**160**	

Note - Andhra Pradesh - Mandal

Gujarat, Karnataka, Maharashtra - Taluks/ Tehsils

Table 16.3

GROUND WATER RESOURCE POTENTIAL (AS PER NORMS OF GEC -97)

S. No	State	Net Annual Ground Water Availability MCM	Existing gross ground water draft for all uses MCM	Net ground water availability for future irrigation development MCM	Stage of Development MCM
1	Andhra Pradesh	29248.33	12951.94	16222.10	44.28
2	Kerala	6433.23	2692.35	3309.00	41.85
3	Rajasthan	11158.97	11634.78	-1909.27	104.26
4	Uttar Pradesh	82505.33	44646.84	37858.50	54.11

17. NATIONAL WATER DEVELOPMENT AGENCY

INTRODUCTION

National Water Development Agency (NWDA) was established in July, 1982 as a registered Society under the Societies Registration Act, 1860 under the Ministry of Water Resources to promote scientific development for optimum utilization of water resources in the country and for preparing feasibility reports for interbasin transfer of water from surplus to deficit areas as envisaged in the National Perspective for Water Resources Development. The Agency functions with the following main objectives:

(a) To promote scientific development for optimum utilization of water resources in the country.

(b) To carry out detailed field surveys and investigations of possible storage reservoir sites and inter connecting links in order to establish feasibility of the proposals of Peninsular Rivers Development and Himalayan Rivers Development Components forming part of National Perspective for Water Resources Development prepared by the then Min. of Irrigation (now Ministry of Water Resources) and Central Water commission.

(c) To carry out detailed studies about the quantum of water in various Peninsular and Himalayan River Systems, which can be transferred to other basins/States after meeting reasonable needs of basin States in the foreseeable future.

(d) To prepare feasibility reports of various components of the schemes relating to Peninsular Rivers Development and Himalayan Rivers Development.

(e) To take all such other actions the Society may consider necessary, incidental, supplementary or conducive to the attainment of above objectives.

ORGANISATION

The Agency is headed by the Director General who is the Principal Executive Officer of the Society, responsible for the proper administration of the affairs and funds of the Society. It has two field organizations, each headed by a Chief Engineer, 5 Circles each headed by a Superintending Engineer, 15 Divisions each headed by an Executive Engineer and 8 Sub-Divisions each headed by an Assistant Executive Engineer/Assistant Engineer.

INTER BASIN TRANSFER OF WATER

NATIONAL PERSPECTIVE PLAN PROPOSALS

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

The water transfer links proposed by NWDA in those components is at Figure 1.

PENINSULAR RIVERS DEVELOPMENT COMPONENT

The Peninsular Rivers Development is divided into following four major parts:

(i) Interlinking of the Mahanadi-Godavari-Krishna-Pennar-Cauvery rivers.
(ii) Interlinking of the west flowing rivers north of Bombay and South of Tapi.
(iii) Interlinking of the river Ken with Chambal.
(iv) Diversion of the west flowing rivers of Kerala and Karnataka to water deficit areas east of the Western ghats.

The work related to Peninsular Component comprises :

Collection of data for 137 basins/sub-basins, water balance studies of 137 basins/sub-basins and at 52 identified diversion points, toposheet & storage capacity studies of 58 identified reservoirs, toposheet studies of 18 links including identification of command area en route, preparation of prefeasibility reports of 18 links and surveys and investigations of 16 water transfer links for preparation of feasibility reports.

Studies undertaken :

Under the Peninsular Component, National Water Development Agency has completed collection of data and water balance studies of all 137 basins/sub-basins and 52 identified diversion points, 58 reservoir studies, toposheet studies of 18 links and all prefeasibility reports.

The field surveys and investigations and preparation of feasibility reports of the following six links were completed by the end of March, 2002.

1. Par-Tapi-Narmada link
2. Pamba-Achankovil-Vaippar link

3. Ken-Betwa link
4. Godavari(Polavaram)-Krishna(Vijayawada) link
5. Krishna(Srisailam)-Pennar link
6. Krishna (Nagarjunasagar)- Pennar (Somasila) link

The field surveys and investigations and preparation of feasibility reports of the following three links are programmed to be completed by March, 2003.

1. Damanganga-Pinjal link
2. Krishna(Almatti)-Pennar link
3. Parbati- Kalisindh-Chambal link

The field surveys and investigations and preparation of feasibility reports of the following five links remained under progress during the year.

1. Mahanadi (Manibhadra)-Godavari(Dowlaiswaram) link
2. Cauvery(Kattalai)-Vaigai-Gundar link
3. Godavari(Inchampalli Low Dam)-Krishna (Nagarjunasagar Tail Pond) link
4. Godavari(Inchampalli)-Krishna (Nagarjunasagar) link
5. Pennar(Somasila)–Cauvery(Grand Anicut) link

The topographical surveys of Godavari (Inchampalli)-Krishna (Nagarjunasagar) and the difficult reaches of Godavari (Inchampalli Low Dam)-Krishna (Nagarjunasagar Tail Pond) links by aerial photogrammetry method were entrusted to NRSA, Hyderabad and same are also under progress. The special studies such as geological survey, geophysical investigations, geotechnical investigations, drilling work for geotechnical investigations, construction materials investigations, borrow area survey, socio-economic and environmental surveys, command area surveys, pre-irrigation soil surveys etc. of the above links remained under progress by other agencies.

HIMALAYAN RIVERS DEVELOPMENT COMPONENT

The Himalayan Rivers Development Component envisages construction of storage reservoirs on the principal tributaries of the Ganga and the Brahmaputra in India, Nepal and Bhutan, along with interlinking canal systems to transfer surplus flows of the eastern tributaries of the Ganga to the west, apart from linking of the main Brahmaputra and its tributaries with the Ganga and Ganga with Mahanadi. It would also provide the necessary discharge for augmentation of flows at Farakka to inter-alia flush the Calcutta Port and the inland navigation facilities across the country. The work related to the Himalayan Component comprises: Water balance studies at 19 diversion points, toposheet studies of 16 reservoirs, toposheet studies of 19 water transfer links, preparation of prefeasibility reports of 14

water transfer links and survey and investigations of 14 water transfer links for preparation of feasibility reports.

Studies undertaken:

Under the Himalayan Rivers Development Component, NWDA has completed water balance studies at all the 19 diversion points, toposheet studies of 16 storage reservoirs & 19 water transfer links and prefeasibility report of 14 links. The field surveys and investigations and preparation of feasibility reports of the following three links programmed to be completed by March, 2003.

1. Sarda-Yamuna link
2. Ghagra- Yamuna link (Indian territory)
3. Chunar-Sone Barrage link

The field surveys and investigations and preparation of feasibility reports of the following six links remained under progress during the year.

1. Yamuna-Rajasthan link
2. Rajasthan-Sabarmati link
3. Sone Dam- Southern Tributaries of Ganga link
4. Ganga-Damodar-Subernarekha link
5. Subernarekha-Mahanadi link
6. Manas-Sankosh-Tista-Ganga link

In addition to the above, topographical surveys and other related investigations for preparation of feasibility report of Gandak-Ganga link were initiated during the year.

The status of studies for Peninsular Component and Himalayan Component is shown in Figure 2 and Figure 3 respectively.

SET UP OF TASK FORCE ON INTERLINKING OF RIVERS

A Task Force on Interlinking of Rivers vide its Resolution No. 2/21/2002-BM dated 13.12.2002 has been set up with the following constitution :

Shri Suresh Prabhu, M.P	-	Chairman
Shri C.C.Patel	-	Vice-Chairman
Dr. C.D.Thatte	-	Member-Secretary

The Task Force will 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 respect of economic viability, socio-economic impacts, environmental impacts and preparation of resettlement plans. The Task Force will also suggest the

prioritization of different project components for preparation of Detailed Project Reports and its implementation, propose suitable organizational structure for implementing the project and to consider various modalities for project funding etc.

In addition to the above mentioned members of the Task Force, part-time members will also be nominated in consultation with the Chairman of the Task Force and with the approval of the Prime Minister. These part-time members will be as under:

1. A member from water deficit States
2. A member from water surplus States
3. An economist
4. A sociologist, and
5. A legal/world wildlife expert.

The milestone/ time table for achieving the goal of interlinking of rivers as indicated in the above resolution is as under:

(i)	Preparation of Action Plan-I, giving an outline of the time schedules for the completion of the feasibility studies, detailed project reports, estimated cost, implementation schedule, concrete benefits and advantages of the project, etc.	30.04.2003
(ii)	Preparation of Action Plan-II, giving alternative options for funding and execution of the project as also the suggested methods for cost recovery.	31.07.2003
(iii)	Meeting with the Chief Ministers to deliberate over the project and to elicit their cooperation.	May/June, 2003
(iv)	Completion of Feasibility Studies (already in progress).	31.12.2005
(v)	Completion of Detailed Project Reports. (Preparation of DPRs will start simultaneously since FSs in respect of six river links have already been completed).	31.12.2006
(vi)	Implementation of the Project (10 years).	31.12.2016

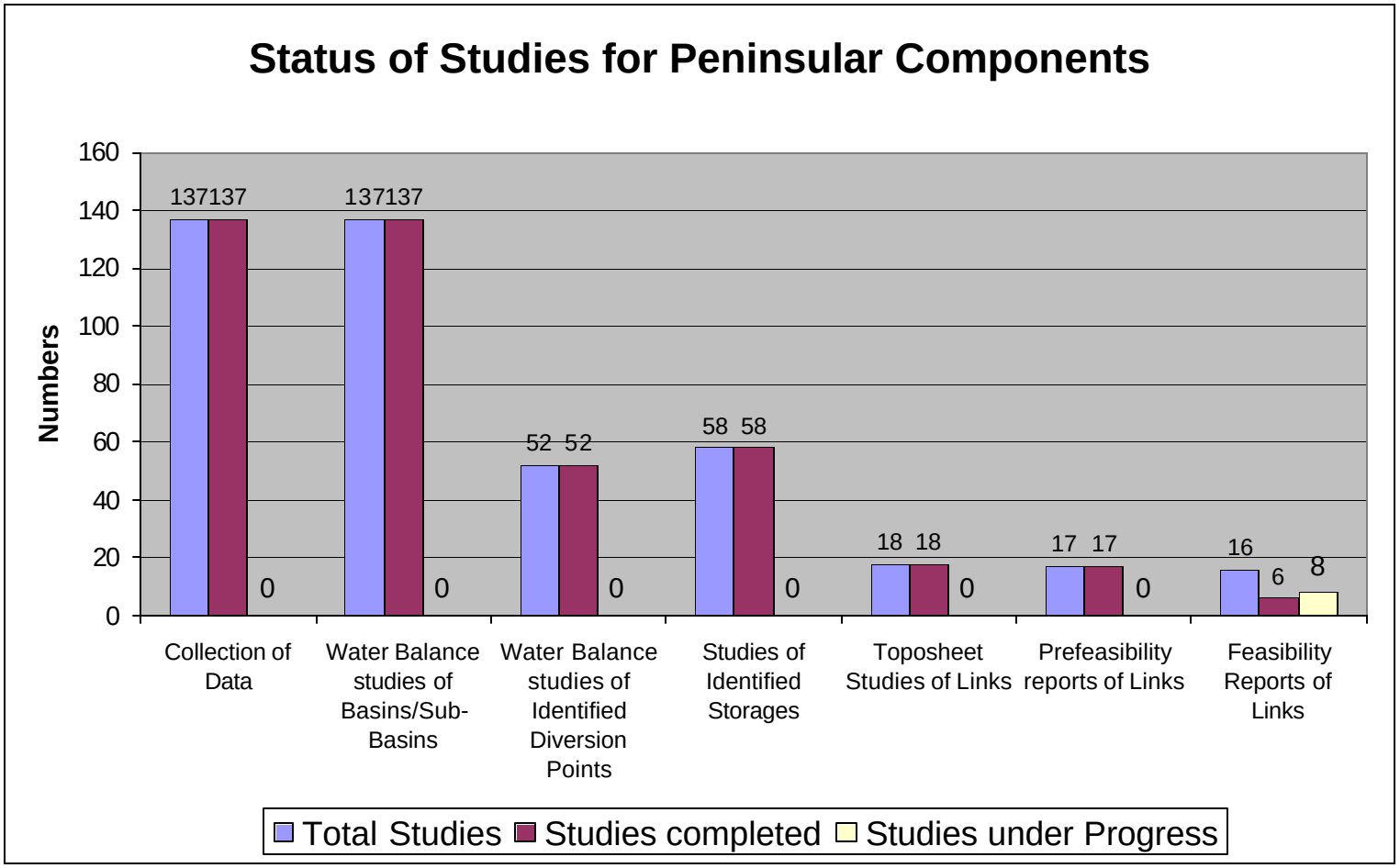

Status of Studies for Peninsular Components
Numbers
160
140
120
100
80
60
40
20
0
137137
137137
52 52
58 58
18 18
17 17
16
6
8
0
0
0
0
0
0
Collection of Data
Water Balance studies of Basins/Sub-Basins
Water Balance studies of Identified Diversion Points
Studies of Identified Storages
Toposheet Studies of Links
Prefeasibility reports of Links
Feasibility Reports of Links
Total Studies
Studies completed
Studies under Progress

Figure - 2

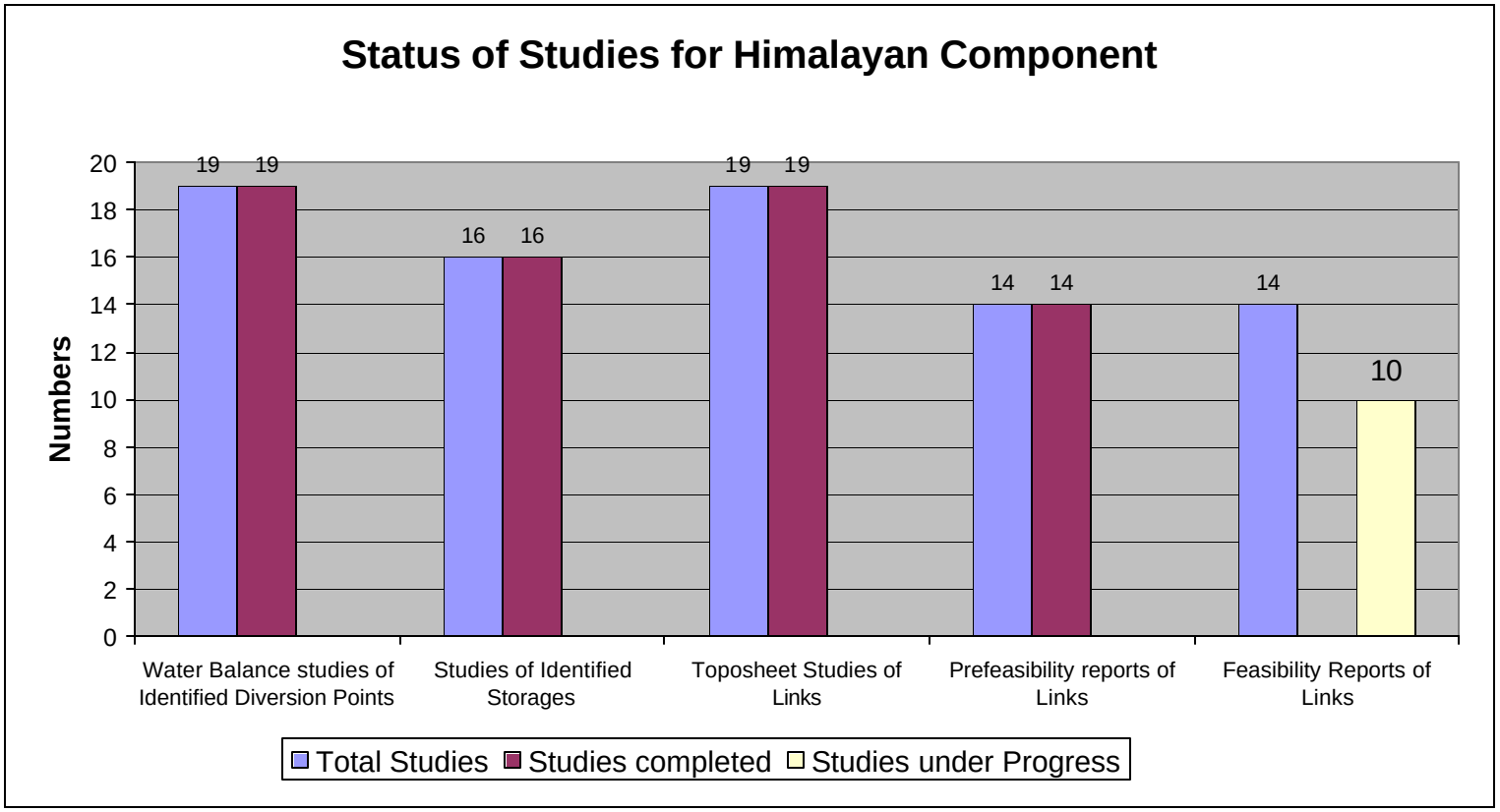

Status of Studies for Himalayan Component
Numbers
20
18
16
14
12
10
8
6
4
2
0
19
19
16
16
19
19
14
14
14
10
Water Balance studies of Identified Diversion Points
Studies of Identified Storages
Toposheet Studies of Links
Prefeasibility reports of Links
Feasibility Reports of Links
Total Studies
Studies completed
Studies under Progress

Figure - 3

18. BRAHMAPUTRA BOARD

INTRODUCTION

The Brahmaputra Board, an autonomous Statutory body was set up by an act of Parliament called Brahmaputra Board Act. (Act 46 of 1980) under Ministry of Water Resources. The Board functions from Guwahati. The jurisdiction of the Board covers both the Brahmaputra and Barak Valleys and extends over all the seven states of North-East Region of the country.

