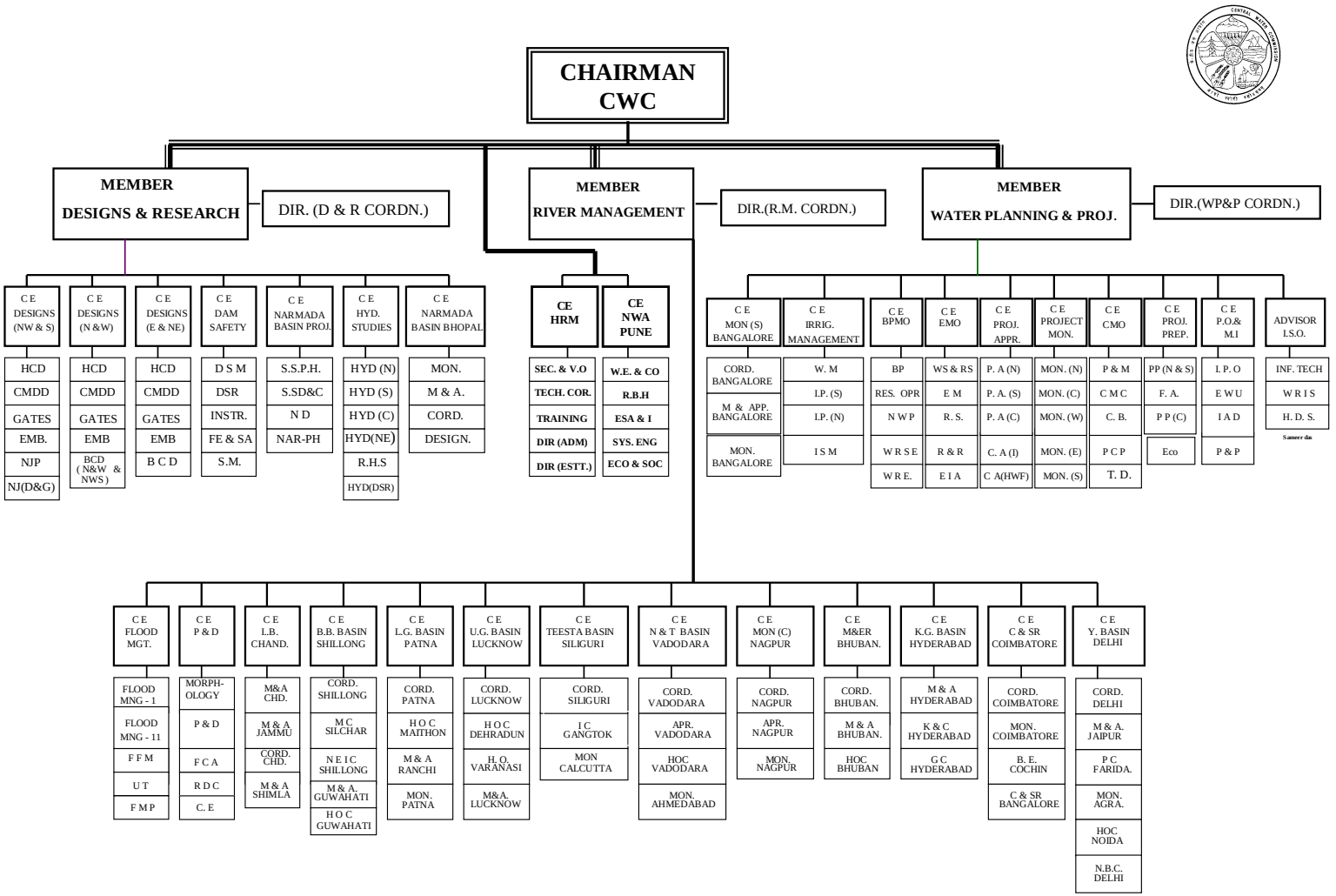
वार्षिक रिपोर्ट
ANNUAL REPORT
2003-2004

केन्द्रीय जल आयोग
CENTRAL WATER COMMISSION


CHAIRMAN
CWC
MEMBER
DESIGNS & RESEARCH
DIR. (D & R CORDN.)
MEMBER
RIVER MANAGEMENT
DIR.(R.M. CORDN.)
MEMBER
WATER PLANNING & PROJ.
DIR.(WP&P CORDN.)
C E DESIGNS (NW & S)
HCD
CMDD
GATES
EMB.
NJP
NJ(D&G)
C E DESIGNS (N &W)
HCD
CMDD
GATES
EMB
BCD (N&W & NWS)
C E DESIGNS (E & NE)
HCD
CMDD
GATES
EMB
B C D
C E DAM SAFETY
D S M
DSR
INSTR.
FE & SA
S.M.
C E NARMADA BASIN PROJ.
S.S.P.H.
S.SD&C
N D
NAR-PH
C E HYD. STUDIES
HYD (N)
HYD (S)
HYD (C)
HYD(NE)
R.H.S
HYD(DSR)
C E NARMADA BASIN BHOPAL
MON.
M & A.
CORD.
DESIGN.
CE HRM
SEC. & V.O
TECH. COR.
TRAINING
DIR (ADM)
DIR (ESTT.)
CE NWA PUNE
W.E. & CO
R.B.H
ESA & I
SYS. ENG
ECO & SOC
C E MON (S) BANGALORE
CORD. BANGALORE
M & APP. BANGALORE
MON. BANGALORE
C E IRRIG. MANAGEMENT
W. M
I.P. (S)
I.P. (N)
I S M
C E BPMO
BP
RES. OPR
N W P
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C E EMO
WS & RS
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R. S.
R & R
E I A
C E PROJ. APPR.
P. A (N)
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P. A (C)
C. A (I)
C A(HWF)
C E PROJECT MON.
MON. (N)
MON. (C)
MON. (W)
MON. (E)
MON. (S)
C E CMO
P & M
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C. B.
P C P
T. D.
C E PROJ. PREP.
PP (N & S)
F. A.
P P (C)
Eco
C E P.O.& M.I
I. P. O
E W U
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ADVISOR I.S.O.
INF. TECH
W R I S
H. D. S.
Sameer da
C E FLOOD MGT.
FLOOD MNG - 1
FLOOD MNG - 11
F F M
U T
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C E P & D
MORPH-OLOGY
P & D
F C A
R D C
C. E
C E L.B. CHAND.
M&A CHD.
M & A JAMMU
CORD. CHD.
M & A SHIMLA
C E B.B. BASIN SHILLONG
CORD. SHILLONG
M C SILCHAR
N E I C SHILLONG
M & A. GUWAHATI
H O C GUWAHATI
C E L.G. BASIN PATNA
CORD. PATNA
H O C MAITHON
M & A RANCHI
MON. PATNA
C E U.G. BASIN LUCKNOW
CORD. LUCKNOW
H O C DEHRADUN
H. O. VARANASI
M&A. LUCKNOW
C E TEESTA BASIN SILIGURI
CORD. SILIGURI
I C GANGTOK
MON CALCUTTA
C E N & T BASIN VADODARA
CORD. VADODARA
APR. VADODARA
HOC VADODARA
MON. AHMEDABAD
C E MON (C) NAGPUR
CORD. NAGPUR
APR. NAGPUR
MON. NAGPUR
C E M&ER BHUBAN.
CORD. BHUBAN.
M & A BHUBAN.
HOC BHUBAN
C E K.G. BASIN HYDERABAD
M & A HYDERABAD
K & C HYDERABAD
G C HYDERABAD
C E C & SR COIMBATORE
CORD. COIMBATORE
MON. COIMBATORE
B. E. COCHIN
C & SR BANGALORE
C E Y. BASIN DELHI
CORD. DELHI
M & A. JAIPUR
P C FARIDA.
MON. AGRA.
HOC NOIDA
N.B.C. DELHI

INDIA – LAND AND WATER RESOURCES : FACTS

•	GEOGRAPHICAL AREA LOCATION	329 M ha. Latitude 8^0 –4′ & 37^0-06′ North Longitude 68^0 – 7′ & 97^0 – 25′ East
•	POPULATION 2001 CENSUS ESTIMATED	1027 Million
•	RAINFALL VARIATION	100 mm in Western most regions to 11000 mm in Eastern most region
•	MAJOR RIVER BASIN (CATCHMENT AREA MORE THAN 20,000 SQ.KM.)	12 Nos. having catchment area 253 M ha.
•	MEDIUM RIVER BASIN (CATCHMENT AREA BETWEEN 2000 AND 20,000 SQ.KM.)	46 nos. having catchments area 25 M ha.
•	TOTAL NAVIGABLE LENGTH OF IMPORTANT RIVERS	14464 Km.
WATER RESOURCES		
•	AVERAGE ANNUAL RAINFALL (1998-2002)	3693.59 BCM
•	MEAN ANNUAL NATURAL RUN-OFF	1869 BCM
•	ESTIMATED UTILISABLE SURFACE WATER POTENTIAL	690 BCM
•	TOTAL REPLENISHABLE GROUND WATER RESOURCES	432 BCM
•	GROUND WATER RESOURCES AVAILABLE FOR IRRIGATION	360 BCM
•	GROUND WATER POTENTIAL AVAILABLE FOR DOMESTIC INDUSTRIAL AND OTHER PURPOSES	71 BCM (approx)
•	ULTIMATE IRRIGATION POTENTIAL	140 M ha.
•	IRRIGATION POTENTIAL FROM SURFACE WATER	76 M ha.
•	IRRIGATION POTENTIAL FROM GROUND WATER	64 M ha.
•	STORAGE AVAILABLE DUE TO COMPLETED MAJOR & MEDIUM PROJECTS (INCLUDING LIVE CAPACITY LESS THAN 10 M.CUM)	213 BCM
•	ESTIMATED ADDITIONAL LIKELY LIVE STORAGE AVAILABLE DUE TO PROJECTS UNDER CONSTRUCTION CONSIDERATION	184 BCM
LAND RESOURCES (2000-01)		
•	TOTAL CULTIVABLE LAND	183.1 M ha.
•	GROSS SOWN AREA	187.0 M ha.
•	NET SOWN AREA	141.1 M ha.
•	GROSS IRRIGATED AREA	75.1 M ha.
•	NET IRRIGATED AREA	54.7 M ha.
HYDROPOWER		
•	ULTIMATE HYDROPOWER POTENTIAL (ESTIMATED)	84044 M.W. at 60% L.F.
•	POTENTIAL DEVELOPMENT BY 1ST APRIL, 2003	14299 M.W. at 60% L.F.

Government of India
Central Water Commission

ANNUAL REPORT

2003 - 2004

From Chairman's Desk

It gives me great pleasure in presenting the Annual Report for the year 2003 – 04 depicting the activities and achievements of CWC, the premier Technical Organisation in Water Resources Sector.

Central Water Commission continued to provide the necessary leadership and guidance for the development of the sector and to provide necessary support to the Ministry of Water Resources on all technical and policy matters. Regular activities of the Commission in respect of appraisal of major and medium irrigation projects and other water resources development schemes, monitoring of major, medium and extension / renovation / modernization projects, design of hydraulic structures, hydrological observation and studies, flood forecasting activities and environmental issues related to projects were successfully carried out during the year. Some of the important achievements of the Central Water Commission during this period were:

1. Acceptance of 15 projects by the Technical Advisory Committee.
2. Monitoring of 93 Major, 44 Medium and 9 ERM Projects and CAD works of 42 projects.
3. Release of Rs.3023.28 crore of CLA under AIBP programme to 103 projects.
4. Accurate and timely issue of 6600 flood forecasts (with 96.5% accuracy) during the monsoon period of 2003, which helped in effective flood management, particularly in Assam, Bihar, Orissa and Uttar Pradesh which faced severe floods.
5. Implementation of World Bank funded Hydrology Project.
6. Studies in respect of Pancheshwar Multipurpose Project – a joint project with Nepal.
7. Design Consultancy in respect of 117 Water Resources Development projects in India and neighbouring countries.
8. Fresh Water Year 2003 was observed at CWC HQ and all field offices with active participation of school children, NGOs etc.

CWC has been paying increased attention to environmental friendly sustainable development of Water Resources Sector. It also continued to make dedicated efforts in computerization and use of computer based technologies in the field of Water Resources Development and Management right from data management to assessment/modelling/analysis of various processes, designs/simulation techniques etc and enhancement of the technical capabilities of its Engineers through national and international training programmes and participation in various seminars, symposiums, workshops etc.

This Report provides an insight into the functions and activities of this organization and the contribution it has made in the development and management of Water Resources.

(R. JEYASEELAN)
CHAIRMAN
CENTRAL WATER COMMISSION

HIGHLIGHTS OF THE YEAR 2003-04

- **DESIGNS:**

  - Design unit of CWC undertook detailed designs and drawings of various types of hydraulic structures for 117 water resources development projects.

  - Upgradation of available technical softwares and hardware capabilities and enhancement of design capabilities of CWC Engineers through training was taken up.

- **RIVER MANAGEMENT:**

  - Carried out Hydrological Observations at 945 sites spread over the country.

  - Operated 166 flood forecasting stations (including 27 inflow forecasting sites) spread over 8 major river basins. 6600 flood forecasts were issued of which 96.5 % were within prescribed limits of accuracy. Daily flood bulletins and weekly flood news letters were issued during the flood season.

  - Provided assistance for maintenance of 34 Hydro-meteorological sites in Bhutan.

  - 11 Projects were under investigation in North-Eastern region.

  - 35 Flood Management Schemes/Master Plans were cleared.

- **WATER PLANNING:**

  - 38 new Major Irrigation Projects & 29 revised Major Irrigation Projects and 49 new Medium & 21 revised medium Irrigation Projects were under appraisal in CWC. 15 projects were accepted by the Technical Advisory Committee.

  - Monitored 146 Major, Medium and extension /renovation / modernization and 42 CAD projects.