The main function assigned to the Board are to carry out survey and investigation and to prepare Master Plan for the control of floods, bank erosion and improvement of drainage congestion, giving due importance to the development and utilization of water resources of the Brahmaputra and Barak Valleys for irrigation, hydropower, navigation and other beneficial purposes. Its assignment also includes preparation of Detailed Project Report of the dams and other projects identified in the Master Plan as approved by the Central Government and to take up construction & maintenance of the project approved by the Central Government and works connected therewith as proposed in the Master Plan and also to maintain and operate such dams and works.

ORGANISATION

The Board consists of 4 fulltime Members comprising the Chairman, the Vice-Chairman, the General Manager and the Financial Adviser and 17 part time Members representing 7 States of the North Eastern Region, North Eastern Council, concerned Ministries namely Water Resources, Finance, Agriculture, Power and Surface Transport and Departments of Government of India, namely Central Water Commission, Central Electricity Authority, India Meteorological Department and Geological Survey of India.

In pursuance of the Brahmaputra Board Act, 1980, a High Powered Review Board to oversee the works of the Brahmaputra Board was constituted in 1982 consisting of the Union Minister for Irrigation (now renamed as Water Resources) as Chairman, Chief Ministers of Assam, Manipur, Meghalaya, Nagaland, Tripura, Arunachal Pradesh and Mizoram and Union Minister of State for Power, Union Minister/ Minister of State for Agriculture, Union Minister/ Minister of State for Surface Transport, Secretary, Ministry of Water Resources, Government of India, Chairman, Central Water Commission as Member and Chairman, Brahmaputra Board as Member- Secretary, Member (River Management), CWC is a permanent invitee to the meetings of the High Powered Review Board.

Activities of Brahmaputra Board ending November, 2002

Preparation of Master Plan, Survey and Investigation

The Brahmaputra Board on its formation was entrusted with the work of preparation of the Master Plan of various rivers and tributaries of the Brahmaputra and Barak river system and rivers of Tripura.

A. Master Plan (Part-I) : for the main stem of the Brahmaputra.
B. Master Plan (Part-II): for the Barak river and its important tributaries.
C. Master Plan (Part-III): for important tributaries of the Brahmaputra and eight rivers of Tripura.

(A & B) Master Plan (Part-I) & (Part-II) have been approved in July 1997.

(C) Master Plan (Part-III)

The formation of the draft Master Plan part-III comprising 41 tributaries of the river Brahmaputra including Majuli Island and 8 rivers of Tripura was started during 1989-90 and completed in March, 1993. These were circulated to all the departments concerned. On the basis of various comments/ suggestion received from various State Governments and Central Government departments, 32 tributaries Master Plans have been so far modified and out of them 27 tributaries Master Plans viz. Buridihing, Dikhow, Dhansiri(S), Kopili- Kolong, Puthimari, Ranganadi, Gumti, Pagladiya, Noa-Nadi, Dikrong, Muhuri, Jia-Bharali, Manu, Champamati, Disang, Jinary, Na-Nai, Juri, Burima, Dhalai, Jiadhal, Bharalu, Lohit, Majuli, Khowai, Ghiladhari and Jinjiram have been approved by the Brahmaputra Board. Other five Master Plans of the Moridhal, Subansiri, Jhanji, Dhaleswari(Bhairabi) and Gaurang sub- basins have been completed and circulated and approval from the Board is awaited.

Preparation of DPR of Identified Drainage Development Schemes

Out of the 34 Nos. of identified drainage development schemes (DDS), one drainage scheme namely Harrang Drainage Development Scheme is under execution by Brahmaputra Board and out of remaining 33 Nos. of Drainage schemes 6 DDS viz. Jengrai, Jokaichuk, East of Barpeta. Rupsagar, Borbhag & Singla have been technically cleared by the CWC and are awaiting Investment Clearance, DPRs of another 5 DDS sub mitted to CWC for examination and clearance. 4 DDS were handed over to the State Govt., 5 are under modification and rest 13 are under preparation/ investigation.

Preparation of detailed Project Report for multipurpose Projects

In December,2002, the Ministry of Water Resources has decided to transfer Dibang Multipurpose Project to NHPC for execution while the Detailed Project Report will continue to be prepared by the Brahmaputra Board with active involvement of CWC and NHPC. The tentative target of submission of the DPR has been fixed as June, 2003. Other projects which are under survey & investigation are Kulsi, Lohit , Jadukata, Noa- Dihing, Kameng, Someswari, Jiadhal, Killing and Dibang(Italin) .

North Eastern Hydraulic and Allied Research Institute (NEHARI)

On the basis of clause 7 of the Assam Accord, the Ministry of Irrigation and Power, Government of India (now Ministry of Water Resources) entrusted construction work of NEHARI to the Brahmaputra Board for establishment of a Hydraulics and Allied Research Institute at Guwahati during Sept, 1985. The Institute has already procured and installed most of the equipments with adequate infrastructure facilities. An intensive training in soil, concrete and Rock testing disciplines was provided to the officers and Staff of Brahmaputra Board with the help of CSMRS, New Delhi at the Institute Complex.

Corpus fund earned by the NEHARI are as follows-

Up to March,2001	-	Rs. 7,80,819.00
During 2001-2002	-	Rs. 87,89,093.00
During 2002-2003	-	Rs. 46,96,262.00 (up to January, 2003)

In hydraulic laboratory under the guidance of CWPRS, the NEHARI has experimented a model of Barak river. Similarly model study of river Jiadhal in Dhemaji district of Assam has been completed. Part model of Phulbari township protection in Meghalaya has also been completed during 2001-2002. At present, model study of river Jiadhal (Phase-II) in Dhemaji district of Assam is in progress and the work completed upto Nov, 2002 is 99.5% of the total work.

Execution, Maintenance and Operation of Multipurpose Dam and other works

Harang Drainage Development Scheme

The Harang Drainage Development Scheme has been cleared by the Standing Finance Commission of the MOWR at an estimated cost of Rs.10.81 crores during the 9th Five year Plan. Accordingly work has been taken up for execution. But due to rise of land value by the district authority and modification of construction drawings by the CWC, the original

estimate has to be revised and the revised estimate amounting to Rs. 30.49 crore has recently been approved by Ministry of Water Resources. The upto date progress of construction of the project is as follows:

(i)	Construction of sluices	-	35%
(ii)	Construction of Embankment	-	59%

Pagladiya Multipurpose Dam Project

The Pagladiya Dam Project has been approved by the Cabinet Committee on Economic Affairs of the Government of India in November, 2000 and the approval of the president of India was communicated by the Ministry of Water Resources in January, 2001 for an estimated cost of Rs. 542.90 crore and approval for continuation of scheme in Xth Plan has been received in Nov.,2002. The project envisages construction of rolled fill earthen dam 26.20 m high and 23 k.m. long at Thalkuchi village, about 26 km. north of Nalbari, Head Quarters of Nalbari District of Assam.

The Brahmaputra Board has initiated the execution of the project.

Re-settlement and Rehabilitation

The requirement of total land for resettlement of 3271 families will be 3238 ha. The Government of Assam has allotted upto now 956 ha. in 33 locations for R&R purpose. Another 48 ha. is being allotted soon in 3 more locations. The tender for construction of the dwelling 268 units in the 4 (four) sites has been invited

Land Acquisition

The Revenue Deptt. Govt. of Assam has issued notification under section 4(l) for 31 villages in the project area for the reservoir and construction of dam and appurtenant Structures.

Infrastructure Development

(i) The approach road to dam site from Khagrabari for a length 3.5 km is under construction.
(ii) Improvement of haul roads has been taken up.
(iii) The project Chief Engineer's office has been set up at Nalbari. One division office at Nalbari and another division office at Rangia are functioning.
(iv) The Govt. of Assam has allotted 1.1 ha. of land at Barsarkuchi, Nalbari where the project Chief Engineer's office will be set up. The land development work in the complex has been completed.

The Security shed and site office at Thalkuchi has been constructed. The site office and one model dwelling unit for resettlement of project affected families has been completed.

Construction of Main Dam

The specification of main dam for tender purpose assigned to the CWC has been completed. The construction drawing of the main dam is also under preparation in CWC. M/S WAPCOS (India) Ltd. has prepared the draft tender document and is being scrutinized in the Brahmaputra Board Head Quarters. Construction of 3 (three) Nos. of raised Platforms for flood affected people (R&D scheme) along Brahmaputra Embankment from Palasbari to Gumi at Guimarah Nahira under Kamrup district of Assam has been completed.

19. CENTRAL WATER & POWER RESEARCH STATION

INTRODUCTION

Central Water and Power Research Station (CWPRS) Pune, is a subordinate office of the Ministry. It is the premier national institute offering comprehensive R&D support to a variety of projects dealing with water and energy resources development and water-borne transport. It offer consultancy and advisory services to the Government in these areas. CWPRS also disseminates expertise and research findings amongst hydraulic research fraternity, aids and promotes research activities at various institutions and carries out training of research manpower. CWPRS was recognized as the Regional Laboratory for the ESCAP in 1971, a testimony to the quality of services offered by it.

The Research Station has been carrying out physical and mathematical modelling studies for solving various complex hydraulic and hydrologic problems, in addition to collecting field data in respect of waves, wind, tides etc. Particularly in Coastal environment Under-water seismic reflection surveys are also being undertaken for determining subsoil stratification and geophysical profiles for deciphering the structure of rocks and sediments beneath the floor of water-covered areas. The Research Station also carries out seismic profile studies for evaluating pre and post dredging operations, selection of pipeline routes and siting of tunnels, bridges and other hydraulic structures. CWPRS has made a significant progress in application of Remote Sensing technique for solutions of river and coastal engineering problems. The facility created under Sediment Disposal Research Scheme has been fully operational and studies related to flushing tunnel, desilting basins, etc. related to run-off the river HE projects undertaken. CWPRS is headed by a Director in the Senior Administrative Grade.

R & D PROJECTS IN 2002-2003

During 2002-2003 a total of 123 new clients-sponsored R&D projects were awarded in various disciplines. The important projects handled are

ESTIMATION OF DYNAMIC MODULUS OF ELASTICITY FOR THE CONCRETE AND FOUNDATION ROCK OF KOYNA DAM, MAHARASHTRA

The Government of Maharashtra constituted an Experts' Committee after Killari earthquake of 30 September 1993, which reviewed the seismic safety of all the major dams in the state, including the Koyna dam. The committee suggested the strengthening of the overflow (OF) section of the Koyna dam, which was not strengthened after the main Koyna earthquake of 11th December 1967. To arrive at the strengthening

requirements, the committee suggested to carry out detailed dynamic response analysis of the dam section by Finite Element Method (FEM). For this purpose CWPRS, carried out the studies for estimating static and dynamic modulii of elasticity of the concrete and the foundation rock of the Koyna dam. Representative core samples were extracted from different locations in the body of the dam and its foundation rock and these were tested experimentally using non-destructive technique. The values of modulus of elasticity obtained in the present study are more reliable, as they are based on the actual dynamic testing of core samples with the frequencies close to the resonant frequency of the dam.

HYDRAULIC MODEL STUDIES FOR RUN-OFF-THE-RIVER HYDROELECTRIC PROJECTS

CWPRS has been entrusted with a number of run-off-the-river, hydroelectric projects in Shivalik ranges. Most of the sites are geologically weak, and have very high concentration of the sediment. The model investigation included studies for flushing of reservoirs, approach flow conditions, spillway crest profile, spillway discharge capacity, alignment of power intake to ensure proper flow conditions, desilting basin, flushing tunnel of the desilting basin etc.

Tala project (1020MW) in Bhutan – Approach as well as flow conditions over rear slope of spillway were improved by introducing curvature in the dam axis; roof profile of the spillway sluice was redesigned as USBR standard profile indicated cavitation tendency; divide walls were introduced along rear slope of the spillway for achieving efficient operation of radial gates, design of plunge pool was evolved; modification in the flushing tunnel flow was evolved for improving flushing of the sediment.

Teesta Project (570MW) in Sikkim – Unique spillway design was evolved as the same was required for efficient operation of energy dissipator as well as flushing of sediment. In order to avoid uncontrolled erosion of both the banks, plunge pool was recommended; transition length of desilting basin was reduced by 50m thereby saving construction costs without sacrificing efficiency.

Chamera Project (300 MW) in HP – Modified spillway crest profile was evolved for improvement in coefficient of discharge; alignment of power intake was modified for eliminating circulation of flow at the intake; approach flow conditions were improved by dressing of hills upstream of spillway, transition length of desilting basin was curtailed by 30m thereby saving considerable construction cost.

MODEL STUDIES FOR WATER QUALITY ASSESSMENT

Due to increasing environmental awareness, number of studies related to water quality aspects are being referred to CWPRS. Some important contributions include:

Tehri Reservoir, Uttranchal – There was public apprehension that the sacred nature of the Ganga River would be affected due to impoundment by 260m high dam. The Prime Minister had appointed a special Committee to look into the matter. 3D mathematical model studies for hydrodynamics and water quality were carried out at CWPRS for the first time in India to examine this aspect. Since the studies concluded that there will be no permanent stagnation and water quality will not be affected, the project was cleared by the Committee.

Fresh water lake at Flat Bay, Andaman – There is acute shortage of drinking water at Port Blair, Andaman, despite heavy rains in the region. In view of the projected water requirement of future, there is a proposal to create fresh water lake by constructing tidal bund across a creek to avoid R&R problems. Detailed studies for hydrodynamics, sedimentation, salinity intrusion and eutrophication were carried out at CWPRS for the first time in India to establish the feasibility of the project.

Chilika Lake restoration, Orissa - Chilika lake is the largest brackish water lake in Asian region and is considered as wetland of International Importance. The salinity in Chilika lake was getting affected due to choking of the lake inlet, as a result of which the fish catch as well as biodiversity of the region was getting endangered. Based on the detailed hydraulic model studies carried out at CWPRS, suitable location for straight cut was suggested, which was implemented in September 2000. As a result, the circulation and salinity in lake has improved. This has resulted in multifold increase in fish catch and improvement in the biodiversity and the Chilika Development Authority received Ramsar Award Evian special prize - 2002 for the achievement.

North Chennai Thermal Power Station (NCTPS) – Due to accumulation of littoral drift material, mouth of the Ennore creek was chocked resulting in reduction in the tidal influx. This, coupled with siltation in the creek system, resulted in severe shortage of cooling water. As a result the power stations were required to be closed resulting in loss of revenue. Thermal model studies were carried out at CWPRS to determine suitable location of intake and outfall structures in view of efficient functioning of power stations and satisfying thermal stipulations laid down by Environmental (Protection) Act, 1986. After incorporating the suggestions of CWPRS for diversions of hot water discharge, both viz., North Chennai Thermal Power Station (630MW) and Ennore Thermal Power Station (2155MW) started running to full capacity.

2-D MATHEMATICAL MODEL STUDIES FOR HYDRODYNAMICS IN THE APPROACHES TO KANDLA CREEK

The Kandla Port Trust (KPT) has been trying to further enhance the port facilities to meet the growing demand for container traffic. The port is planning to increase the available draft at the port from 10.2 m to 13.5 m, in stages, to cater to IV and V generation vessels. The approach channel from the Gulf is maintained by perennial dredging. There are two permanent physical models of KPT at CWPRS for undertaking hydraulic model studies on various aspects of port development. The optimization of dredging in the approach channel (Sogal channel) has been a major task for KPT and CWPRS. Detailed hydraulic model studies using physical models are already in progress at CWPRS for deepening the navigation channel. A separate request for development of mathematical models for the Kandla port approaches and creek system was made by KPT to further augment the hydraulic model capabilities at CWPRS. The 1-D model covers the entire Kandla-Hansthal creek system and the approach area. The 2-D model covers the area in the Kandla creek and its approaches up to Outer Tuna Buoy (OTB). The present study also includes the preliminary simulations on the effect of blocking the Inshore channel for dumping of dredged spoils in this area. The 1-D and 2-D mathematical models along with the physical models would help in the optimization of the approach channel in terms of the maintenance dredging and achieving the desired depths in the berthing and navigational areas, for the future development of the port.

20. CENTRAL SOIL & MATERIALS RESEARCH STATION

INTRODUCTION

The Central Soil and Materials Research Station (CSMRS), New Delhi, is an attached office of the Ministry. It is a premier organization in the country dealing with the field explorations, laboratory investigations, basic and applied research in the field of Geomechanics and Construction Materials, concerning river valley projects construction, safety evaluation of existing Dams, etc. The Research Station primarily functions as an Adviser and Consultant to the various Departments of Government of India, State Governments and Government of India Undertakings/ Enterprises. The sphere of activities of the Research Station is covered under the disciplines of :

- Soil Mechanics and Foundation Engineering including Soil Dynamics, Soil Chemistry, Geotextiles and Rockfill Technology.
- Rock Mechanics including Instrumentation, Engineering Geophysics, Grout Technology and Drilling Technology for sub-surface characterisation.
- Construction Materials and Concrete Technology including Chemistry of Concrete.

Besides contribution to almost all the major river valley projects spread all over the country, the CSMRS has also rendered consultancy to projects in the neighbouring and the middle-east countries like Myanmar, Srilanka, Afghanistan, Bangladesh, Iraq, Algeria, etc in the past. At present, it is handling a few projects in Bhutan & Nepal. CSMRS has also imparted training to personnel from within the country/foreign countries in the fields of Geomechanics and Construction Materials Characterization for Civil Engineering Structures connected with river valley projects. CSMRS is headed by Director who is in the Senior Administrative Grade.

ACTIVITIES DURING THE YEAR

Investigation for Projects

Investigation for as many as 50 river valley projects and other civil engineering structures have been handled successfully with particular reference to foundation and borrow area materials characterization for which a large number of laboratory tests have been conducted and detailed Technical Reports finalized.

Research Schemes

Studies in the following research schemes were carried during the year 2002-2003 :

a. Identification and Characterization of Dispersive Soils.
b. Diagnostic Investigations of Existing Dams
c. Study on Landslides
d. Rock Blasting
e. Monitoring of Rock Bursts by Acoustic Emission Technique
f. Advanced Mineralogy and Chemistry of Materials of Construction
g. Development of High Performance Concrete Chemicals
h. New Construction Techniques
i. Behaviour of concrete under multiaxial state of stresses
j. Structural Testing
k. Dynamic Characterisation of Mass Concrete for Dams

CSMRS has also established Geosynthetics Division and the Rock Mechanics Laboratory has been upgraded.

SELF SPONSORED RESEARCH SCHEMES

- Prediction of Consolidation Characteristics of Fine Grained Soils
- Effect of pH on Physical and Engineering Properties of Soils
- Use of Fly Ash as a Filter Material for Retention of various Toxic Cations
- Correlation between Point Load Strength and Uniaxial Compressive Strength
- Rockmass Classification based on Geophysical properties (P, S Wave & Resistivity)
- Anchoring Materials for Rock Bolting
- Use of Flyash in Reinforced Concrete for Corrosion Resistance
- Effect of large size aggregate on compressive strength of mass concrete
- Temperature Study of Mass Concrete
- Correlation of Ultrasonic Pulse Velocity and Strength Characteristics of Concrete.

CONSULTANCY WORKS

A large number of consultancy works pertaining to river valley projects and connected civil engineering structures were handled in 2002-2003. Some of the important projects handled are given below:

Tehri Rockfill Dam Project, Uttaranchal

Under the Quality assurance programme, as per MOU between THDC, Tehri & CSMRS, New Delhi, CSMRS continued its association with quality

assurance work of construction materials being used in the project (260.5 m high Earth and Rockfill Dam). The activities accomplished during 2002-2003 include gradation, in-situ density and in-situ permeability tests for soil core, filter material and shell during the field visits. Soil samples from Palas and adjacent to Old Koti Borrow areas were received and tested for their suitability as impervious core materials. As the material required for the clay core from this and the earlier borrow areas investigated was not sufficient, the suitability of material from other borrow areas such as Uppu village, Khand village and Moti Bagh (court area) was also explored and test results from these areas were evaluated for their suitability as construction material for the core of the dam. Senior officers of CSMRS visited Tehri Dam Project, Uttaranchal to participate in the 20th and 22nd Technical Advisory Committee (TAC) meetings of the project. 21st TAC meeting was also attended at THDC, Noida office.

Pancheshwar Multipurpose Project, Nepal/India

Pancheshwar Multipurpose Project, India-Nepal is envisaged for harnessing the water resources of river Mahakali. The project is located 2.5km downstream of the confluence of river Mahakali and Sarju rivers. The proposal involves constructing a 315m high Rockfill Dam with central clay core. The installed capacity of the project is 3000 MW. Trial blasting was carried out at Big Elephant and Tiger Quarries and prototype gradation curve was finalized for maximum size for 1000mm. Based on this curve, three modelled gradation curves were derived having maximum size of 80mm, 50mm and 25mm. From these modeled curves the quantities for each of the maximum particle size samples were obtained for undertaking triaxial, oedometer, specific gravity and relative density tests to arrive at shear strength parameters. The report of the investigation was sent to the project authorities.

In-situ stress measurement using Surface Hydrofracturing equipment in 4 boreholes was made upto a depth of 295 m., which is a major achievement in the water resources sector in India.

Tala H.E. Project, Bhutan

Tala H.E. Project envisages the construction of 91 m high concrete dam across the river Wangchu near Honka in Bhutan. The project comprises of Head race tunnel of 6.8 m dia and 22,250 m long and Tail race tunnel of 7.5 m dia with underground power house having installed capacity of 1020 MW (6 pelton type turbines of 170 MW capacity each). For the construction of the project structures, CSMRS was entrusted with the following works at different periods. Testing of concrete cubes of 45 cm size cast with full mix concrete of M12.5 A150 and M20 A75 grades and also cubes of 15 cm size cast with wet screened concrete for the same two

grades for determining their compressive strength at 28 days age so as to get the co-relation between the strength of full mix concrete and wet screened mix concrete for the two grades. The testing of concrete cubes, reinforcement steel bars (plain), welded steel bars, reinforcement tor steel bars, anchor bolts, Dwydag anchors, couplings were tested in CSMRS and reports submitted to Project. In-situ stress measurements using Minifrac System in Pressure Shaft at three different locations were also conducted.

Other Consultancy Services

Consultancy services have been also provided in Rihand Dam Project, UP; Lower Jhelum H.E. Project, Baramulla, J&K; Parbati Dam H.E. Project (Stage-III), H.P.; Dhauliganga H.E. Project, Uttaranchal ; Idukki Dam Project; Bhakra Dam project ; Baglihar HE Project, J&K and Bakkarwala DDA site near Dwarka, D.D.A., Delhi.

River Links

The Geotechnical investigations of the following river links are in progress for National Water Development Agency (NWDA).

- Krishna (Almatti) – Pennar Link Project, Karnataka/A.P.
- Cauvery – Vaigai – Gundar Link Project, Tamil Nadu.
- Parbati – Kalisindh – Chambal Link Project, M.P.
- Ghagra – Yamuna – Link Canal Project, U.P.
- Sarda – Yamuna Link Canal Project, U.P.

Laboratory Investigations

Laboratory Investigations for assessment of rock have been carried out for 10 projects of which two are located in North East and one in J&K.

INDIAN NATIONAL COMMITTEES

The following two national level committees were constituted by the Govt. of India for funding/providing financial support to various Research/Educational Institutions for carrying out basic/applied research in the field of Rock Mechanics, Soil Mechanics and Construction Materials and Structures :

- **Indian National Committee on Geotechnical Engineering (INCGE)**

  The Present Status of Research Schemes is given as under :-

1.	Total no. of Research Schemes sanctioned	39
2.	Sanctioned amount of grant-in-aid	Rs.337.43 lakh
3.	Grant-in-aid released till date	Rs.230.79 lakh

4	No. of schemes completed	17
5.	State of the Art reports printed and distributed amongst Principal Investigators (PI's) Academicians/researchers	3
6.	No. of schemes closed	2
7.	Schemes likely to be closed	7
8.	On-going projects	13
9.	New Schemes under consideration	3

?? **Indian National Committee on Construction Materials and Structures (INCCMS)**

The present status of the Research Schemes is given as under :-

1.	Total No. of Research Scheme sanctioned	19
2.	Sanctioned amount of grant-in-aid	193.33 lakh
3.	Grant-in-aid released till date	144.22 lakh
4.	No. of schemes completed	6
5.	Schemes likely to be closed	5
6.	Ongoing Projects	8
7.	New Schemes under consideration	10

IGNOU STUDY CENTRE 0744P AT CSMRS

A Study Centre 0744 P of IGNOU (Indira Gandhi National Open University) is under operation in CSMRS since January, 2001 for the courses of Bachelor of Technology in Construction Management (BTCM) and Bachelor of Technology in Water Resources Engineering (BTWRE). During the Session January to December, 2002, overall 306 nos. of students have been enrolled for these courses. The classes have been organized on every Saturday and Sundays. CSMRS officers worked as counsellors for different subjects. The session has been completed successfully.

CSMRS – NGI INSTITUTIONAL CO- OPERATION PROGRAMME

Central Soil and Materials Research Station, and Norwegian Geotechnical Institute, Oslo, Norway have entered into Institutional Co-operation Programme agreement in the field of "Investigation of Geological Hazards in Dam Reservoirs for Safety of Downstream Structures" for a period of 3 years w.e.f. Nov, 2002. The Institutional Co-operation Programme was launched/ inaugurated by Minister of Water Resources on 11th Dec. 2002. This programme is funded by Norwegian Agency for Development and Co-operation (NORAD) for a sum of NOK 2.83 Million (1 NOK app. Equals 6 Indian Rupees).

Under the programme, Rihand Dam Project (U.P) has been planned to be taken up for detailed investigations. The foundation of dams on weak rocks shall also be a main area of study under this programme. This study

shall help in designing the dams founded on weak rocks of Lower Himalayas and Shivalik formations. In this project, emphasis will also be placed on education and training programmes on various aspects of geo-hazards to dams and water resources structures. Public awareness and human resource development will constitute an important component of the programme of activities for this project.

21. NATIONAL INSTITUTE OF HYDROLOGY

INTRODUCTION

The National Institute of Hydrology was established by the Government of India in December 1978 with its headquarters at Roorkee as an autonomous society, fully aided by the Ministry of Water Resources.

The main objectives for which National Institute of Hydrology has been established are:

- ?? To undertake, aid, promote and coordinate systematic and scientific studies in all aspects of hydrology so as to improve the present practices in planning, design and operation of water resources projects;
- ?? To cooperate and collaborate with other national and international organisations in the field of hydrology;
- ?? To establish and maintain a research and reference library in pursuance of the objectives of the Society, and to equip this with books, reviews, magazines, and other relevant publications and;
- ?? To do all other such things as the Society may consider necessary, incidental or conducive to the attainment of the objectives for which the Institute has been established.

ORGANISATION

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

The Institute has set up six regional centres in order to deal with specific hydrological problems of different regions of the country and for primary effecting interaction with States. The Centres for Hard Rock region at Belgaum, National Institute of Hydrology Centres for Flood Management Studies for Brahmaputra, Guwahati, Western Himalayan region, Jammu, National Institute of Hydrology Centres for Flood Management Studies for

Ganga, Patna, Deltaic and East Coast region, Kakinada, Ganga Plains (South), Sagar.

STUDIES AND RESEARCH

The studies and research in the Institute are being carried out by eighteen scientific divisions at Headquarters Roorkee and the two Centres for Flood Management Studies and four regional Centres, broadly under the following major categories:

- ?? Basic studies and research
- ?? Applied studies and research
- ?? Software Development
- ?? Field and Laboratory oriented studies
- ?? Sponsored and consultancy research

During 2002-2003, studies and research have been carried out in various areas of hydrology. Based on these eighty reports are being brought out. More than hundred papers have also been published in national and international journals and proceedings of national and international conferences/seminars and symposia.

Since the inception of the Institute, besides carrying out regular basic and applied research and development studies, the Institute and its regional centres have also taken up a few problems with emphasis on research content, which are specifically referred to it by the Central and State Government Organisations and Public Sector Undertakings. Also, a number of research projects sponsored by Central and State Governments were taken up by scientists of the Institute. During 2002-2003 work on nine ongoing projects was continued. Studies on two projects were completed and final report submitted.

THE NUCLEAR HYDROLOGY LABORATORY OF NIH ACCREDITED AS ONE OF THE TOP THREE LABORATORIES OF THE WORLD, BY THE IAEA

The Institute participated in the international laboratory comparison for the measurement of environmental tritium in waters, which was organised by the International Atomic Energy Agency, Vienna, Austria. About 102 laboratories from world over including those from USA, Canada, Australia and European countries, etc. participated in this exercise. The performance of Nuclear Hydrology Laboratory at NIH, Roorkee has been found to be excellent and the results matched very well with the values of IAEA. Considering both accuracy and reliability in measurements, the NIH Nuclear Hydrology laboratory ranked among the top ten laboratories of

the world that participated in the exercise. In one case of measurement of moderately higher radioactivity, the NIH laboratory was one among the three laboratories that reported the correct value which brought laurels to NIH, Ministry of Water Resources as well as India.

STUDIES REGARDING SHIFTING CHARACTERISTICS OF RIVER GANGA BETWEEN ARA AND PATNA

In this study, evaluation of the shifting characteristics of a reach of the river Ganga between Ara to Patna, having a length of 66 km has been carried out using the data of 1974-76, 1989, 1996, 1998 and 2000 by evaluating the following aspects viz. (i) shifting course of river Ganga between Ara to Patna from 1974-76 to 2000 and identification of the critical locations where shifting has occurred, (ii) details of the shifting characteristics of river Ganga at the identified critical locations and (iii) shifting pattern of river Ganga at the identified critical locations as obtained from the data of 1974-76, 1989, 1996, 1998 and 2000. It is observed that the total shift of river Ganga at Neknamtola is 2.76 km at Jirakhantola is 1.22 km at Daudpur near Danapur is 1.45 km at Dighwara is 2.18 km and at Hajipur is 2.43 km over a period of about 25 years from 1974-76 to 2000. Further, during this period there is an increase of 3.8 km in the width of the river Ganga at Daudpur. The magnitude of the year-wise shifts and the rate of shifting have also been evaluated for each of the five locations.

STUDIES TO ANALYSE AND MODEL THE PHENOMENON OF FLUORIDE CONTAMINATION IN THE GROUND WATER OF SELECTED AREAS OF ANDHRA PRADESH, ASSAM, ORISSA AND RAJASTHAN

The problem of fluorosis occurs with varying intensity in different parts of the country. At present the total number of states endemic for fluorosis are seventeen namely; Andhra Pradesh, Assam, Bihar, Delhi, Gujarat, Haryana, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. Keeping in view the severity of the problem, fluoride contamination studies in Andhra Pradesh, Assam, Orissa and Rajasthan has been taken up in project mode jointly with NIH Regional Centres for a period of five years. During the year 2002-2003, district Jodhpur has been taken up for the study. Ground water samples from district Jodhpur have been collected during pre-monsoon season and analyzed for fluoride content to evaluate the extent of fluoride contamination and to identify the problematic zones in the regions. Further data collection and processing is under progress.

INDIAN NATIONAL COMMITTEE ON HYDROLOGY (INCOH)

The Indian National Committee on Hydrology (INCOH) was constituted by the Ministry of Water Resources in the year 1982. It is an apex body with

the responsibility of coordinating the various activities concerning hydrology in the country. The Chairman, Central Water Commission is the Chairman of the Committee, with members drawn from the Central and the State Governments as well as experts from academic and research organisations besides a few members drawn from non-governmental professional associations. The Committee gets a feed back from States and co-ordinates activities at the State level through State Coordinators. The Secretariat of INCOH is with NIH. The Committee has successfully fulfilled its role and made important contributions for hydrological activities in the country during the past nineteen years. The Committee brings out a bi-yearly journal entitled "Jal Vigyan Sameeksha" and also coordinates the International Hydrology Programme (IHP) of UNESCO in India.

A joint R&D Session of INCOH & INCH was organised at CSMRS, New Delhi during 24-25 October, 2002. About 19 research projects were presented during three technical sessions. A joint technical session was organised to identify the thrust areas in hydrology and hydraulics for inviting new R&D projects. Under the auspices of INCOH a preparatory meeting on 'Effect of climate change on water resources' was organised at Central Water Commission on 21st December, 2002. The 26th meeting of INCOH was held at Central Water Commission, New Delhi on 17th January, 2003. Two State of Art Reports published during the year by INCOH were released on this occasion. During the year, the Committee sponsored twelve conferences, seminars, etc. Also two R&D projects sponsored by INCOH were completed and presently twenty-seven projects are in progress. India has actively participated in the Fifth Phase of IHP of UNESCO. The preparation for India's participation in IHP-VI has also been initiated.

STUDIES AND RESEARCH FOR THE NORTH EAST REGION

The following important studies were carried out by the NIH Centre for Flood Management Studies for Brahmaputra at Guwahati during the year 2002-2003 :

1. Design Flood Studies for Noa Dihing River – GIUH Approach
2. Flood Plain Delineation and Risk Zoning in Burhi Dihing Basin
3. Runoff Estimation for Lohit Dam Project
4. SCS Modelling for Runoff Studies for Jadukata River Basin

22. GANGA FLOOD CONTROL COMMISSION

INTRODUCTION

Ganga Flood Control Commission, a sub-ordinate office of the Ministry of Water Resources was established in 1972 with its headquarters at Patna.

ORGANISATION

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

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

ACHIEVEMENTS DURING YEAR 2002-2003

Updating of Comprehensive plan for flood management :

Comprehensive plan for flood management for all the 23 river systems of the Ganga basin have already been prepared with data upto 1991. The updating of the comprehensive plan is now being taken up and is a continuing activity of GFCC. Upto March 2002, comprehensive plans for 16 river systems namely Gomati , Mahananda , Ghaghra, Adhwara group of rivers, Kamla Balan, Bagmati, Burhi Gandak, Kiul Harohar, Damodar, Punpun, Mayurakshi-Babla, Ramganga , Jalangi, Tons, Ajoy and Yamuna have been up-dated.

This year, updating of Comprehensive Plans for Badua Chandan, Rupnarayan-Haldi-Rasalpur and Tidal river system have been undertaken.

Assessment of adequacy of waterways under road and rail bridges

The study report on adequacy of waterways under road and rail bridges in respect of 21 river system i.e, Punpun, Ajoy, Burhi Gandak, Mayurakshi, Bagmati, Mahananda, Damodar, Yamuna, Jalangi, Gandak, Gomati,

Ghaghra, Ramganga, Rupnarain-Haldi-Rasulpur, Tons, Kamla-Balan, Adhwara group of river, Kiul-Harohar, Badua-Chandan, Sone and Kosi were completed by the end of March 2002. Studies in report of bridges on main course of river Ganga and that on Damodar have been planned for the year 2002-03 are under progress. Updating the report of the Damodar would be completed by December, 2002.