- 71 important reservoirs with total live storage of 131.28 BCM were monitored on weekly basis.

- Central Loan Assistance (CLA) of Rs. 3023.284 crore was recommended for release to 103 projects under Accelerated Irrigation Benefit Programme (AIBP).

- Provided technical assistance to Ministry of Water Resources in respect of the inter-state water disputes such as Cauvery Water Dispute and the Ravi-Beas Water Dispute.

- **HRM:**
  - 284 in service officers were sponsored for training, attending seminars/ workshops etc. in India which were organised by other organisations and 18 in service officers participated in various programmes aboard.

C O N T E N T S

CHAPTER-I

INTRODUCTION

1.1 HISTORY OF CWC

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

1.2 ORGANISATION

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

CHAIRMAN

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

MEMBER (WATER PLANNING & PROJECTS)

Responsible for overall planning and development of river basins, national perspective plan for water resources development in accordance with the National Water Policy, techno-economic appraisal of Water Resources

Projects and assistance to the States in the formulation and implementation of projects, monitoring of selected projects for identification of bottlenecks to achieve the targeted benefits, preparation of project reports for international assistance, environmental aspects, issues of construction machinery of projects etc.

MEMBER (DESIGNS & RESEARCH)

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

MEMBER (RIVER MANAGEMENT)

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

The incumbents for the posts of Chairman, Central Water Commission and Members during the year 2003-04 were :

1.	Chairman, CWC	:	Shri R. Jeyaseelan (1.4.2003 - 31.3.2004)
2.	Member (WP&P)	:	Shri S.K. Das (1.4.2003 - 6.11.2003)
			Shri C.B. Vashista (7.11.2003 - 31.3.2004)
3.	Member (D&R)	:	Shri R. Jeyaseelan (1.4.2003 - 6.11.2003)
			Shri S.K. Das (7.11.2003 -31.3.2004)
4.	Member (RM)	:	Shri M.K. Sharma (1.4.2003 - 31.3.2004)

1.3 BROAD FUNCTIONS

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

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

- To undertake necessary surveys and investigations as and when so required, to prepare designs and schemes for the development of river valleys in respect

of power generation, irrigation by gravity flow or lift, flood management, environmental management, rehabilitation and resettlement, soil conservation, anti-water logging measures, reclamation of alkaline and saline soils, drainage and other related facilities such as malaria control, recreation and fish culture, navigation, and for drinking water supply ;

- To undertake construction work of any river valley development scheme on behalf of the Government of India or State Government concerned;

- To advise and assist, when so required, the State Governments (Commissions, Corporations or Boards that are set up) in the investigation, surveys and preparation of river valley and power development schemes for particular areas and regions;

- To advise the Government of India in respect of Water Resources Development, regarding rights and disputes between different States which affect any scheme for the conservation and utilization and any matter that may be referred to the Commission in connection with river valley development;

- To advise the Government of India and the concerned State Governments on the basin-wise development of water resources;

- To advise the Government of India with regard to all matters relating to the Inter-State water disputes;

- To advise the Government of India regarding settlement of priorities for plant, materials and foreign exchange among various river valley development schemes and monitoring of projects;

- To collect, coordinate the collection of, publish and analyse the data relating to tidal rivers, rainfall, runoff and temperature, silting of reservoirs, behaviour of hydraulic structures, environmental aspects etc. and to act as the Central Bureau of Information in respect of these matters;

- To collect, maintain and publish statistical data relating to water resources and its utilization including quality of water throughout India and to act as the Central Bureau of Information relating to water resources;

- To initiate schemes and arrange for the training of Indian Engineers in India and abroad in all aspects of river valley development and also coordinate the training activities in the State Government Institutions.

- To standardize instruments, methods of observation and record, materials for construction, design and operation of irrigation projects;

- To initiate studies on socio-agro-economic and ecological aspects of irrigation projects for the sustained development of irrigation;

- To conduct and coordinate research on the various aspects of river valley development schemes such as flood management, irrigation, navigation, water power development etc., and the connected structural and design features;

- To promote modern data collection techniques such as remote sensing technology for water resources development and river forecasting and development of computer softwares;

- To conduct studies on dam safety aspects for the existing and future dams and standardize the instruments for dam safety measures;

- To initiate morphological studies to visualise river behaviour, bank erosion/coastal erosion problems and advise the Central and State Governments on all such matters;

- To conduct experiments, research and to carry out such other activities as will promote economic and optimum utilization of water resources; and

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

1.4 REGIONAL OFFICES

In order to achieve better results in the Water Resources Sector and have better coordination with State Government departments, CWC has established regional offices. It has 13 regional offices, each headed by a Chief Engineer. The offices are located at Bangalore, Bhopal, Bhubaneswar, Chandigarh, Coimbatore, Delhi, Hyderabad, Lucknow, Nagpur, Patna, Shillong, Siliguri and Vadodara. In addition, for training of Central and State in-service engineers, CWC also has a National Water Academy located at Pune.

1.5 PERSONNEL MANAGEMENT

The staff strength of CWC in position as on 31.12.2003 was 4463 as against the sanctioned posts of 5391. The details of posts (sanctioned and filled) at the headquarters and at the field offices are given in Table 1.1. Summary of sanctioned and filled posts in different groups is given in Table 1.2.

Table 1.1
STAFF STRENGTH

Category	Sanctioned	Filled
Headquarters	2074	4463
Field	3317	
Total	**5391**	**4463**

Table 1.2
GROUP-WISE DETAILS OF POSTS SANCTIONED AND FILLED

Sl. No.	Category	Sanctioned	Filled
1.	Group "A"	698	553
2.	Group "B"	480	445
3.	Group "B" (Non. Gazetted)	516	375
4.	Group "C"	2634	2171
5.	Group "D"	1063	919
	Total	**5391**	**4463**

1.6 PLAN SCHEMES & ANNUAL BUDGET

1.6.1 Plan Schemes

Details of the Plan Schemes under operation during the year in CWC are given below:

Sl. No.	Name of The Plan Schemes	Description
1.	Data Collection	***Objective :*** Establishment and maintenance of 111 key Stations for collection of hydrological observation data other than Ganga & Indus. ***Year of start*** : 1983-84 ***X Plan Outlay (Rs. in Crore)*** : 40.00
2.	Snow Hydrological studies	***Objective*** : Collection of Snowmelt run-off data and preparation of snowmelt run-off Model. ***Year of start*** : 1995-96 ***X Plan Outlay (Rs. in Crore)*** : 2.00
3.	Monitoring of water quality of Rivers in India	***Objective*** : Collection of Hydro-Meteorological data on quantity and quality of water resources 945 hydrological observation stations. ***Year of start*** : 1990-91 ***X Plan Outlay (Rs. in Crore)*** : 10.50
4.	Hydrological observations on river originating from Bhutan.	***Objective*** : Collection of Hydrological data for rivers flowing through Bhutan and communication of real time data. ***Year of start*** : 1994-95 ***X Plan Outlay (Rs. in Crore)*** : 1.50
5.	Investigation of Kirthai and other multi-purpose projects in Indus Basin.	***Objective*** : Survey Investigation of Kirthai H.E. Project and preparation of DPR and R&M of sites. ***Year of start*** : 1993-94 ***X Plan Outlay (Rs. in Crore)*** : 7.00
6.	Studies on Reservoir Sedimentation River Morphology and other Remote Sensing Application	***Objective*** : Reservoir Sedimentation studies using Hydrographic Techniques, River Morphology study and Water logging /Alkalinity studies. ***Year of start*** : IX Plan ***X Plan Outlay (Rs. in Crore)*** : 14.00
7.	Up-gradation of facilities and skills in CWC regarding dam safety and rehabilitation in India	***Objective*** : Establishment of two units on dam Break Modelling and Emergency Action Plan. ***Year of start*** : 2002-03 ***X Plan Outlay (Rs. in Crore)*** : 8.00
8.	Setting up of specialized units in HE Design Pumpstorage and instrumentation.	***Objective*** : Setting up of instrumentation museum and training of personnel in specialised subjects. ***Year of start*** : 2002-03 ***X Plan Outlay (Rs. in Crore***) : 3.00
9.	Up-Gradation and Modernisation of information system in CWC.	***Objective*** : Upgrading CWC's networking, publication unit and library. ***Year of start*** : 1998 ***X Plan Outlay (Rs. in Crore)*** : 12.00
10.	Strengthening & Monitoring of FF&HO network in Brahmaputra and Barak Basins.	***Objective*** : Strengthening and monitoring of existing Flood Forecasting and Warning system. ***Year of start*** : 1995-96 ***X Plan Outlay (Rs. in Crore)*** : 19.00

11.	Capital Section for Flood Control Projects.	***Objective*** : Construction/Purchase of office/ Residential Building ***Year of start*** : 2003-04 ***X Plan Outlay (Rs. in Crore)*** : 25.00
12.	Investigation of Water Resources Development in NE States.	***Objective*** : Investigation of irrigation and HE Projects, and preparation of DPR. ***Year of start*** : 1999-2000 ***X Plan Outlay (Rs. in Crore)*** : 4.00

1.6.2 Annual Budget

The Plan and non-plan budget outlays and expenditure for the year 2003- 2004 are given in Table 1.3

Table 1.3
ANNUAL BUDGET 2003-2004

(Rs. In cores)

Particulars	**Budget**	**Expenditure**
Plan	49.58	39.6
Non-Plan	99.18	102.38
Total	**148.76**	**141.98**

The Outlay and Expenditure on various plan and non-plan schemes during 2003-2004 is given in Table 1.4.

Table 1.4
PLAN AND NON-PLAN OUTLAY AND EXPENDITURE ON SCHEMES

Sl. No.	**Name of Scheme**	**Plan**		**Non-Plan**	
		Outlay	**Expenditure**	**Outlay**	**Expenditure**
1.	Direction & Administration	-	-	10.78	10.53
2.	Consultancy	-	-	13.39	13.73
3.	Research	-	-	1.04	0.98
4.	Training	1.63	1.23	0.48	0.30
5.	Data Collection	7.30	7.65	35.67	37.66
6.	Survey & Investigation	-	-	5.52	4.79
7.	Other Schemes				
	- Major Medium	17.05	11.71	2.94	2.74
	- Flood Control	23.60	19.01	29.36	31.65
	Total	**49.58**	**39.60**	**99.18**	**102.38**

1.7 CONSULTANCY SERVICES

The Designs & Research Wing and the investigation circles of CWC have been providing consultancy to Central Departments, State Governments and Public Sector Organisations in Planning, Surveys & Investigation and Design of river valley projects in India and abroad. MOU was signed with Narmada Valley Development Authority (NVDA) for providing design consultancy of new projects in Narmada basin.

1.8 PROGRESSIVE USE OF HINDI IN OFFICIAL WORK

Efforts for propagation and progressive use of Hindi in official work continued as in the previous years. Hindi Pakhwara was organized in CWC very effectively during September 2003. 7 competitions were organized. The winners were awarded cash prizes and certificates of merit. Three sub-ordinate offices of CWC were awarded Rajbhasha shields for the year 2002-03 for doing maximum official work in Hindi. During the year, 2 Hindi Computer Training and 2 Hindi workshops were organized in the Headquarter in which 74 officers and staff took part. During the year, 6 officers were nominated under Hindi teaching schemes, namely Prabodh, Pragya & Praveen.

CWC offices located at Jaipur, Hyderabad, Vadodara and Patna were inspected during the year to keep a watch on the compliance of orders and instructions in respect of the use of Rajbhasha.

1.9 RESERVATION FOR SC, ST & OBC

The representation of SC, ST & OBC officials in different grades is given in Table 1.5.

Table 1.5
REPRESENTATION OF SC & ST OFFICIALS IN DIFFERENT GRADES

Category	Total No. of posts	No. of SCs	No. of STs	No. of OBCs
Group A	553	64	16	16
Group B	445	60	9	-
Group B (Non Gazetted)	375	75	10	3
Group C	2171	272	55	72
Group D	919	264	91	12
Total	**4463**	**735**	**181**	**103**

1.10 STATUS OF FILLING UP OF VACANCIES RESERVED FOR DISABLED PERSONS

Section 33 of the Persons with Disabilities (Equal Opportunities Protection of Rights and Full Participation) Act 1995 provides that Government shall appoint in every establishment such percentage of vacancies, not less than 3% for persons or class of persons with disabilities of which 1% each shall be reserved for persons suffering from (i) blindness or low vision (ii) hear impairment and (iii) locomotor disabilities or cerebral palsy in the posts identified for each disability. In pursuance of this posts for disabled persons have been identified.

The position of Disabled Persons in position as on 31.12.2003 is given in Table 1.6. Efforts are being made to fill up the back log vacancies.

Table 1.6
NUMBER OF DISABLED PERSONS IN POSITION AS ON 31.12.2003

GROUP	TOTAL	OH	VH	HH
'A'	1	1	-	-
'B'	5	4	-	1
'C'	13	12	1	-
'D'	8	3	4	1
Total	**27**	**20**	**5**	**2**

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

1.11 WELFARE MEASURES AND INCENTIVES

The different welfare measures and incentives that are in existence include:

1. Benevolent Fund to provide immediate financial assistance;
2. Co-operative Thrift and Credit Society to meet the financial needs and to cultivate the thrift habit;
3. Encouragement to sports personnel by providing prizes and other amenities;
4. Timely redressal of grievances.

Summary of activities under the welfare schemes are given below.

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

- Immediate Relief upto Rs. 10,000/-
- Long Term Relief upto Rs. 8,000/- payable in eight monthly instalments.

The administration of the fund vests in the Governing Body which comprises of a Chairman, one Honorary Secretary, one Treasurer and 8 Members. The audited accounts are placed before the General Body in the Annual General Body meeting. The existing subscription rate is Rs. 5/- (Five) per month. During the year 2003-04 there were three cases of immediate relief and three cases of long term relief approved by the Governing Body of the Benevolent Fund.