Monitoring of important flood management schemes

GFCC is monitoring 7 important flood management schemes namely (i) Buxar Koelwar Embankment of Bihar (ii) Badlaghat Nagarpara Embankment of Bihar (iii) Ghea-Kunti Basin Drainage Scheme of West Bengal (iv) Tamluk Basin Drainage Scheme of West Bengal (v) Urgent Development Works of Sunderban Area of West Bengal (vi) Punpun Right Bank Embankment Phase-I of Bihar and (vii) Maniram Domingarh Embankment Scheme Uttar Pradesh. Figure 1 indicates the flood prone areas of Ganga basin States.

In addition, the following centrally sponsored schemes are also being monitored.

- Maintenance of flood protection works of Kosi and Gandak projects in Nepal.
- Flood proofing programme in north Bihar.
- Extension of embankments of Lalbakeya, Kamla, Bagmati and Khando rivers
- Critical anti-erosion schemes being executed by the states of West Bengal (4 nos.), Bihar(8 nos.), Uttar Pradesh (6 nos.) and Uttaranchal (1 no.).

Monitoring of floods in the Ganga basin

GFCC is monitoring the flood events of Ganga basin every year. During the monsoon of 2002, 17 weekly flood bulletins were issued. The Annual flood report for the year 2001 in respect of Ganga basin has also been prepared and circulated to all concerned. The annual flood report for the year 2002 is under preparation.

Performance evaluation of flood management schemes

During the year 2001-2002, the work on performance evaluation study of one completed scheme namely Lucknow Town Protection in U.P. has been completed by the consultant and the draft Final Report after study is under examination.

Technical examination of flood management schemes

Technical examination of the schemes is a continuing activity of the commission. During the year 2002-2003, 19 Flood Management Schemes of the Ganga basin has been examined out of which 4 schemes have been cleared. TAC note for one scheme have been sent to the Advisory Committee on Irrigation Flood Control and Multipurpose Projects with recommendations for acceptance and 3 other schemes were sent to Planning Commission for investment clearance. For 15 other schemes pertaining to various Ganga basin states, observation of GFCC have been sent to the concerned state Govts. for compliance. 3 flood proofing schemes of north Bihar have also been examined and the observations of GFCC have been sent to the concerned authorities for compliance.

Meetings

- Two meetings of the Sub-Committee to examine the reasons of variation in cost estimate of flood management schemes, were held on 24th April 2002 and 21st October 2002 respectively.
- 33rd meeting of the GFCC is proposed to be held by the end of March 2003.

COMMITTEES

Maintenance of flood protection works of Kosi and Gandak

The Kosi High Level Committee (KHLC) and the Gandak High Level Committee (GHLC) inspected flood protection measures taken for the Kosi and right bank of the Gandak and made recommendations for the protection works to be undertaken before the flood season of 2003.

Standing Committee on Inundation Problem between India and Nepal

" Standing Committee on Inundation Problem between India and Nepal " was setup in the year 1986 in pursuance of the decision taken by the Prime Minister of India and his Majesty the King of Nepal during discussion on 8th December 1985 for dealing with the problems of inundation along Indo-Nepal border on a continuing basis. The leader of the Indian side is the Chairman, GFCC. 12th meeting of this committee was held in October 2002 at Kathmandu, Nepal in which issues relating to inundation problems in the border areas between the two countries were discussed and decisions were taken to mitigate the same.

Indo-Nepal Sub-Committee on Embankment Construction

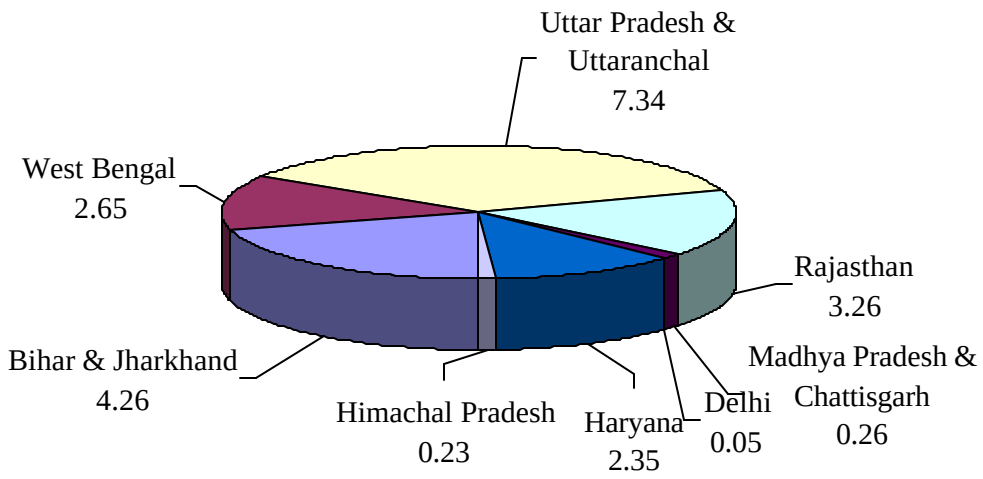
The Indo-Nepal Joint Committee on Water Resources (JCWR) in its first meeting held in October 2000 decided to merge the Joint team of Experts

and the Joint Committee on Embankment Construction to form the India-Nepal Sub-Committee on Embankment Construction. Accordingly, the Indo-Nepal Sub-Committee on Embankment Construction was constituted.

So far three meetings of the sub-committee have been held. The last meeting was held in October 2002, in which various decisions regarding construction of embankment on Lalbakeya, Bagmati, Kamla & Khando rivers were taken.

The works on raising & strengthening of embankments on Lalbakeya and Bagmati rivers in India are in progress. The work on Lalbakeya embankment in Nepal portion is also in progress. The work on Bagmati embankment in Nepal portion is likely to start soon.

FLOOD PRONE AREA OF GANGA BASIN STATES
(TOTAL = 20.40 Mha)



23. FARAKKA BARRAGE PROJECT

INTRODUCTION

The Farakka Barrage at Farakka in West Bengal, was commissioned in 1975 for preservation of Calcutta Port by improving the regime and navigability of the Bhagirathi-Hooghly river system. The increased upland supplies from the Ganga at Farakka into the Bhagirathi have reduced salinity in the system and ensured supply of potable water to Calcutta and surrounding areas from Farakka to Calcutta. The rail-cum-road bridge built across the river Ganga at Farakka has established direct road and rail communication link to the North-Eastern States and bordering countries to North-East. The Bhagirathi, the Feeder Canal and the Navigation Lock at Farakka form a part of the Haldia-Allahabad Inland Waterway (National Waterway No.1). The principal components of the Project are :

- A 2245.00 metre long barrage across the River Ganga with a rail-cum-road bridge and a Head Regulator on the right side.
- A 213.00 metre long barrage across the river Bhagirathi at Jangipur and a lock beside it.
- Feeder Canal of 1,133.00 cumec (40,000.00 cusec) carrying capacity and 38.38 km long, taking off from the Head Regulator.
- Navigation works such as Locks, Lock Channels, Shelter Basins, Control Tower Building, Navigational Lights and other Infrastructure.
- 33.79 km long Left Afflux Bundh of Farakka Barrage and 16.31 km long Left Afflux Bundh of Jangipur Barrage.
- Two Road-cum-rail Bridges & two road bridges across the Feeder Canal.
- A number of Regulators at different locations in both Murshidabad and Malda District.
- Bagmari Syphon at RD 48.0 of Feeder Canal.

FUNCTIONS & ORGANISATION

The functions of Farakka Barrage Project include : Operation & Maintenance of the Project ; Anti-erosion works in the upstream and downstream of Farakka Barrage ; carrying out additional works as and when necessary.

The various activities of Farakka Barrage Project are performed under the guidance of following Committees :

1) The Farakka Barrage Control Board.

2) The Technical Advisory Committee (TAC) under the Chairmanship of Member (Design & Research), CWC.

3) Committee for Monitoring the Progress under the Chairmanship of Member (Design & Research), CWC.

Farakka Barrage Project is headed by the General Manager who is in the Senior Administrative Grade.

ACTIVITIES DURING THE YEAR 2002-2003

Apart from the routine works related to operation and maintenance of the project, following important activities were undertaken by the FBP during the year 2002-2003 :

a. Anti-Erosion Measures

In view of severe erosion along the bank of river Ganga in Malda and Murshidabad districts of West Bengal, the FBP has taken up river training and flood protection works in upstream and downstream of Farakka Barrage and along left afflux bundh of Jangipur Barrage. In view of the recommendations of TAC of FBP and Expert Committees set up Planning Commission, protection work from Ch. 1300 m to Ch. 6300 m (except for 150 m which was done by the Government of West Bengal) have been completed. The TAC in its 98th meeting also suggested construction of 6 nos. bed bars in between Ch. 450 to Ch. 490 and bank revetment between Ch. 400 and Ch. 450 with launching apron for a length of 500 m before the flood season of 2002. This work was also completed in time.

b. Protection works for Feeder Canal

Protection works for bed and banks of Feeder Canal were completed as per the recommendations of the Sub-Committee for Canal Study.

24. NARMADA CONTROL AUTHORITY

INTRODUCTION

In pursuance of the decision of the Narmada Water Disputes Tribunal (NWDT) under Clause-XIV of its final order, the Government of India framed the Narmada Water Scheme, which, inter-alia, constituted the Narmada Control Authority and Review Committee, in 1980 for proper implementation of the decisions and directions of the Tribunal. Narmada Control Authority is located at Indore.

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

ORGANISATION

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

The Review Committee of the Narmada Control Authority (RCNCA) headed by the Union Minister of Water Resources can suo-moto or on the application of any party State or Secretary to the Government of India, Ministry of Environment and Forests, review any decision of the Authority. In urgent cases, the Chairman of the Review Committee can, on an application of the Government of any party State, or the Secretary to the Government of India, Ministry of Environment & Forests, grant stay on any order of the Authority pending final decision or review.

MEETINGS OF NARMADA CONTROL AUTHORITY

The Narmada Control Authority held two meetings during the year 2002-03 (64th emergency meeting on 17.5.2002 and 65th meeting on 22.11.2002) in which issues relating to resettlement and rehabilitation, further raising of the Sardar Sarovar Dam and other project related matters were discussed.

Important Decision Taken by the Authority

1. Permission to raise spillway blocks No. 30 to 46 from EL 90 m to EL 95 m & construction of 3m high hump over blocks No. 31 to 45 and maintenance of reservoir level in Sardar Sarovar at or below EL 90 m during the non-flood season.
2. Request to Governments of Maharashtra, Madhya Pradesh and Rajasthan for releasing the outstanding share to SSNNL.
3. Request to Ministry of Power to prepare an approach paper on the proposed association of Central Public Sector Undertaking (CPSUS) in the construction of SSP.
4. Approval of the proposal of O&M of 7 G&D sites by CWC for the period 2003-06.

SUB-GROUPS/ SUB-COMMITTEES

The Authority has constituted the following discipline based sub-groups:

1. Resettlement & Rehabilitation Sub-Group under the Chairmanship of Secretary, Union Ministry of Social Justice and Empowerment.
2. Environment Sub-Group under the Chairmanship of Secretary, Union Ministry of Environment & Forests.
3. Rehabilitation Committee under the Chairmanship of Secretary, Union Ministry of Social Justice & Empowerment.
4. Narmada Main Canal Sub-Committee under the Chairmanship of the Executive Member, Narmada Control Authority.
5. Hydromet Sub-group under the Chairmanship of the Executive Member, Narmada Control Authority.
6. Power Sub-Committee under the Chairmanship of Member (Power), Narmada Control Authority.

Two meetings of the Resettlement & Rehabilitation Sub-Group and one meeting of Power Sub-Committee were held till the end of December, 2002.

MONITORING OF PROJECTS

As per Sub-Clause-8(3)(ii) of Clause-XIV of NWDT award, the Authority shall decide the phasing and shall coordinate construction programmes of Narmada Sagar Project (NSP) & Sardar Sarovar Unit-II Canals with a view to obtaining expeditiously optimum benefits during and after the completion of the construction of the projects, having due regard to the availability of funds. In compliance of these directions, the NCA has been monitoring the progress of construction works of the Indira Sagar Project and Unit-II-Canals of the SSP and bringing out half yearly status reports for

the period ending September and March of each year. The reports for the period ending 31st March & 30th September, 2002 in respect of these two projects were brought out by the NCA.

RESETTLEMENT AND REHABILITATION ACTIVITIES

The Resettlement and Rehabilitation policy for the affected persons of Sardar Sarovar Project (SSP) is based on the decisions and final orders of the Narmada Water Disputes Tribunal (NWDT) Award. Considering the socio-economic and cultural background of the population being displaced and with a view to improving the living conditions of these people, all the three participating States have formulated their own policies which contain more liberal provisions than those envisaged in the Narmada Water Disputes Tribunal (NWDT) Award.

The R&R progress is being monitored effectively by the monitoring machinery i.e Resettlement & Rehabilitation (R&R) Sub-Group of the Narmada Control Authority, chaired by the Secretary to the Government of India, Ministry of Social Justice and Empowerment. In addition, a Rehabilitation Committee headed by the Union Secretary for Ministry of Social Justice and Empowerment also makes field visits to the submergence villages and R&R sites and the observations/ suggestions of the Committee are being complied with by all the party States. Table 24.1 indicates overall cumulative progress of the resettlement and rehabilitation of Project Affected Families (PAF) up to October 2002.

Table 24.1

State	Total PAF (No.)	Total PAF Resettled (No.)	Balance Families to be resettled. (No.)
GUJARAT	4728	4670	58
MAHARASHTRA			
a) In Gujarat	999	766	233
b) In Maharashtra	2222	1841	381
Total	**3221**	**2607**	**614**
MADHYA PRADESH			
a) In Gujarat	14124*	4898	9226*
b) In Madhya Pradesh	18890*	5622	13268*
Total	**33014**	**10520**	**22494**
Grand Total	**40963**	**17797**	**23166**

* This number may change after taking option of PAF and finalisation of Land Acquisition Awards.

The project affected families are also provided subsistence allowance, rehabilitation grant, ex-gratia, productive assets, insurance cover and civic amenities like primary schools, dispensaries, children park, panchayat ghar, religious places, tree platforms, wells, hand-pumps, transit sheds, electrification, etc. and employment to some of them.

ENVIRONMENTAL SAFEGUARD MEASURES

The Environmental clearance of the Indira Sagar Project (ISP) and Sardar Sarovar Project (SSP) from environmental angle was granted by the Ministry of Environment & Forest, on 24.6.1987. The Environmental Safeguard Measures (ESM) were to be planned for implementation pari-passu with the progress of construction of the dam. The NCA was entrusted with the monitoring works. For effective monitoring of implementation of ESM, the NCA has constituted amongst other a sub-group on Environment. The Environment Sub-Group chaired by the Secretary, Ministry of Environment and Forests, monitors the survey/studies and implementation of the environmental safeguard measures and their efficacy. A series of studies and impact analyses were carried out for detailed programming and implementation of the environment safeguard measures to mitigate identified negative impacts in reservoir, command, and downstream areas as well as the estuary. The present status of key concerns is as follows:

1) **Phased Catchment Area Treatment Scheme (CAT):** CAT works were completed in Gujarat and Maharashtra. In Madhya Pradesh, the CAT works are expected to be completed in 4 years. The cost of CAT of directly draining sub-watersheds is being borne by the project. The cumulative progress of CAT was 1,53,269 ha. Against the target of 1,79,180 ha in SSP and 52,763 ha against the target of 62,975 ha in ISP by the end of October, 2002.

2) **Compensatory Afforestation:** Approval for diversion of forest land for SSP and ISP was granted by MOEF in 1987 subject to the condition that CAF for every ha of forest land submerged or diverted for construction of the project, there should be compensatory afforestation on one ha of non forest land plus reforestation on two ha of degraded forest. The cumulative progress of CAF works was 46,262 ha against the target of 46,355 ha in SSP and 80,359 ha against the target of 80,945 ha in ISP have been achieved up to October, 2002.

3) **Command Area Development:** A large number of studies have been undertaken by the project authorities for development of command area under SSP. Most of the studies are now complete. CAD plan for Phase-I is on the anvil. It is planned to complete the works in the command area pari-passu with the construction of the canal system.

Plans for development of command area works under ISP are under revision by the Government of Madhya Pradesh.

4) **Flora, Fauna & Carrying Capacity:** Studies have been carried out and completed by all the party States. Field surveys for terrestrial flora & fauna were conducted for identifying rare and/or endangered species for devising appropriate conservation measures. The main emphasis was on the conservation of endangered species, provision of migratory corridors and improving the sustaining capacity of the surrounding areas. Action plans are under advanced stage of implementation.

5) **Seismicity and Rim Stability:**

Sardar Sarovar Project: A Dam Safety Panel advises on specific design issues referred to it and its recommendations are suitably incorporated in the dam design. The seismic design aspects were reviewed by the panel after the Bhuj earthquake and it confirmed the adequacy of design and dam safety. Studies of Reservoir Induced Seismicity (RIS) and Rim Stability have been carried out by the Geological Survey of India (GSI), CWPRS, Pune, University of Roorkee and the World Bank Consultant. Construction and instrument installation works are completed at all the 9 identified seismic monitoring stations. Analysis of data collected by these observatories is done by the expert institutions.

Indira Sagar Project: In order to study the effect of seismicity on the dams of the Narmada Sagar Complex, a network of 10 seismological observatories with sophisticated instruments is to be established based on the recommendations of the Dam Review Panel, Central Water and Power Research Station, (CWPRS) Pune and the India Meteorological Department (IMD) for monitoring pre and post impoundment seismicity in the vicinity. In addition, one more station at Pandhana in Khandwa Districts was established.
At present only Narmada Nagar and Khandwa stations are fully functional and other stations shall be operational very soon. Buildings for all these observatories have been constructed and the instruments are being installed.

6) **Health Aspects:** A large number of studies have been carried out on the health profile of villages in three affected states. Substantial work has been carried out to identify health risk and disease within the affected areas of the SSP & ISP. Project authorities have prepared an action plan on health aspects to provide necessary health facilities at the dam site for people around the periphery and at the relocation sites. The plans are under implementation.

7) **Archaeology and Anthropology:** Based on extensive survey and studies carried out by archaeologists and anthropologists of repute to preserve the rich cultural heritage of Narmada valley, the works for relocation of ancient monuments, excavation of mounds, documentation of pre-historic sites etc. have been undertaken.

Against eight State protected monuments requiring relocation, 2 have been completed. Out of 6 sites for excavation one has been excavated. In addition, north bastion of Joga Fort, a Centrally protected monument shall be impacted by the scour action of water at FRL. Steps are being taken for protecting the same.

ENERGY MANAGEMENT CENTRE OF NARMADA CONTROL AUTHORITY

An Energy Management Centre (EMC) is being set up by the Narmada Control Authority at Indore to monitor the sharing of Power generated at Sardar Sarovar Project by the party states. The total work of the EMC, estimated to cost Rs.3.69 crores, was divided into four packages. Packages-I, awarded to BHEL, comprises of microprocessor based Remote Terminal Units (RTUs). The RTU at Canal Head Power House (CHPH) has been installed and pre-commissioning tests carried out. Package-II, also awarded to BHEL, comprises of Supervisory Control and Data Acquisition System (SCADA) equipment, associated software and communication equipment. SCADA equipment at Energy Management Centre (EMC), Indore and Western Region Load Despatch Centre (WRLDC), Mumbai has been installed and data transfer between EMC and WRLDC has been tested over a leased data circuit. Package-III, comprises auxiliary equipment like Uninterrupted Power Supply Systems (UPS), Diesel Generator (DG) set, air conditioning etc. All the equipment under this Package have been installed at EMC and work completed. Package-IV, awarded to M/s Intrax, comprises of Time of the Day (TOD) metres. All the equipment under this Package have been received and will be installed at the River Bed Power House (RBPH) control room when it is ready.

HYDROMET NETWORK IN NARMADA BASIN

NCA has been entrusted with the work of implementation of the Hydromet network which, inter-alia, comprises setting of up of 7 key Gauge, Discharge & Silt (GDS) stations, upgradation of equipments at Gauge & Discharge (GD) sites of CWC & State Government and setting up a Real Time Data Acquisition System (RTDAS) in the Narmada basin. The upgradation of GDS sites has already been accomplished. The running and maintenance of 7 GDS sites of the NCA which has been entrusted to Central Water Commission as deposit work is continuing. For the RTDAS, a contract on turnkey basis was signed with M/s ECIL in September, 1996 for

an amount of Rs.12.85 crore for implementation of Real Time Data Acquisition System (RTDAS) Network comprising 26 Remote Stations (RS) in the basin and a Master Control Station at Indore. The Remote stations, depending upon their configuration, will automatically collect various hydro meteorological data such as water level, rainfall, evaporation, solar radiation, wind speed and direction, relative humidity and ambient temperature and transmit the same to Master Control Centre (MCC) through Data Relay Transponder (DRT) on board METSAT series satellite. The MCC at Indore has already been established. After launch of the new satellite METSAT in September, 2002 Seven out of the Twenty Six remote stations have been tuned to transmit the data through DRT on board METSAT and the remaining Nineteen stations are under the process of optimization with the new satellite and the work is likely to be completed by January, 2003. The software for the Water Management System including flood forecasting and integrated reservoir operations in the Narmada basin is under development by M/s ECIL. The Project is in the advanced stage of implementation and has been rescheduled to be tested during the monsoon of 2003. The RTDAS on completion will be useful in giving timely flood warnings for safety of various major dams including SSP&ISP on river Narmada and related softwares will help in proper accounting and apportionment of Narmada Water among the beneficiary states in accordance with the mandate given by NWDT.

ANNUAL WATER ACCOUNT OF NARMADA BASIN

According to the orders contained in the Sub-Clause-8 of the Clause-XIV of the NWDT award, NCA has been preparing Annual Water Account for the Narmada basin by collecting the data from the state concerned on areas irrigated by Narmada waters in each season, withdrawals for domestic, municipal and industrial uses or any other purposes. The Authority has also been mandated by the award to determine the volume of water flowing in the river Narmada and its tributaries in a water year (1st July to 30th June). Annual Water Accounts upto the year 2000-01 have already been finalized and published by the Authority and draft report for the water year 2001-02 is under preparation and finalization.

25. SARDAR SAROVAR CONSTRUCTION ADVISORY COMMITTEE

COMPOSITION AND FUNCTIONS

The Sardar Sarovar Construction Advisory Committee (SSCAC) was constituted in 1980 by the Government of India in accordance with the directives of the Narmada Water Disputes Tribunal (NWDT) with a view to ensure efficient, economical and early execution of Unit-I (Dam and Appurtenant works) and Unit-III (Hydro Power works) of the Sardar Sarovar Project. The Secretary, Government of India, Ministry of Water Resources, is the Chairman of the Committee. The Officers of the departments like Irrigation, Power, Revenue, Welfare etc. concerned with the construction of the project, of the four party states viz. Gujarat, Maharashtra, Rajasthan and Madhya Pradesh, along with their counterparts from Government of India and the Narmada Control Authority, are Members of the Committee. The Committee has a full time Secretary of the rank of the Chief Engineer from the Central Water Commission. The secretariat of the Committee is located at Vadodara.

IMPORTANT DECISIONS

68th meeting of the SSCAC was held on 27th June 2002. Some of the important decision taken in 68th meeting are as follows :

a) The Committee approved the Draft Tender for the supply and supervision of erection of 250 MVA, 13.8/420 KV Generator-Motor Transformers for the River Bed Power House of Sardar Sarovar Project.
b) The Committee approved the Annual Development Plan (2002-03) for the Unit-I and Unit-III works of the Sardar Sarovar Project.
c) The Committee approved the raising of the composite block no. 51 of the Sardar Sarovar Dam up to EL 121.92m (i.e. crest level).
d) The Committee reviewed the position of share cost payment by the party states of Madhya Pradesh, Maharashtra and Rajasthan, to Gujarat.
e) The Committee approved the consolidated functions of its Permanent Standing Committee (PSC) as Claims Committee.

PERMANENT STANDING COMMITTEE

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

Members. The Secretary, SSCAC is the Member Secretary of the PSC. 86th meeting of the PSC was held on 14th November 2002, wherein following important decisions were taken.

a) Approval for the procurement of testing and measuring equipment by NCA for its RTDAS project.
b) Approval for the deviations in specifications of some of the quoted supplies / works of RTDAS project.

PROGRESS OF MAIN DAM WORKS

The construction of the main spillway portion of the dam had been held up for over five years due to the writ petition filed by Narmada Bachao Andolan in the Supreme Court of India. The final judgement on the case was delivered by the Supreme Court on 18th October 2000, in which the Court cleared raising of the dam up to EL 90.0m, and also gave directions for further construction of dam as per the award of the Narmada Water Disputes Tribunal. As per Court's directions, the permission for further raising of dam is now to be given by the NCA, after obtaining clearances from the Resettlement and Rehabilitation Sub-group and the Environment Sub-group, and in consultation with the Grievances Redressal Authorities (GRA's) of Gujarat, Maharashtra and Madhya Pradesh.

Subsequent to the final order of Supreme Court, the main dam of the Sardar Sarovar Project was programmed to be raised to a minimum elevation (EL) of 100.0m by June 2002, as per the action plan approved by the NCA (in its 61st meeting held on 17th November 2000) as given in Table 25.1below :

Table 25.1

Dam Height (EL)	Time Frame	
	Completion of R&R	Completion of Dam
100.0m	December 2001	June 2002
110.0m	December 2002	June 2003
121.0m	December 2003	June 2004
138.68m	December 2004	June 2005

The NCA's stipulated target however was not achieved due to the slow progress of Resettlement and Rehabilitation works. The NCA in its 64th meeting, held on 17th May 2002, gave permission to raise the main spillway blocks (nos. 30 to 46) only up to EL 95.0m, along with permission to construct 3.0m high humps over blocks 31 to 45 for the safety of downstream stilling basin. The work of raising of the effective level of dam to EL 95m from EL 90.0m was completed on 4th July 2002, and the work of

3.0m humps above EL 95.0m was completed on 15th July 2002. The status of overall progress of works for the month ending October 2002 is given in Table 25.2:

Table 25.2

Particulars	Estd. Qty.	Progress upto October 2002	% Work Completed
Excavation (Lakh Cu.m.)	64.00	63.49	99.21
Concreting (Lakh Cu.m.)	68.20	60.66	88..95

PROGRESS OF CANAL HEAD POWER HOUSE

The Civil and Electrical works of Canal Head Power House have been completed, and all the five units each of 50 MW capacity are ready for commissioning. The units will be commissioned when the dam height reaches the level of 110.64 m.

PROGRESS OF RIVER BED POWER HOUSE

The work on the River Bed Power House was held up due to development of stress zone in the powerhouse cavern and non-receipt of embedded parts for the Turbine Generator (T.G.) Sets owing to some contractual problems. The issue of supply of T.G. Sets was resolved with the signing up of a fresh agreement with M/s. Sumitomo Corporation of Japan. The revised price of the supply contract is 23194.709 million Yen + Rs. 96.23 crores. The supply of T.G. Sets parts has commenced and material worth 22034 million Yen has been received at site. The work of further excavation in the River Bed Power House cavern and concreting have also commenced, and the status of progress of civil work at the end of October 2002 is given in Table 25.3 below :

Table 25.3

Particulars	Estd. Qty.	Progress up to October 2002	% Work Completed
Open Excavation (Th. Cu.m.)	1715.000	1662.857	96.96
U.G. Excavation (Th. Cu.m.)	731.159	676.466	92.52
Concrete (Th.Cu.m.)	325.442	259.238	79.66

As per the draft Revised Implementation Schedule (June 2002) under discussion in the SSCAC, first unit of RBPH is targeted for commissioning by September 2004, with commissioning of other units at an interval of four months, and the last unit will be commissioned in May 2006.

PROGRESS OF IRRIGATION BYE-PASS TUNNEL

The decision about necessity of IBPT was taken in the 60th meeting of the NCA held on 18th July 2000, which was endorsed by the RCNCA in its 9th meeting held on 18th August 2001. The Irrigation Bye-Pass Tunnels (IBPT) arrangement comprises of two 5.5 m diameter tunnels across the right bank hill, connecting the main reservoir with the first irrigation pond. The twin IBPTs, with invert level of EL 88.39 m at the inlet, will have a discharge capacity of about 283.12 cumecs (10000 cusecs) at reservoir level of 97.54 m and 441.66 cumecs (15000 cusecs) at reservoir level of 110.67 m.

Presently the excavation and lining works on one of the tunnels has been completed and water is passing through it to the canal system. In case of the second tunnel, excavation work and lining has been completed, while other works like gates, stilling basin etc. in progress. The work of tunnel shafts and installation of gates are in progress in both the tunnels. Concreting for bell mouth, trash rack and stoplog gates recess has been completed up to EL 115.0m for both tunnels. The overall progress of IBPT works at the end of October 2002 is given in Table 25.4 below :

Table 25.4

Particulars	Estd. Qty.	Progress up to October 2002	% Work Completed
Open Excavation (Lakh Cu.m.)	7.36	7.28	98.88
Tunnel & Shaft Exc. (Lakh Cu.m.)	0.35	0.32	90.86
Concrete (Lakh Cu.m.)	1.02	0.89	87.64
Installation of gates (Th. Tonne)	2.48	0.62	25.00

26. BANSAGAR CONTROL BOARD

INTRODUCTION

The Bansagar Control Board was set up by the Government of India through a Resolution in January 1976. The Board functions from Rewa (Madhya Pradesh) accordance with an agreement reached between the Governments of Madhya Pradesh, Uttar Pradesh and Bihar on the 16th September 1973 for sharing the waters of River Sone and the cost of the Bansagar Dam. The Resolution was amended in 1990. The main features of the amended resolution are as below: -

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

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

ORGANISATION

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

BANSAGAR DAM PROJECT

Bansagar Dam, on Sone River, a joint venture of the States of Madhya Pradesh, Uttar Pradesh and Bihar is being executed by the Water Resources Department, Government of Madhya Pradesh under the

directions of the Bansagar Control Board. The respective States are carrying out the execution of the canals and power systems independently.

The benefits and cost of the dam, including land acquisition and rehabilitation, are shared by Madhya Pradesh, Uttar Pradesh and Bihar in the ratio of 2:1:1.

Components of Bansagar Dam

The Bansagar dam envisages construction of –

i) 67.5 m high masonry dam including rock fill flanks across the Sone river just downstream of the gorge at Kusumah (Deolond). Length of masonry dam, left rock fill dam and right rock fill dam are 670.00 m, 161.00 m and 185.00 m respectively.
ii) Six low earth dykes, four on the left bank of Sone River and two on its right bank with a total length of 6.95 km.
iii) Kuteshwar Lime Stone Deposits Protection works.

Benefits from the Project

Irrigation Benefits-

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

Power Benefits-

(i)	Power generation in Madhya Pradesh	425 MW

Completion Schedule

As per construction programme approved by the Executive Committee in its 64th meeting held on 14.06.2002, it is proposed to complete the dam as per following schedule, provided funds as per the construction programme are provided by the participating States of Madhya Pradesh, Bihar and Uttar Pradesh.

Dam up to Crest level : Since completed in June 2000.
Dam up to Top Bund Level (full Height) : By June'2004

Progress of Works

The rock fill dams and non-overflow masonry dams on either flank have been completed to their full height. All the overflow blocks have been completed up to crest level of 326.40 m and Rehabilitation & Resettlement (R&R) works of 44,000 Project Affected Persons (PAPs) up to the corresponding submergence level of RL 335.00 m have also been completed. With the partial storage up to crest level of dam, power generation has commenced and 1734 million units of electricity worth about Rs 346 Crores have been generated till December 2002 utilizing Bansagar waters. Besides power generation, irrigation in area of about 1000 hectare in Madhya Pradesh and domestic water supply to Rewa and adjoining towns/ villages is being provided since partial commissioning of dam in June 2000. Also regulated releases are being provided to Bihar for utilization in Sone Command areas under Indrepuri Barrage. During the current year 2002-03, in addition to the existing 3 units of 105 MW at Power House No.1 and two units of 20 MW each at Dam-toe Powerhouse, 2 units of 15 MW at Power House No. 2 were commissioned during August/ September 2002 and the one remaining unit of 20 MW at Dam-toe Power House was commissioned in September 2002. With the power generation alone, the project is likely to pay back its cost in next 8 years.

The dam at its full height will submerge 336 villages. According to Socio-Economic survey conducted in 1980-81 approximately 1.5 lakh PAP's of 23,390 families are likely to be affected. Total 56,428-hectare land is coming under submergence, out of which 34,765-hectare is private land, 17,185-hectare is revenue land and 4,478-hectare is forestland. R&R Programme is being implemented based on norms approved by the Executive Committee and orders issued by Government of Madhya Pradesh. Comprehensive R&R Policy for the project has been finalized.

27. BETWA RIVER BOARD

ORGANISATION AND ITS COMPOSITION

In accordance with the inter-state agreement of July 1972 between Uttar Pradesh and Madhya Pradesh, a decision was taken to constitute a Control Board for the execution of the Rajghat Dam Project, a joint venture of Madhya Pradesh and Uttar Pradesh. Accordingly, the Betwa River Board was constituted under the Betwa River Board Act, 1976 by the Ministry of Water Resources for efficient, economical and early execution of the project. The head quarters of the Board are at Jhansi (Uttar Pradesh).

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

RAJGHAT DAM PROJECT

Rajghat Dam Project is a joint venture of Madhya Pradesh and Uttar Pradesh. The Rajghat Dam with appurtenant structure is under construction across River Betwa to provide irrigation facilities to 1.38 lakh Ha. In Uttar Pradesh and 1.21 lakh Ha. In Madhya Pradesh with Power generation of 45 MW through Rajghat Hydro Electric Project at the toe of Dam on left flank. The cost as well as benefits of the project are to be shared equally by both the States. 99% work of Dam and Power House is completed by June 2002. Remaining work is proposed for completion by June 2003.

The completion of Phase-I construction of Dam in 1992 up to its crest level (RL 357 M) has created storage of 8.48 TMC. The water storage was utilized for irrigation through Betwa and Bhander Canal systems of U.P. and M.P. respectively. The impounding of water in reservoir above crest has been started since last three years. The reservoir was filled up to RL 365.70 m, RL 366.00 m and RL 368.35 m in the years 2000-2001, 2001-2002 and 2002-2003 respectively.

LAND ACQUISITION

Total villages under submergence of the Dam in U.P. & M.P. States are 38 & 31 respectively. Compensation of M.P. area is almost completed. In U.P., the District Administration, Lalitpur, had paid the land compensation of 25

villages and for balance 13 villages the land compensation is being paid by BRB through mutual negotiation.

COMPLETION SCHEDULE

The Rajghat Dam has almost been completed. The main remained activity is the Acquisition of Land & Properties of 13 villages in U.P. area. The filling of reservoir upto its full capacity of RL 371.00 M could , not be possible till the acquisition of land k& property in the area coming under submergence is not completed. The spillway discharging capacity of Rajghat Dam is 14 lakhs cusecs whereas the discharging capacity of D/S Matatila Dam spillway is 8.0 lakhs cusecs.