1.11.2 Co-Operative Thrift And Credit Society: Department of Irrigation Co-operative Thrift & Credit Society Ltd., has been functioning with its registered office at West Block – I, R.K. Puram, New Delhi since March 1959 for the welfare and benefit of the officers and staff of the Ministry of Water Resources, Central Water Commission, Central Soil & Materials

Research Station, Department of Power, Central Electricity Authority, Principal Pay & Accounts Office of the Ministry of Water Resources and Pay & Accounts Office, Central Water Commission. It provides its member loans to the extent of Rs. 75,000/- and emergency loan of Rs. 5000/-, recoverable in 60 and 10 monthly instalments respectively at a rate of interest of 9% per annum. The Society pays gratuity for retiring members and writes off outstanding loans against deceased members from the members' welfare fund.

1.11.3 Sports and Cultural Activities

A number of CWC officials and staff participated in the Inter-ministry athletics and sports events and distinguished themselves with excellent performance. CWC Hockey Team was winner of the Inter-ministry Hockey tournament. CWC Team also participated in Inter-ministry music, dance & short plays competition and won four prizes.

1.11.4 Setting Up Of Liaison Cell For SC/ST/OBC/Handicapped Persons

A Liaison Cell for SC/ST/OBC/Handicapped Persons has been set up in CWC to look after their welfare.

1.12 RESTRUCTURING OF CENTRAL WATER COMMISSION

The National Commission for Integrated Water Resources Development Plan (NCIWRDP) set up to study the development and management of National Water Resources in professional manner, under the Chairmanship of Dr. S.R. Hashim, the then Member, Planning Commission in its report has, inter-alia, recommended that the "entire question of restructuring of the Central Water Commission may be got studied in detail by appointing competent consultants." The major recommendations of the Hashim Report are:

- CWC to be restructured as a Statutory High Powered Commission initially by an executive order and simultaneously by making suitable provisions in the new law on interstate rivers.
- CWC should be vested With executive Powers to control national water management works.
- With powers to establish innovative organizational structure for specific purposes.
- Chairman of the commission should actually function as Secretary to GOI in certain delineated responsibilities.
- The Commission may have 6 full time Members.
- The link of CGWB to CWC needs to be specifically looked into for coordinated functions for water resources development.

Accordingly, the Ministry of Water Resources has awarded the Consultancy for the above studies to the Administrative Staff College of India, Hyderabad. The terms of reference of the study include (i) the evaluation of present status of Central Water Commission and its function; (ii) future projections in the Water Sector for 2025; (iii) Mission for Central Water Commission in respect of the future projections for 2025; and the organizational structure and related issues in respect of CWC to enable it in achieving the Mission. This study is in progress.

CHAPTER-II

WATER RESOURCES DEVELOPMENT

2.1 WATER RESOURCES IN INDIA

Central Water Commission (CWC) has been making periodical assessment of the Country's Water Resources. The water resources potential of the country, which occurs as natural runoff in the rivers is about 1869 Billion Cubic Metres (BCM). It constitutes more than 4% of the total river flows of the world. However, due to various constraints of topography and uneven distribution over space and time, only about 1122 BCM, of the total annual water potential can be put to beneficial use. This can be achieved through 690 BCM utilizable surface water and 432 BCM through ground water. In majority of river basins, present utilisation is significantly high and is in the range of 50% to 95% of utilizable surface resources. In some of the river basins like Narmada and Mahanadi, the utilisation is quite low. With inter basin transfer of water from surplus basins to deficit basins, it has been estimated that the quantity of utilizable water can be increased by 200-250 BCM.

While water for drinking purpose has been accorded topmost priority in water use, irrigation is the major consumer of water. Ultimate irrigation potential which can be created making use of the utilizable surface water resources through major, medium and minor projects would be about 75.9 M ha. Irrigation potential making use of ground water has now been assessed as 64 M ha. Thus the total irrigation potential from surface and ground water sources would be about 139.9 M ha. This does not include the irrigation potential of about 35 M ha. which can be created by long distance inter basin transfer of water from surplus to deficit basins. Water Resources potential in the major river basins is given in Table 2.1.

Table 2.1

WATER RESOURCES POTENTIAL IN THE MAJOR RIVER BASINS OF INDIA

UNIT: BCM

Sl. No.	Name of the River Basin	Average Annual Potential in the river	Estimated Utilisable Flow (excluding Ground Water)
1.	Indus (upto Border)	73.31	46.00
2. a.	Ganga	525.02	250.00
b.	Brahmaputra, Barak & others	585.60	24.00
3.	Godavari	110.54	76.30
4.	Krishna	78.12	58.00
5.	Cauvery	21.36	19.00
6.	Pennar	6.32	6.86
7.	East flowing Rivers between Mahanadi & Pennar	22.52	13.11
8.	East Flowing Rivers between Pennar and Kanyakumari	16.46	16.73
9.	Mahanadi	66.88	49.99

Sl. No.	Name of the River Basin	Average Annual Potential in the river	Estimated Utilisable Flow (excluding Ground Water)
10.	Brahmani & Baitarni	28.48	18.30
11.	Subarnarekha	12.37	6.81
12.	Sabarmati	3.81	1.93
13.	Mahi	11.02	3.10
14.	West Flowing Rivers of Kutch, Saurashtra including Luni	15.10	14.98
15.	Narmada	45.64	34.50
16.	Tapi	14.88	14.50
17.	West flowing rivers from Tapi to Tadri	87.41	11.94
18.	West flowing rivers from Tadri to Kanyakumari	113.53	24.27
19.	Area of Island drainage in Rajasthan Desert	Neg	
20.	Minor River Basins drainage to Bangladesh & Myanmar	31.00	
	Total	**1869.37**	**690.32**

Source: CWC Publication - Water Related Statistics – 1998

2.2 HIGHLIGHTS OF WATER RESOURCES SECTOR

As the variability of rainfall over the country is well known, the development of water resources for irrigated agriculture received high priority in different plan periods. The achievements in irrigation sector, during the various plans are given in the following paragraphs.

2.2.1 Irrigation Potential: Major & Medium Irrigation Sector

The ultimate irrigation potential of the country is estimated as 140 M ha. of which irrigation potential from major & medium irrigation projects is assessed as 58.5 M ha. Irrigation potential in the country from major and medium irrigation projects which stood at 9.7 M ha. in 1951 has risen to 37.05 M ha. till the end of IX Plan. The cumulative figures of potential created in the successive plan periods are given in Figure- 2.1.

2.2.2 Major and Medium Irrigation Projects

In 1951, at the time of launching of the First Five Year Plan, there were 74 major and 143 medium irrigation projects in the country. During the plan period since 1951 to the end of IX Plan in 2002, as per available information, 316 major, 995 medium and 172 ERM (Extension/ Renovation/ Modernization) schemes were taken up of which 154 major, 774 medium and 87 ERM projects have reportedly been completed. Total number of projects taken up/ completed since pre-plan period upto the end of IXth plan is given in the Table 2.2.