Planning and Present status of Rajghat Power House Works

The estimate of Rajghat Hydro Electric Project at 1997 price level was Rs. 131.26 crores which included Rs. 58.41 crores for the civil works. The revised cost of the civil works of Power House is Rs. 66.89 crores at December 1999 price level and same has been furnished by Betwa River Board to MPEB. MPEB have contributed Rs. 59.51 crores up to 31.3.2002. The total expenditure incurred on civil works of Rajghat Power House till May 2002 is Rs. 60.60 crores.

The three units of Power House have been tested and commissioned during 1999-2000. 1047 lakh units of power were generated during 2001-2002. 579 lakh units were generated in 2002-2003.

Financial Position of Betwa River Board

The financial position of Rajghat Dam and Rajghat Power House Project as on 3.2.03 is given in Table 27.1 and Table 27.2 respectively :

Table 27.1: Rajghat Dam

(Rs. in crore)

Name of State	Apportionment as per revised cost estimate (Rs. in crore)	Contribution received up to 19.2.03 (Rs.in crore)	Balance to be contributed.as on 19.2.03 (Rs.in crore)	Net expenditure incurred up to 31 05 02 (Rs.in crore)	Balance available with BRB as on 19.2.03. (Rs.in crore)
U.P.	150.300	132.850	17.450		
M.P.	150.300	132.095	18.205		
Total	300.600	264.945	35.655	247.754	8.5

Table 27.2 : Rajghat Power House

Work	Revised cost estimate of work component	Contribution received up to 19.2.03	Balance to be contributed.	Net expenditure incurred up to 31.12.02	Balance available with BRB as on 31.12.02.
(a)Civil Works by BRB	66.890	59.510	7.38	60.601	(-) 1.091
(b) E/M works by MPEB	72.85	Expenditure has been made by MPEB directly.	-	-	-

MEETINGS : During 2002-03 one meeting of the Executive Committee of Betwa River Board (74th) was held on 03.02.03.

28. TUNGABHADRA BOARD

INTRODUCTION

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

ORGANISATION

At present, the Board consists of the Chairman, appointed by the Government of India, and two Members, one each, representing the States of Andhra Pradesh and Karnataka. In the discharge of its assigned functions, the Board exercises powers of a State Government. It makes rules for the conduct of its own business. The Government of Andhra Pradesh and the Government of Karnataka provide funds in agreed proportions and also depute staff to man the various specified posts, as per an agreed proportion.

The working table for canal wise distribution of water to the States is prepared every year by the Tungabhadra Board in consultation with the State Governments, and is reviewed for time to time during the water year. The regulation of water is carried out in accordance with the agreed working table.

STATUS OF ACTIVITIES

Irrigation

As the monsoon rains were deficit, in the catchment, the Tungabhadra Reservoir did not fill up to the full reservoir level in the year. The inflow into the reservoir from June to November, 2002 was 3,829.00 Million Cumec (Mcum) [135.225 Thousand Million Cubic feet (TMC ft.)].

The utilization of water by the States of Karnataka and Andhra Pradesh till November, 2002 was 1,725.60 MCum (60.917 TMCft) and 751.80 MCum (26.546 TMCft) respectively as against the likely utilization of 3,157.32 MCum (115.500 TMCft) for the water year 2002-2003. Evaporation losses from June to November, 2002 were 134.60 MCum (4.753 TMCft) to be shared by Karnataka and Andhra Pradesh in the ratio of 12.5 : 5.5.

Hydro Power

Two Power Houses are maintained by the Tungabhadra Board, with a total installed capacity of 72 MW, and a target of 160 million units of power generation is envisaged during the water year 2002-2003. Against this the power generated till December, 2002 was 121.685 million units. The target for 2003-2004 is 160 million units. The power generated is shared between the States of Karnataka and Andhra Pradesh in the ratio of 20:80.

Mini Hydel Power Plant

There is a proposal for establishing a Mini-Hydel Plant, to be located at the Right Bank High Level Canal of the Tungabhadra Project on Build, Operate, Own and Transfer (BOOT) basis. The proposed capacity of the plant is 8.25 MW with an yearly generation of 27 million units. An Independent Power Producer (IPP) has been selected for setting up the mini hydel plant. Andhra Pradesh Power Transmission Corporation (APTRANSCO) & Karnataka Power Transmission Corporation Limited (KPTCL) have been requested to enter into a power purchase agreement with the IPP.

Further, the Government of Karnataka has accorded approval for setting up a mini-hydel power plant of 1.20 MW capacity to M/s Tungabhadra Steel Products Limited at head of the Raya and Basavanna channel of the Tungabhadra Dam. The Tungabhadra Board is examining the proposal of M/s. Tungabhadra Steel Products Limited.

Fisheries

The Tungabhadra Reservoir has a water spread area of 378 Sqkm at full reservoir level affording tremendous scope for development of fisheries. Quality fish seeds are reared in the Board's Fish Farm to meet the demand of the public and for stocking in the Reservoir to increase the biomass. The fishing rights of the Reservoir was auctioned for the year to a local Fisheries Society for Rs. 33.10 lakh. In order to facilitate preservation of fish catch, the Board is running an Ice-cum-Cold Storage Plant. The revenue generated on account of selling fish nets till December, 2002 was Rs 16.54 lakh against target of Rs. 40.0 lakh for the year.

Board Meeting

During the year, the Tungabhadra Board held two meetings till December, 2002.

29. WATER AND POWER CONSULTANCY SERVICES (INDIA) LIMITED

INTRODUCTION

Water and Power Consultancy Services (India) Limited (WAPCOS), New Delhi is one of the Mini Ratna Public Sector Enterprise of Government of India. It was set up in the year 1969 to channelise Indian expertise in the fields of Water & Power Sectors and allied fields for the benefit of developing countries. It provides services in a wide range of activities covering pre-feasibility studies, feasibility studies, field investigations, detailed engineering, construction management, commissioning and testing, operation and maintenance, quality assurance & management, and human resources development. The main fields of WAPCOS operations cover Irrigation, Drainage, Ground Water Exploration, Minor Irrigation, Flood Control, Watershed Management, Hydro Power Engineering, Thermal Power Transmission and Distribution, Water Supply and Sanitation (Rural & Urban), Environmental Engineering, Ports & Harbours, Rural and Urban Development, Roads and Highway Engineering, System studies and Information Technology and Human Resources Development.

INTERNATIONAL OPERATIONS

WAPCOS is registered with various international funding agencies like World Bank, Asian Development Bank, African Development Bank, Arab Fund for Economic and Social Development, Kuwait Fund for Arab Economic Development etc. and also handles ITEC programmes including Water Resources Projects funded by JBIC, Japan. It has been providing consultancy services in India, Asia and Africa. WAPCOS has been accredited with ISO 9001.

Recognition of Merit

- Rated as "Excellent" by the Department of Public Enterprises since 1993
- Ranked amongst the top ten PSEs for the year 1999-2000
- Awarded the 'Merit Certificate' for "Excellent" performance during 1999-2000 and 2000-2001 by the Vice President of India.

In recognition of its contribution in the Water and Power Sectors, WAPCOS has been elected as a Member of the Governing Body of Consultancy Development Centre, an autonomous body supported by DSIR, Ministry of Science & Technology and as Vice President of the Governing Council of Consulting Engineers Association of India (CEAI) for the year 2001-2003.

FINANCIAL ACHIEVEMENTS

The year 2001-2002 has been significant from the point of view of performance as well as in respect of policy orientation for the company's growth. The company has been able not only to sustain the growth of business but also improved upon the same. The consultancy income reached an all time high of Rs. 4514.28 lakh as against Rs. 4241.29 lakh in the year 2000-2001, with the highest growth rate in recent past. In the foreign exchange earnings front also, inspite of constraints and difficulties in the foreign market being faced currently as a global phenomenon, the company has been able to post net foreign exchange earnings of Rs. 256.51 lakh. The company paid a dividend of Rs. 0.95 Crore which is 47.5% on its paid up capital of Rs. 200.00 lakh. The company since its inception has been able to manage its business operations from its own resources and has not taken recourse to borrowing.

TECHNICAL ACTIVITIES

The activities of the Company are carried through four Centres. The activities during the Financial Year 2001-2002 are reported below :-

COMMERCIAL AND INFORMATICS CENTRE

Important projects handled include

- Impact Assessment of Accelerated Irrigation Benefit Programme (AIBP) Projects;
- Small Grants Facility for Water Sector under Ministry of Environment & Forests;
- Water Quality Monitoring in Allahabad, Nellore, Sehore and Kangra districts, RGNDWM, Ministry of Rural Development, Govt. of India
- Design of Storm Water Drainage System for Gangtok, Govt. of Sikkim
- Managed Economic Reforms Project, Deptt. of Economic Affairs, Ministry of Finance.

CENTRE FOR WATER RESOURCES

Irrigation Division

Important projects handled include:

- Wabi Shebele Master Plan Study Project, Ethiopia;
- Rengali Irrigation Sub-project LBC, Phase-II, Orissa;
- Kurnool-Cuddapah Modernisation Project, A.P.;

?? Arresting Salinity Ingress and Ground Water recharge for 34 creeks of Bhadrak, Puri, Kendrapara Districts, Orissa.

System Studies and Human Resource Development Division Important projects handled include :

?? Surplus Water Utilisation of Sardar Sarovar Dam for Saurashtra and Kachchh Regions;

?? Hydrological Studies of Godavari Basin;

?? Real Time Flood Forecasting in Tambraparani Basin of Tamilnadu;

?? Preparation of Master Plan for Flood Management and Erosion Control in North Bengal, Phase – I.

National Level CAD Training programmes on various topics sponsored by Ministry of Water Resources were also organised.

Planning and Investigations Division

Important projects handled include :

?? Ghatprabha Right Bank Canal (GRBC), Bagalkot;

?? Micro Canalization Studies and Topographical survey of Indira Gandhi Nahar Project (Phase I & II)

?? Micro-Network Planning for Block VI and VII of SRBC Project, Nandyal, AP;

?? Detailed Route Survey pipeline from Vizag to Secundrabad (AP) – 600 km length, Gas Authority of India Ltd.

CENTRE FOR POWER

Important projects handled include :

Foreign Projects

?? Tala H.E. Project, Bhutan ;

?? Kurichhu H.E. Project, Bhutan ;

?? 132 KV Transmission Grid, Eastern Bhutan ;

?? Hwange Thermal Power Station Phase-II Project (920 MW), Zimbabwe ;

?? Rural Electrification Master Plan Implementation, Zimbabwe ;

?? Geo-technical Investigations for Pancheshwar Multi-purpose Project (Indo-Nepal Joint Venture) ;

Indian Projects

?? Accelerated Power Development & Reforms Programme (APDRP) ;

?? Teesta Stage – IV & VI Government of Sikkim;

?? Topographical survey for model studies for bridge alignment on river Kosi in Bihar;

?? Stability analysis of Ash Pond Dyke for Ib Thermal Power Station.

CENTRE FOR DIVERSIFICATION

ENVIRONMENT DIVISION

The Centre for Environment has been conducting environmental studies for various mega projects in hydropower, water resources, ports & harbours, Mining, industrial sector etc. Centre for Environment's major activities involved Environmental Impact Assessment (EIA) studies for diverse projects, contaminated site assessments, forestry, design of treatment plants, air and water quality models, terrestrial and aquatic ecological studies.

PORTS & HARBOURS DIVISION

Important projects handled include :

?? Contract Management of River Conservancy works on NW-1 and NW-2 for Inland Waterways Authority

?? Detailed Project Report for development of Fresh Water Lake at Flat Bay - Port Blair

?? 3-D Modelling for Water Quality Studies for Tehri reservoir

WATER SUPPLY AND SANITATION DIVISION

Important projects handled include :

Foreign Projects

?? Laboos area water supply project (Republic of Yemen)

?? Water Supply and Sewerage for Residential Colony Sienchekha and Arekha (Tala Hydroelectric Project), Bhutan

Indian Projects

- DPR for providing water supply facility and underground drainage facilities for 7 CMCs and 1 TMC in Bangalore Urban District;
- Master plan of water supply sewerage and drainage system of NOIDA for 2021;
- DPR on Drainage Problem for Port Blair City;
- Construction Supervision of Batch 3x, 4 & PRI Villages (Kumaon-II Region), Uttaranchal.

INDIAN NATIONAL COMMITTEE ON IRRIGATION & DRAINAGE (INCID)

The Indian National Committee on Irrigation and Drainage (INCID) is the National Committee for India for the International Commission on Irrigation and Drainage (ICID). INCID contributes to various ICID meetings/ workshops/ congresses and conferences as also to other International conferences. One of the important functions carried out by the INCID is the processing, coordination and monitoring of the R&D Schemes funded by the Ministry. WAPCOS serves as the main secretariat for INCID and continued to provide secretarial assistance to it during the year under review.

30. NATIONAL PROJECTS CONSTRUCTION CORPORATION LIMITED

INTRODUCTION

National Projects Construction Corporation Limited (NPCC) Ballabgarh an ISO 9001-2000 certified Company was established in the year 1957 as a Premier Construction Company to provide the necessary know how and resources for construction of Canal Systems, Irrigation and River Valley Projects, Dams and Barrages, Hydel and Thermal Power Projects, Industrial Structures, Roads & Bridges, Buildings and Townships, Airfields, etc. The corporation has been associated with 184 Projects of National and International importance. Since the NPCC is one of the few Construction Companies in the Government Sector having expertise and equipment for construction of tunnels, which form a major component of any hydroelectric power project.

The Corporation was doing well till 1988-89 but started incurring losses due to various reasons. The Corporation has since taken a number of measures to improve its performance such as aggressive marketing, diversification of activities in to new areas like environment-connected projects, highways and turnkey jobs etc. As a result of these measures the Corporation has been able to achieve an all time high order book position of over Rs. 770 crore.

In view of the marked improvement in the performance of the Corporation in the current year, the Revival Plan has been prepared and the same is under active consideration of the Ministry. The authorized capital of the company is Rs.30 crore and its Paid up Capital is Rs.29.84 crore.

TURNOVER

The turnover of the corporation during the last five years and the target for the current year 2002-03(upto Dec. 2002) is given below

(Rs in Crores)

Year	!997-98	1998-99	1999-00	2000-01	2001-02	2002-03
Turnover	116.89	121.3	142.41	156.89	137.6	120.3

The revised target for achieving turnover for the year 2002-03 is Rs.150.00 crore.

NEW WORKS SECURED

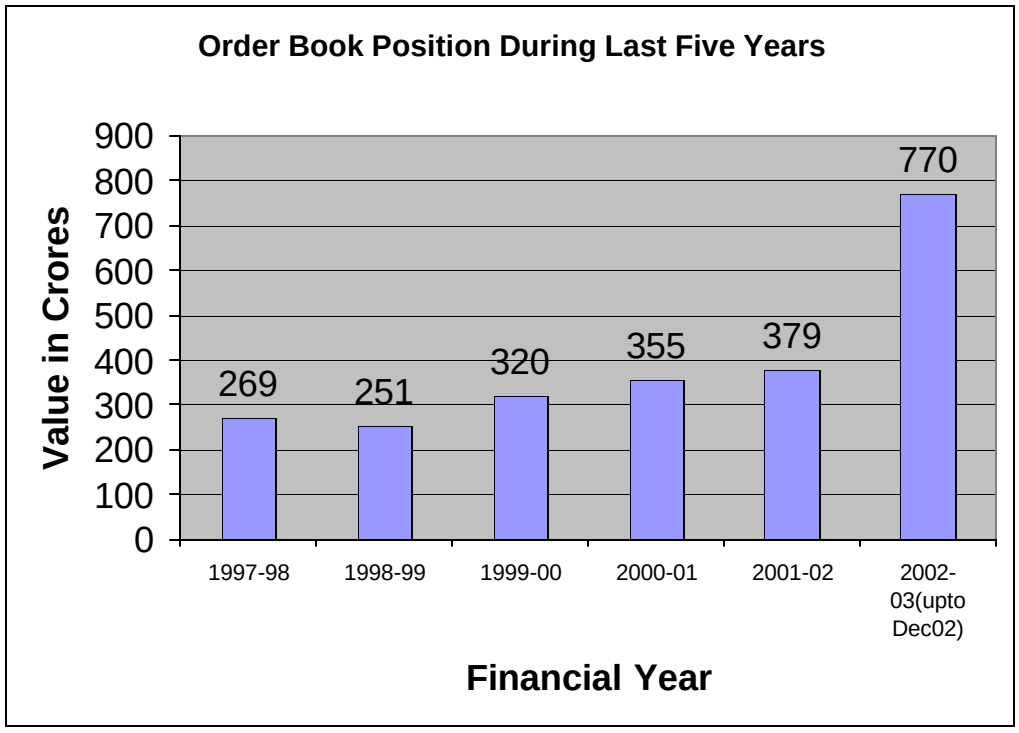
Despite several constraints in the tendering, corporation has secured new works for Rs. 635.05 crore as detailed below.