Table 2.2

Project Type	Number of Projects		
	Taken up	Completed	Spillover into X Plan
Major*	390	228	162
Medium*	1138	917	221
ERM	172	87	85

* Including pre-plan projects

The Table 2.3 shows the growth of irrigation potential created through Major and Medium Irrigation Projects and corresponding outlays/ expenditure in various plan periods. The cumulative irrigation potential created till the end of IXth Plan is 37.05 M ha and target for Xth Plan is 9.93 M ha. State wise cumulative potential created through major and medium projects upto the end of IXth Plan and target for Xth Plan is given in Table 2.4.

Number of Major, Medium and ERM projects taken up and completed in plan and pre-plan period are shown in the enclosed Fig 2.2, 2.3 and 2.4 respectively.

Table 2.3

PLANWISE OUTLAYS AND CUMULATIVE GROWTH IN CREATION OF IRRIGATION POTENTIAL (Major & Medium Projects)

PERIOD	Outlay/ Expdr. (Rs. Crores)	Potential created in M ha		Potential utilized (M ha)
		During	Cumulative	
Pre-plan period	-	9.70	9.70	9.70
I Plan (1951-56)	376	2.50	12.20	10.98
II Plan (1956-61)	380	2.13	14.33	13.05
III Plan (1961-66)	576	2.24	16.57	15.17
Annual Plan (1966-69)	430	1.53	18.10	16.75
IV Plan (1969-74)	1242	2.60	20.70	18.69
V Plan (1974-78)	2516	4.02	24.72	21.16
Annual Plans (1978-80)	2079	1.89	26.61	22.64
VI Plan (1980-85)	7369	1.09	27.70	23.57
VII Plan (1985-90)	11107	2.22	29.92	25.47
Annual Plans (1990-92)	5459	0.82	30.74	26.32
VIII Plan (1992-97)	21072	2.22	32.96	28.44
IX Plan (1997-2002)	48259^{+}	4.09	37.05	31.03
X Plan (2002-2007)	71213*	9.93*	46.98*	

Source:Working Group Report on Major, Medium Irrigation for X Plan.

\+ Outlay *Provisional

Table 2.4

STATEWISE CREATION OF IRRIGATION POTENTIAL THROUGH MAJOR & MEDIUM IRRIGATION SECTOR

(Th ha)

Sl. No.	State	Ultimate Irrigation Potential	Achievement of Potential created upto IX Plan (1997-2002)	Target of Potential creation During X Plan	Achievement of potential created during 2002-2003
1	Andhra Pradesh	5000.00	3303.22	739.88	NF
2	Arunachal Pradesh	0.00	0.00	4.00	0.80
3	Assam	970.00	243.92	116.10	5.50
4	Bihar	5223.50	2680.00	948.42	51.00
5	Goa	62.00	21.17	26.66	NF
6	Gujarat	3000.00*	1430.37	1904.00	NF
7	Haryana	3000.00	2099.49	119.00	32.00
8	Himachal Pradesh	50.00	13.35	8.00	0.20
9	Jammu & Kashmir	250.00	179.69	25.00	1.40
10	Karnataka	2500.00*	2121.12	999.89	57.12
11	Kerala	1000.00	609.49	90.00	10.00
12	Madhya Pradesh	4853.07	1386.90	265.30	101.75
13	Maharashtra	4100.00*	3239.00	1276.43	NF
14	Manipur	135.00*	156.00	28.15	-
15	Meghalaya	20.00	0.00	-	-
16	Mizoram	0.00	-	-	-
17	Nagaland	10.00	0.00	-	-
18	Orissa	3600.00	1826.56	465.07	29.92
19	Punjab	3000.00	2542.48	160.30	NF
20	Rajasthan	2750.00*	2482.15	413.80	44.80
21	Sikkim	20.00	0.00	0.00	-
22	Tamil Nadu	1500.00*	1549.31	9.38	4.25
23	Tripura	100.00	4.90	-	-
24	Uttar Pradesh	12154.00	7910.09	1000.76	145.34
25	West Bengal	2300.00*	1683.29	700.00	39.00
26	Uttaranchal	346.00	280.30	6.20	1.24
27	Chhattisgarh	1146.93*	922.50	305.00	58.00
28	Jharkhand	1276.50	354.47	315.00	NF
29	Total U.Ts.	98.00	6.51	0.00	0.00
	Total States+U.Ts.	**58465.00***	**37046.28**	**9926.34**	**582.32**

Source: Working Group Report on Major & Medium Irrigation for X Plan
*NF – not furnished * need revision*

2.2.3 Irrigation Development under Tribal Sub-Plan districts

155 Irrigation Projects benefiting Tribal Sub-Plan districts, which were taken up prior to the formulation of the TSP, have been completed. The ultimate irrigation potential of these projects is 2252.96 Th ha. A total of 404 projects under the Tribal Sub-Plan districts have been completed upto the end of IX Plan. The total ultimate potential from these projects is 6201.13 Th ha. There are 278 on-going irrigation projects under Tribal Sub-Plan districts which have spilled over to the X Plan and the new projects taken up during X Plan. The ultimate irrigation potential of these projects is 12150.62 Th ha. Fig. 2.5 shows the Tribal Sub-Plan Areas and Predominantly Tribal Areas

During the year, the Status Report for the year 2002-2003 with regard to financial progress and physical benefits of the major and medium irrigation projects were prepared.

Fig. 2.1

GROWTH OF IRRIGATION POTENTIAL

CREATED DURING PRE - PLAN & PLAN PERIODS (CUMULATIVE)

(MAJOR AND MEDIUM IRRIGATION SECTOR)

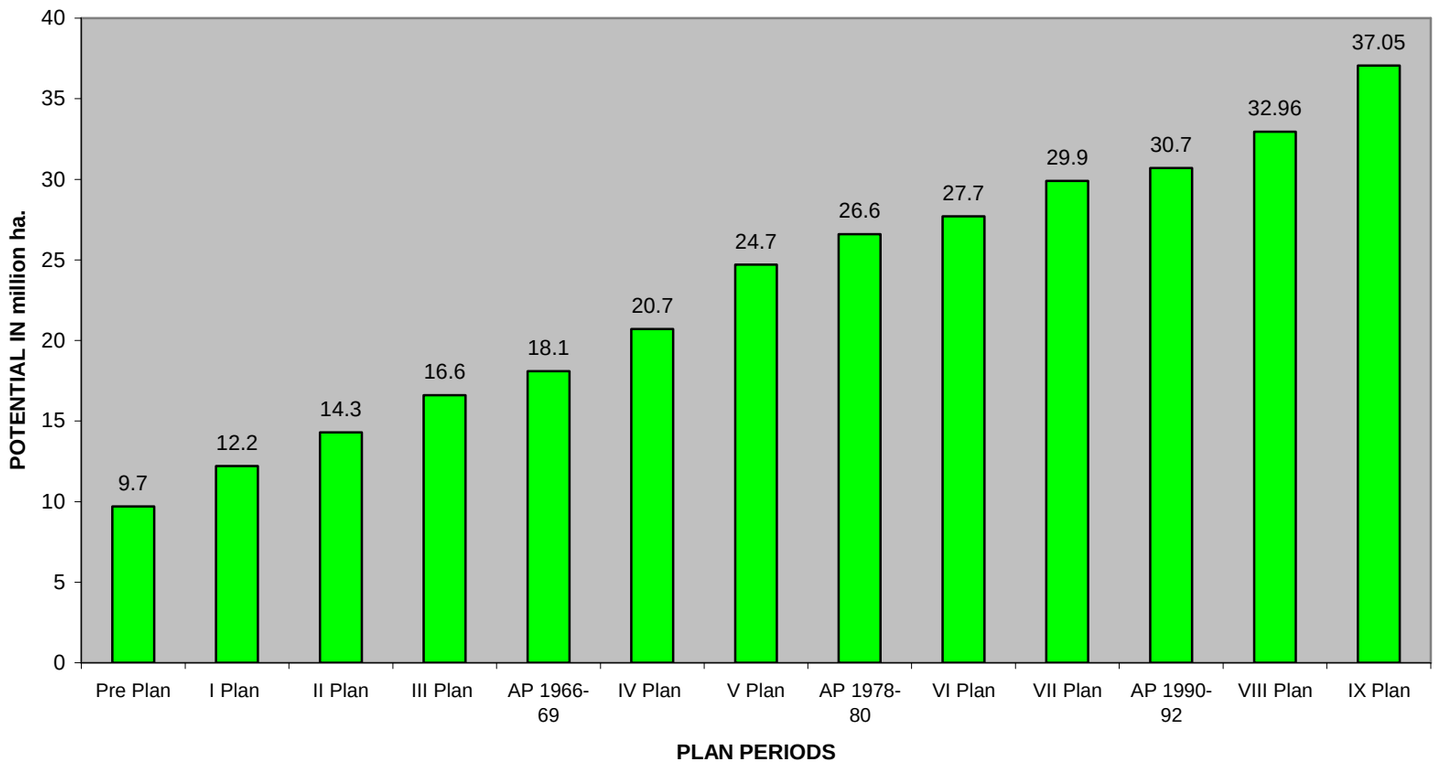


Fig. 2.2

MAJOR IRRIGATION PROJECTS

TAKEN UP AND COMPLETED DURING PRE PLAN & PLAN PERIODS UP TO END OF IXTH PLAN (CUMULATIVE)