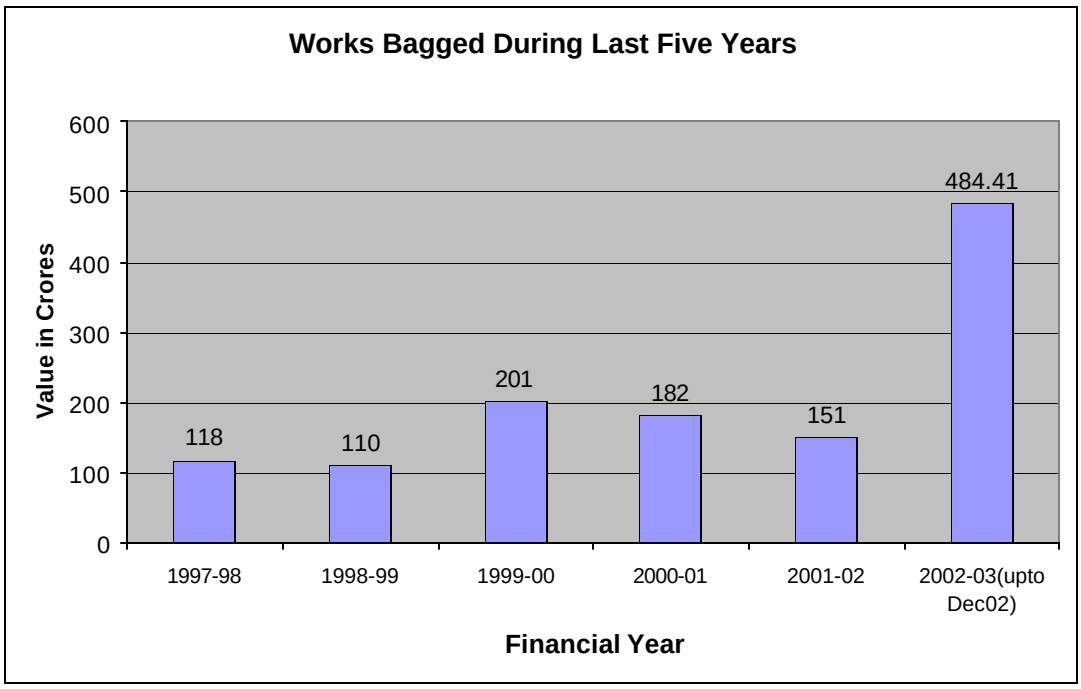
A. Year 2001-02 Rs.150.64 crore against a target of Rs.135.00 crore.
B. Year 2002-03 Rs.484.41 crore against a target of Rs.135.00 crore. Up to December 2002

Order Book Position as on 31.12.2002 is Rs.770.00 crore.

Major Works awarded to NPCC during the year: -

- Development of Heritage Corridor for Taj Trapezium Zone covering area of Taj Mahal, Agra Fort, Ram Bagh, Eatmad-ud-Daula, Chini Ka Rauaza and River Yamuna to the tune of Rs.175 crore (estimated) from Directorate of Environment, Government of UP.
- Construction of Head Race Tunnel, Surge Shaft and Penstocks for the total value of Rs.102.00 crore of Maneri Bhali Hydro Electric Project Stage-II awarded by Irrigation Department, Government of Uttaranchal
- Construction of residential and office buildings etc. to the tune of Rs.63.50 crore awarded by Assam Rifles This work is spread over in North Eastern States of Tripura, Meghyala, Mizoram, Nagaland, Arunachal Pradesh and Manipur





WORKS UNDER EXECUTION

At present, the corporation is w orking on 94 Unit / 133 Projects site spread all over the country. Some of the important projects in hand are as follows.

(a) IRRIGATION AND RIVER VALLEY PROJECTS

- Khuga Dam Manipur
- Diversion Schemes of Mailakcherra, Sonaicherra & Dorraicherra and Muhuri Irrigation Project, Construction of Head work with Gates, Head Regulator etc. in Tripura.
- Jobat Dam, Construction of Masonary Dam and allied Civil works, Indira Sagar Escape Channel and Cross Regulator Works ; Ajnal Aquaduct ;Bansagar Spillway Bridge & Bariyarpur Canal and Datia Canal works in MP.
- Diversion Channel at Kanpur in UP.

(b) HYDROELECTRIC PROJECTS.

Maneri Bhali Hydro Electric Project that includes Construction of Head Race Tunnel, Surge Shaft, Pen Stocks in Uttranchal.

(c) THERMAL PROJECTS

Construction of Building and allied civil works for Bokaro Thermal Power Projects (BTPS) in Jharkhand and some of the following various works of National Thermal Power Corporation (NTPC) located in different States: -

- ?? Ash Dyke/Building works at Vindhyachal Super Thermal Power Project (VSTPP) in Madhya Pradesh.
- ?? Site Levelling work of Phase-II at Kahalgaon Super Thermal Power Project (KSTPP) in Bihar.

(d) INDUSTRIAL PROJECTS & ENVIRONMENTAL PROJECTS.

- ?? Thiruvananthapuram Sewerage Scheme Works in Kerala.
- ?? Replace ment of Pipe Lines for Delhi Jal Board at Shahdara in Delhi.
- ?? Sewerage Works (2 Packages) in Gwalior in Madhya Pradesh.
- ?? Development of Taj Trapisium Zone (TTZ) Heritage Corridor Works at Agra in UP.

(e) MISCELLANEOUS PROJECTS

The Corporation has under taken several construction assignments relating to Buildings, Roads, Hospitals, Bridges, and Flyovers etc. These include: -

- ?? 62 schools at Ganjam, Bhadrak & Jagatsinghpur under Prime Minister Relief Funds in Orissa.
- ?? Construction/up gradation of Rural Roads under Pradhan Mantri Gramin Sadak Yojana at Sidhi, Bhopal, Rewa & Shahadol and Railway Over Bridge at Champa in Madhya Pradesh.
- ?? Construction of Residential & Office Buildings for Assam Rifles in the state of Nagaland, Arunanchal Pradesh, Manipur, Mizoram, Meghalaya and Tripura
- ?? Department of Telecommunication (DOT) Building at Guwahati in Assam.
- ?? Reinforced Cement Concrete (RCC) Bridge at Kawamara,Chunnigsanj Cherra and across river Gumti ; Construction of College Campus, Fisheries College at Agartala and New Legislative Assembly Building at Agartala in Tripura
- ?? School Complex at Bijapur Educational Institutions Society (KREIS), Sira Reservoir for Karnatka Urban Water Supply Drainage Board and Flyover at National College Circle Banglore in Karnataka.
- ?? Kanchipuram Bridge in Chennai and Over Bridge at Trichy in Tamilnadu.

- Krishak Bharitya Co-operative (KRIBHCO) Township and Hindon Bridge & Drain Bridge at NOIDA in Uttar Pradesh.
- Building works at Guru Ghasi Dass University, Bilaspur in Chattisgarh.
- Execution of earthwork in bank, construction of minor bridges etc in West Bengal.
- Construction of Administrative Office Complex Industrial ,Udyog Sadan, Patparganj and Building Works, Patel Chest Institute in Delhi.
- Construction of 30 nos Hostels & 4 nos. Training Institute at different locations and RCC Box culverts, other ancillary works for Broad Gauge (BG) Line Between Baidyanathdham - Dumka in Jharkhand.
- Building Complex of Central Institute of Plastic Engineering & Technical (CIPET) at Hazipur and Police Lines Quarters at Khagaria and Over Bridge at Baily Road at Patna in Bihar.
- 10 Nos Major Bridges on Broad Gauge (BG) Railway Line across rivers between Chakki Bank and Mukerian in Punjab.

VOLUNTARY RETIREMENT SCHEME

The corporation implemented the VR Scheme since the financial year 1991-92 as announced by the Government to reduce manpower, which is one of major contributory factors of the sickness of the corporation. The revised VR Scheme on Gujarat Pattern as announced by the government has been implemented since December 2001.

During the year (January - December 2002) 329 Nos. employees had exercised option under VRS, out of them 211 Nos. employees have been relieved from the services of the Corporation. Requests from 118 Nos. employees are pending. They shall be relieved on receipt of allocation funds from the Government. Altogether a total number of 2546 employees have been relieved under VR Scheme till 31st December 2002.

ANNEXURE – I

STAFF STRENGTH OF THE MINISTRY OF WATER RESOURCES

Sl. No.	Name of Office	GROUP A					GROUP B										GROUP C					GROUP D					TOTAL Group A, B, C & D				
							Gazetted					Non-Gazetted																			
		Total	SC	ST	PH	OBC	Total	SC	ST	PH	OBC	Total	SC	ST	PH	OBC	Total	SC	ST	PH	OBC	Total	SC	ST	PH	OBC	Total	SC	ST	PH	OBC
1.	Ministry of Water Resources (Proper)	67	7	1	-	-	44	7	2	-	-	91	17	2	-	7	153	23	4	3$	14	95	50	8	2$$	9	450	104	17	5	3(
2.	Controller of Accounts, MoWR	3	-	-	-	-	52	3	-	-	-	-	-	-	-	-	210	43	9	2	9	31	13	3	1	1	296	59	12	3	1(
3.	Central Water Commission	599	74	14	1	24	459	51	9	3	-	383	68	12	-	3	2280	295	55	12	84	963	274	102	8	52	4684	762	192	24	1(3
4.	Central Soil & Materials Research Station	67	10	2	-	3	34	2	2	-	1	43	5	2	-	5	125	28	8	2	4	97	32	7	2	2	366	77	21	4	15
5.	Central Water & Power Research Station	161	25	2	-	2	69	1	3	-	-	97	14	6	-	9	544	74	38	12	16	376	81	25	13	12	1247	195	74	25	3(
6.	Central Ground Water Board	448	51	15	-	17	394	49	16	-	16	291	34	9	-	9	2244	332	114	13	66	1824	341	102	7	37	5201	807	256	20	14 5
7.	Farakka Barrage Project	19	3	1	-	-	21	6	1	-	-	85	6	-	1	1	512	44	4	4	13	283	81	9	5	4	920	140	15	10	1(
8.	Ganga Flood Control Commission	22	2	-	-	-	12	1	-	-	-	2	-	1	-	-	40	9	-	-	-	14	5	1	-	-	90	17	2	-	-
9.	Bansagar Control Board	2	-	-	-	-	-	-	-	-	-	1	-	-	-	-	9	-	-	-	-	7	-	-	-	-	19	-	-	-	-
10.	Sardar Sarovar Construction Advisory Committee	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	1	-	-	-	4	-	-	-	-	17	1	-	-	-
11.	Brahmaputra Board	81	3	-	1	7	27	2	1	-	3	84	4	6	-	-	311	40	20	4	40	161	25	11	5	6	664	74	38	10	5(

12.	**Narmada ControlAuthority**	25**	-	-	-	-	8	-	-	-	-	19	2	-	-	1	61	11	6	2	7	31	9	2	1	1	144	22	8	3	9
13.	**National Water Development Agency**	69	4	-	-	-	72	7	1	-	-	14	2	-	-	-	377	60	18	5	17	132	34	8	4	-	664	107	27	9	1
14.	**National Institute of Hydrology**	84	10	2	-	7	-	-	-	-	-	49	5	-	-	-	73	18	-	2	-	51	19	-	-	-	257	52	2	2	7
15.	**Water & Power Consultancy Services (India) Limited**	247	21	4	1	5	26	4	1	-	-	25	2	2	1	-	146	31	7	3	11	26	13	2	1	-	470	71	16	6	1
16.	**National Projects Construction Corporation Limited**	283	15	2	1	11	-	-	-	-	-	320	15	1	-	5	328	49	4	7*	5*	56	5	1	-	-	987	84	8	8	2
	Total	2182	225	43	4	76	1218	133	36	3	20	1504	174	41	2	40	7422	1058	287	71	286	4151	982	281	49	124	16476	2572	688	129	5

$ In Group C post, 2 PH employees are also OBC and SC
$$In Group D post, 1 PH employee is also OBC.
*** One incumbent belongs to both category of PH and OBC.**
****13 Officers in Group A and 4 in Group B (Total 17) are on deputation.**

ANNEXURE-III

LIST OF POSTAL ADDRESSES OF HEADS OF ORGANISATIONS UNDER THE MINISTRY OF WATER RESOURCES

Sl. No	Organisation	Name of Head of Organisation	Telephone	Fax
1.	Government of India, Ministry of Water Resources, Room No. 412, IV Floor, Shram Shakti Bhavan, Rafi Marg, New Delhi – 110 001.	Shri A.K. Goswami, Secretary	23710305 23715919	23731553
	Attached Offices			
1.	Central Water Commission, Room No. 326, Sewa Bhavan, R.K. Puram, New Delhi – 110 066.	Shri R. Jeyaseelan, Chairman	26187232	26195516
2.	Central Soil and Materials Research Station, Room No. 309, Hauz Khas, New Delhi – 110 016.	Shri A.K. Dhawan, Director	26850025	26853108
	Subordinate Offices			
1.	Farakka Barrage Project, P.O. Farakka Barrage, Distt. Murshidabad – 742 212 West Bengal.	Shri M.U. Ghani, General Manager	03485- 253285	03485- 253608
2.	Ganga Flood Control Commission, Sinchai Bhavan, III Floor, Patna – 800 015	Shri C.B. Vashistha, Chairman	0612- 2233591	0612- 2222294
3.	Central Water and Power Research Station, P.O. Khadakwasla Research Station, Pune –411 024.	Smt. V.M. Bendre, Director	020- 24380825	020- 24381004
4.	Central Ground Water Board, CHQ, Faridabad.	Shri J.S. Burjia, Chairman	95129- 2413050	95129- 2419059
5.	Bansagar Control Board, Samab Colony, Rewa, Madhya Pradesh.	Shri S.K. Haldar, Secretary	07662- 226318	07662- 242433
6.	Sardar Sarovar Construction	Shri Indra Raj,	0265-	0265-

	Advisory Committee, Narmada Bhavan, A Block, IV Floor, Vadodara – 390 001.	Secretary	2421272	2437262
Registered Societies				
1.	National Institute of Hydrology, Jal Vigyan Bhavan, Roorkee- 247 667 (Uttaranchal).	Dr. K.S. Ramashastri, Director	01332-272906 01332-272907 01332-272908 01332-272909 (extn. 221) 01332-272718	01332-272123
2.	National Water Development Agency, 18-20, Community Centre, Saket, New Delhi – 110 017.	Smt. Radha Singh, Director General	26852735	
	Statutory Bodies			
1.	Narmada Control Authority, BG-113, Scheme No. 74-C, Vijay Nagar, Indore –452 010.	Shri A.K. Goswami, Chairman	0731-2551144	0731-2559886
2.	Brahmaputra Board, Basistha, Guwahati.	Shri M.K. Sharma, Chairman	0361-2307453	0361-2308588
3.	Betwa River Board, Nandanpura, Jhansi –284 003.	Shri J.N. Purohit, Chief Engineer	0517-2480183	
4.	Tungabhadra Board, H. No. 5-9-201/B&B1, Chirag Ali Lane, Hyderabad – 500 001(AP)	Shri V.K. Jyothi, Chief Engineer (CWC) & Chairman	23201605	23201605
	Public Sector Undertakings			
1.	Water and Power Consultancy Services (India) Limited, 76-C, Institutional Area, Sector – 18, Gurgaon – 122 015.	Shri P.L. Diwan, Chairman and Managing Director	95124-2397394	95124-2397392
2.	National Projects Construction Corporation Limited, Plot No. 67-68, Sector 25, Faridabad (Haryana)	Shri S.C. Bali, Chairman and Managing Director	95129-2231272	95129-2231269

ANNEXURE - IV

LIST SHOWING BUDGET ESTIMATES/ REVISED ESTIMATES OF VARIOUS SCHEMES AND PROGRAMMES OF THE MINISTRY OF 2002 - 2003

(Rs. in crore)

Sl No.	Sector/ Organisation/ Scheme	B.E. 2002-03		R.E. 2002-03	
		Plan	Non-Plan	Plan	Non-Plan
1	2	3	4	5	6
I	**SECRETARIAT-ECONOMIC SERVICES**	**2.02**	**11.69**	**1.33**	**11.26**
II	**MAJOR AND MEDIUM IRRIGATION**				
1.	Central Water Commission	22.62	74.74	20.91	68.06
2.	Central Soil &Materials Research Station	6.62	3.85	5.47	3.85
3.	Central Water & Power Research Station	8.60	19.31	4.67	18.14
4.	National Water Development Agency	16.50	0.00	15.50	0.00
5.	National Institute of Hydrology	2.96	3.27	2.87	3.27
6.	Research and Development Programme	2.50	0.00	3.49	0.00
7.	National Projects Construction Corporation Limited	1.00	14.00	0.00	27.00
8.	Sutlej Yamuna Link Canal Project	0.00	8.00	0.00	1.00
9.	Boards & Committees	0.00	2.71	0.00	1.63
	Total: Major & Medium Irrigation	**60.80**	**125.88**	**52.91**	**122.95**
III	**MINOR IRRIGATION**				
1.	Central Ground Water Board	112.16	45.30	101.16	45.13
2.	Surface Water Schemes	8.00	0.00	7.95	0.00
3.	R. & D. Programme	1.00	0.00	0.20	0.00
	Total :- Minor Irrigation	**121.16**	**45.30**	**109.31**	**45.13**

IV.	**COMMAND AREA DEVELOPMENT**				
1.	Command Area Development Programme	201.00	0.00	151.74	0.00
2.	R. & D. Programme	1.00	0.00	1.31	0.00
	Total : Command Area Development	**202.00**	**0.00**	**153.05**	**0.00**
V.	**FLOOD CONTROL**				
1.	Central Water Commission	20.62	32.07	23.29	28.68
2.	Flood Proofing Programme	1.50	0.00	0.01	0.00
3.	Ganga Flood Control Commission	2.30	0.00	2.01	0.00
4.	Emergent Flood Protection measures in Eastern and Western Sectors	0.00	3.00	0.00	3.00
5.	Survey & Investigation of Kosi High Dam Project	1.00	0.00	0.38	0.00
6.	Maintenance of flood protection works of Kosi and Gandak Projects	4.00	0.00	8.50	0.00
7.	Pancheshwar Multipurpose Project	5.00	0.00	4.65	0.00
8.	Joint Observation on common rivers with Bangladesh and neighbouring countries	4.00	0.00	0.75	0.00
9.	Critical anti-erosion works in Ganga Basin States	25.00	0.00	31.95	0.00
10.	Extension of embankments on Lalbakeya, Kamla, Bagmati and Khando rivers	5.00	0.00	5.00	0.00
11.	Critical anti-erosion works in Coastal and other than Ganga Basin States	2.00	0.00	0.01	0.00
12.	Improvement of Drainage in Mokama Group of Tals	0.10	0.00	0.35	0.00
13.	New Schemes for Majuli island in Assam, Dihang Project etc.	0.50	0.00	0.50	0.00

14.	Schemes for the benefit of North Eastern States & Sikkim	20.00	0.00	20.00	0.00
	-Brahmaputra Board	10.00	0.00	7.50	0.00
	-Flood Control in Brahmaputra and Barak Valley	45.00	0.00	12.50	0.00
	-Pagladia Dam Project	5.00	0.00	5.00	0.00
	-Harrange Drainage Scheme	**80.00**	**0.00**	**45.00**	**0.00**
	Sub Total S. No. 14				
	Total : Flood Control	**151.02**	**35.07**	**122.40**	**31.68**
VI.	**TRANSPORT SECTOR**				
1.	Farakka Barrage Project	25.00	22.09	23.00	21.94
	TOTAL (I to VI)	**562.00**	**240.03**	**462.00**	**232.96**
VII	**ACCELERATED IRRIGATION BENEFITS PROGRAMME ****	**2800.00**	**0.00**	**2800.00**	**0.00**
	Grand Total	**3362.00**	**240.03**	**3262.00**	**232.96**

Source of financing : Demand No. 101 – Ministry of Water Resources for 2003-2004
**** Source of financing : Demand No. 30 – Transfer to States & Union Territory Governments for 2003-2004**

ANNEXURE – V

LIST OF POSTAL ADDRESSES OF DIRECTORS OF PUBLIC GRIEVANCES/ STAFF GRIEVANCES IN THE MINISTRY OF WATER RESOURCES AND ITS VARIOUS ORGANISATIONS

Sl. No.	Name of the organization	Name & Designation	Address
1.	Ministry of Water Resources, Government of India.	Shri J.S. Burjia, Joint Secretary (Admn.)& Director (Public Grievances) Ms. Aruna Jain, Director (E) & Director (Staff Grievances)	Room No. 403, IV Floor, Shram Shakti Bhavan, Rafi Marg, New Delhi-110 001. Telefax No. 23710343 Room No. 431, IV Floor, Shram Shakti Bhavan, Rafi Marg, New Delhi-110 001. Tel. No. 23716747
2.	Central Water Commission, New Delhi.	Shri O.P. Khanda, Secretary	Central Water Commission, Room No. 326, Sewa Bhavan, R.K. Puram, New Delhi-110 066. Tel. No. 26187232 Fax No. 26195516
3.	Central Soil & Materials Research Station, New Delhi.	Shri S. S. Brar, Chief Research Officer & Director (Staff Grievances)	Central Soil & Materials Research Station, Room No, 309, Hauz Khas, New Delhi-110 016. Tel. No. 26850025 Fax No. 26853108
4.	Farakka Barrage Project, Farakka Barrage.	Shri B.K. Chakravarty, Superintending Engineer (Coord.)	Farakka Barrage Project, P.O. Farakka Barrage, Distt. Murshidabad West Bengal – 742 212. Tel. No. 03485-253285 Fax No. 03485-253608
5.	Ganga Flood Control Commission, Patna.	Shri Bibhas Kumar, Director (MP-II) (Admn.) & Director (Grievances)	Ganga Flood Control Commission, Sinchai Bhavan, III Floor, Patna-800 015. Tel. No. 0612-2233591

6.	Central Water & Power Research Station, Khadakwasla (Pune)	Dr. I. D. Gupta, Joint Director	Central Water & Power Research Station, P.O. Khadakwasla Research Station, Pune-411 024. Tel. No. 020-24380825 Fax No. 020-24381004
7.	Central Ground Water Board, Faridabad.	Shri B.K. Mendiratta, Superintending Engineer & Director (Public Grievances) Shri A.K. Aggrawal, Deputy Director (Stat.) & Director (Staff Grievances	Central Ground Water Board, CHQ, Faridabad. Tel. No. 95129-2412524 95129-2419105 Fax No. 95129-2419059 Tel. No. 95129-2413050 Fax No.95129-2419059
8.	Sardar Sarovar Construction Advisory Committee, Vadodara	Shri N. K. Bhandari, Deputy Secretary	Sardar Sarovar Construction Advisory Committee, Narmada Bhavan, 'A' Block, 4th Floor, Vadodara- 390 001 Tel. No. 0265-2421272 Telefax No. 0265-2437262
9.	Bansagar Control Board, Rewa	Shri Soumitre Haldar, Secretary	Bansagar Control Board, Samab Colony, Rewa (M.P.) Tel. No. 07662-226318 Fax No. 07662-242433
10.	Water & Power Consultancy Services (I) Ltd., Gurgaon	Shri D.S. Pahwa, General Manager (P&A)	Water & Power Consultancy Services (I) Ltd., 76-C, Institutional Area, Sector-18, Gurgaon-122 015. Tel. No. 95124-2397394 Fax No. 95124-2399220

11.	National Projects Construction Corporation Limited	Shri M. Sharma, AGM (C&M)	National Projects Construction Corporation Limited, Plot No. 67-68, Sector 25, Faridabad (Haryana). Tel. No. 95129-2231272 Fax No. 95129-2231269
12.	National Institute of Hydrology, Roorkee	Dr. A.K. Bhar, Scientist 'F' & Chairman (Grievance Cell)	National Institute of Hydrology, Jal Vigyan Bhavan, Roorkee-247 667. (Uttaranchal) Tel. Nos. 01332-272906/ 272907/ 272908/ 272909 Fax No. 01332-272123
13.	National Water Development Agency, New Delhi.	Shri P.R. Chopra, Chief Engineer (HQ)	National Water Development Agency, 18-20, Community Centre, Saket,NewDelhi-110 017. Tel.No. 26852735 Fax No. 26960841
14.	Narmada Control Authority, Indore.	Shri Jhujhar Singh, Member (Power)	Narmada Control Authority, BG-113, Scheme No.74-C, Vijay Nagar, Indore-452 010. Madhya Pradesh. Tel. No. 0731-2551144 Fax No. 0731-2559886
15.	Brahmaputra Board, Basistha (Guwahati)	Shri G.P. Singh, Superintending Engineer (MP)	Brahmaputra Board, Basistha, Guwahati. Tel. No. 0361-2307453 Fax No. 0361-2308588
16,	Betwa River Board, Nandanpura, Jhansi.	Shri R.S. Ram, Secretary	Betwa River Board, Nandanpura, Jhansi-284 003. Tel. No. 0517-2480183

ANNEXURE VI

DETAILED ASSESSMENT OF PERFORMANCE FOR THE YEAR 2002-2003 IN RESPECT OF THE AUTONOMOUS ORGANISATIONS UNDER THE MINISTRY OF WATER RESOURCES

Sl. No.	Organisation
1.	National Water Development Agency
2.	National Institute of Hydrology
3.	Brahmaputra Board

DETAILED ASSESSMENT OF PERFORMANCE OF NATIONAL WATER DEVELOPMENT AGENCY, NEW DELHI

The genesis of setting up of National Water Development Agency, an autonomous organisation under the Ministry, its functions, organizational structure etc. have been given in detail in chapter 17.

2. National Water Development Agency (NWDA) is carrying out the feasibility studies of the National Prospective Plan for water resources development on a scientific basis which, inter alia, envisage diversion of water from surplus river basins to deficit / drought-prone areas of the country by interlinking major rivers of the country. The plan includes construction of storage reservoirs to store flood waters and interlinking of river systems for optimum utilization of river waters. The water so diverted will be used for irrigation, drinking and other purposes. This plan comprises of two components, namely Peninsular Rivers Development and Himalayan Rivers Development.

3. Under the Peninsular component, NWDA has completed data collection and water balance studies of 137 basins / sub-basins, 52 identified diversion points, toposheet studies of 58 identified storages, 18 toposheet studies of links alignments and prepared pre-feasibility reports of 17 water transfer links. Based on these water balance studies and pre-feasibility reports, NWDA has identified 16 inter basin water transfer link proposals for the preparation of feasibility reports under peninsular component. Presently, the work of field surveys and investigations for preparation of feasibility reports of link schemes is on hand. Feasibility reports of 6 links have already been completed and such reports for another 3 links are programmed to be completed by March 2003. The field surveys and investigations and preparation of feasibility reports of another 5 links remained under progress during the year 2002-2003. Moreover, the special studies such as geological survey, geophysical investigations, geo-technical investigations, drilling work for geo-technical investigations, construction materials investigations, borrow area survey, socio-economic and environment surveys, command area surveys, pre-irrigation soil surveys etc. of the above links remained under progress by other agencies.

4. Under the Himalayan component, NWDA has completed water balance studies at 19 diversion points, toposheet studies of 16 storage reservoirs, toposheet studies of 19 link alignments and prepared pre-feasibility report of 14 water transfer links. Based on these water balance studies and pre-feasibility reports, NWDA has identified 14 inter-basin

water transfer link proposals for preparation of feasibility reports under Himalayan components. The field surveys, investigations and preparation of feasibility reports of 3 links are programmed to be completed by March, 2003, whereas these activities for another 6 links remained under progress during the year 2002-2003. In addition to these, topographical surveys and other related investigations for preparation of feasibility reports of one more link was initiated during the year.

5. The feasibility reports of all the identified water link schemes under Peninsular and Himalayan components were originally programmed to be completed by the year 2008. However, in view of the setting up of a Task Force on Interlinking of Rivers under the Chairmanship of Shri Suresh Prabhu, Member of Parliament vide Ministry's Resolution No. 2/21/2002-BM dated 13.12.2002 and milestone dates / time table indicated therein, as mentioned in detail in chapter 18, the programme of preparation of feasibility reports is now being accelerated by NWDA so as to complete the task by the year 2005.

6. The Implementation of the above programme of inter-basin water transfer is expected to provide additional irrigation benefits of 35 million hectare i.e. 25 million hectare from surface waters and 10 million hectare from increased use of ground waters which will be over and above the ultimate irrigation potential of about 140 million hectare envisaged from major, medium and minor irrigation projects and would generate 34,000 MW of power, apart from the benefits of flood control, navigation, water supply, fisheries, salinity and pollution control etc.

7. It is mentioned that 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. However, the whole programme of implementation would depend on the seriousness of the States involved to arrive at consensus regarding sharing of surplus water over and above their own needs and the cooperation extended by them to achieve the objectives of inter-basin water transfer. In order to further speed up the process towards implementation of the link schemes, NWDA has prepared detailed 'Action Plans for Implementation' of five links which are identified as inter-basin links or those involving one or two States only. The concerned States could concentrate on these links and expedite the process of negotiations amongst themselves so that the work of preparation of the DPRs could be taken up.

8. Initially when Peninsular River Development Component was taken up by NWDA when it was set up in 1982, it was estimated that Rs. 107.42 crores would be required for carrying out the various activities. In 1990, when the work of Himalayan Rivers Development Component was also

included in the scope of activities of NWDA, the estimate was revised to Rs. 181.00 crores. The expenditure incurred by NWDA since its inception up to March, 2002 was Rs. 109.68 crores. During the year 2002-2003, the budget allocation was Rs. 16.50 crores and revised budget estimate was Rs. 15.50 crores. The actual expenditure incurred during the year 2002-2003 upto 31.12.2002 is Rs. 9.12 crores.

DETAILED ASSESSMENT OF PERFORMANCE OF NATIONAL INSTITUTE OF HYDROLOGY, ROORKEE

The National Institute of Hydrology was established in 1978 as nucleus for studies and research in the area of Hydrology. The main objectives, organizational set up, achievements etc. of the Institute are given in detail in Chapter 21.

2. The Institute carried out studies and research in various areas of hydrology during the year 2002-2003. Based on these, 80 reports are being brought out and more than 100 papers have been published in national and international journals and proceedings of national and international conferences / seminars and symposia. The Institute and its regional centers have also taken up a few problems with emphasis on research content, which are specifically referred to it by the Central and the State Government Organisations and Public Sector Undertakings. Also, a number of research projects sponsored by Central and State Governments have been taken up by the scientists of the Institute. During 2002-2003, work on 9 ongoing projects was continued and studies on two projects were completed and final report submitted. The Institute also functions as the Secretariat of the Indian National Committee on Hydrology (INCOH).

3. In the international laboratory comparison for the measurement of environmental tritium in waters organised by the International Atomic Energy Agency, Vienna, the performance of Nuclear Hydrology Laboratory of NIH was ranked amongst the top ten laboratories of the world that participated in the exercise. In one case of measurement of moderately higher radio activity, the NIH Laboratory was one amongst the three laboratories that reported the correct value.

4. In the 'Hydrology Project' funded by World Bank, the main role envisaged for NIH is to strengthen and expand the Institute's capabilities for training to serve the important objectives of the Project, namely (i) Modernization and improvement of data collection and processing procedures and (ii) Use of computers and software for water data management. A major responsibility of the Institute would be to provide

training for trainers in the required skills through short courses run at Roorkee and organising courses for data base managers and data base supervisors for use of the data processing software. During the year, four training courses on HYMOS and one training course on Basic Hydrology were held for officers of Central / State Governments and other organisations covered under the Hydrology Project. Furthermore, under this project, work on following demand driven Research and Development Projects is being carried out in collaboration with the concerned state organisations:

- ?? Fresh Water – saline Water Inter Relationship in Multi-acquifer System of Krishna Delta in Andhra Pradesh.
- ?? Estimation of Irrigation return flow in Lokapavani Area of K.R. Sagar Command in Karnataka.
- ?? Artificial measures for Ground Water recharge in Alluvial and Hard Rock areas of Maharashtra.
- ?? Data collection and processing for study on catchment area of Upper Bhopal Lake and its ecosystem.

Works on these project have progressed satisfactory and studies were completed as per schedule.

5. The following important studies were carried out by the NIH Center for Flood Management Studies for Brahmaputra at Guwahati during the year 2002-2003.

(i) Design Flood Studies for Noa Dihing River – GIUH Approach
(ii) Flood Plain Delineation and Risk Zoning in Burhi Dihing Basin
(iii) Dunoff Estimation for Lohit Dam Project
(iv) SCS Modelling for Runoff studies for Jadukata River Basin.

6. During the year 2002-2003, extension of Library and construction of Auditorium at Roorkee were completed.

7. The financial outlay for the Institute for 2002-2003 is as under:

Budget estimate (BE)	**(Rs. in Crores)**
Plan	2.41
Hydrology Project	0.55
Non Plan	3.27

DETAILED ASSESSMENT OF PERFORMANCE OF BRAHMAPUTRA BOARD, GUWAHATI

The Brahmaputra Board was set up under the Brahmaputra Board Act (Act 46 of 1980). The main objectives, organizational set up, achievements etc. of the Board are given in Chapter 18.

2. During the year 2002-2003, out of a total of 26 Master Plans, 5 are completed and awaiting approval from the Board, 5 are under preparation and 16 are under survey and investigation. Out of 31 drainage development schemes, 6 are awaiting investment clearance for execution, 5 are awaiting technical clearance from Central Water Commission, in respect of 5 DPR is under modifications as per suggestions from Central Water Commission and State Governments, DPR is under preparation in respect of 10, Project is under investigation in respect of 4 and 1 project is under execution. Similarly out of 9 multi purpose projects 8 are under survey and preparation of DPR and 1 is under execution.

3. The Pagladiya Dam Project with an estimated cost of Rs. 542.90 crore envisages construction of rolled fill earthen dam 26.20 m high and 23 km. long at Thalkuchi village, about 26 km. north of Nalbari, headquarters of Nalbari district of Assam. Out of a total requirement of 3238 ha. required for resettlement of 3271 families Government of Assam has allotted 956 ha. in 33 locations till now and another 48 ha. is being allotted soon in 3 more locations. The tender for construction of 268 dwelling units in the four sites has been invited. The Revenue Department of the Government of Assam has issued notification under Section 4 (1) for 31 villages in the project area for the reservoir and construction of dam and appurtenant structures.

4. Necessary infrastructures like approach road to dam site, improvement of haul road, setting up of Project Chief Engineer's Office at Nalbari has been taken up and construction of security shed and site office at Thalkuchi and 1 model dwelling unit for resettlement of affected families has been completed.

5. While the draft tender document prepared by the WAPCOS (India) Limited is being scrutinized in the Board the specifications of main dam for tender purpose assigned to CWC has been completed and the construction drawing of the main dam is under preparation. Construction work has already been completed in respect of 3 numbers of raised platforms for flood affected people (R&D Scheme) along Brahmaputra embankment.

6. The North Eastern Hydraulic and Allied Research Institute (NEHARI) the construction of which was entrusted to the Board in September 1985 has already procured and installed most of the equipment with adequate infrastructures facilities. An intensive training in soil, concrete and rock testing disciplines was provided to the officers and staff of the Brahmaputra Board with the help of CSMRS, New Delhi.

The Fund earned by the NEHARI are as follows :-

Upto March, 2001	-	Rs. 7,80,819.00
During 2001-2002	-	Rs. 87,89,093.00
During 2002-2003 (Upto January, 2003)	-	Rs. 46,96,262.00