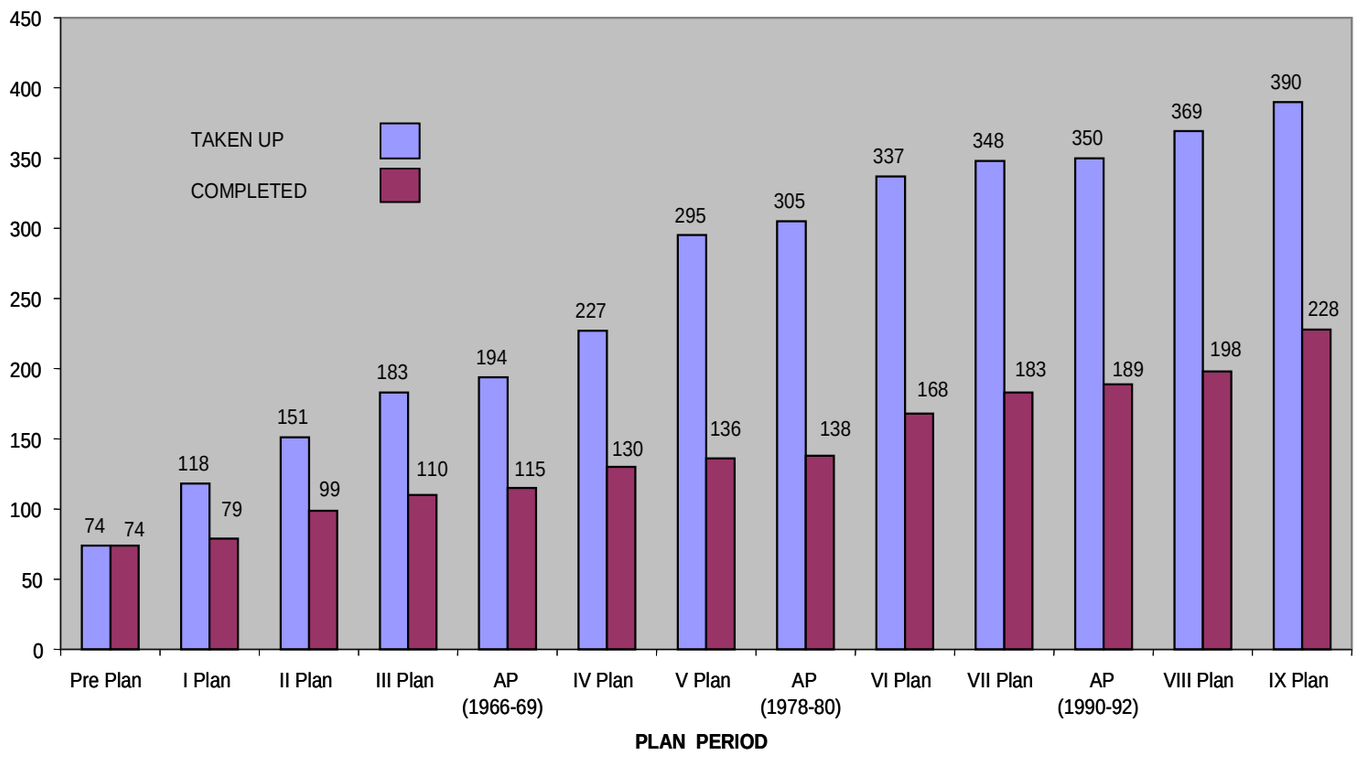


Fig. 2.3

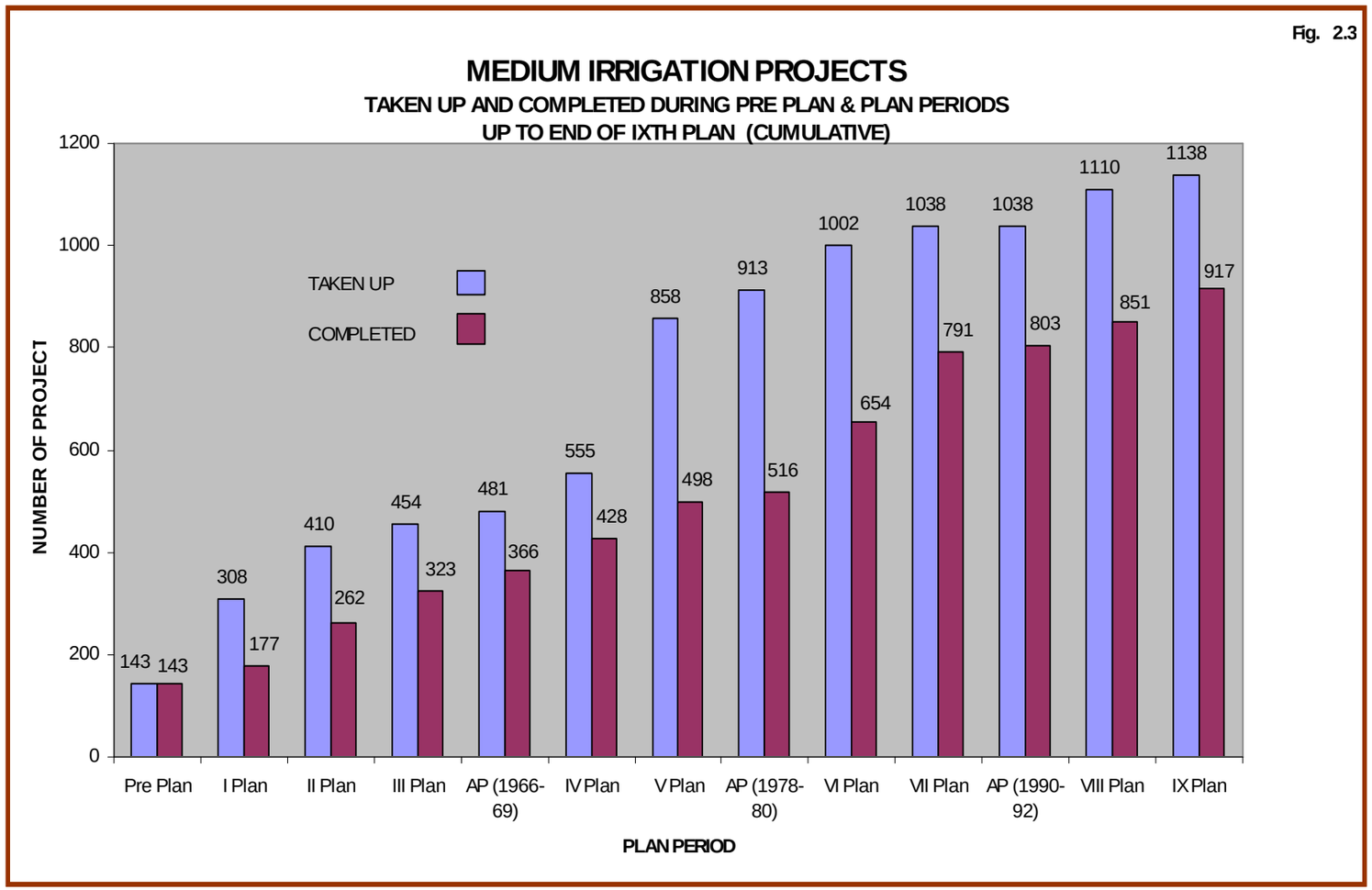
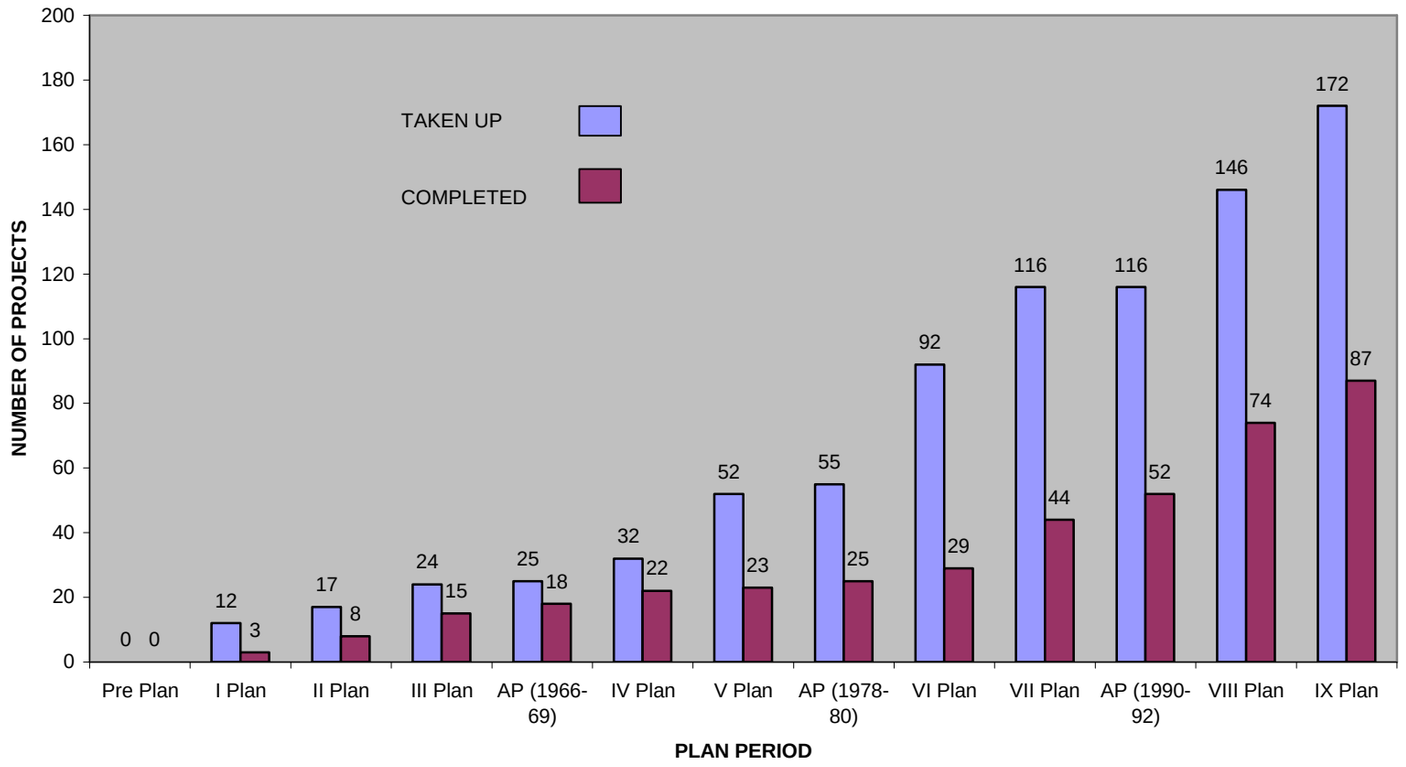

MEDIUM IRRIGATION PROJECTS
TAKEN UP AND COMPLETED DURING PRE PLAN & PLAN PERIODS
UP TO END OF IXTH PLAN (CUMULATIVE)
NUMBER OF PROJECT
PLAN PERIOD
TAKEN UP
COMPLETED
0
200
400
600
800
1000
1200
143
143
308
177
410
262
454
323
481
366
555
428
858
498
913
516
1002
654
1038
791
1038
803
1110
851
1138
917
Pre Plan
I Plan
II Plan
III Plan
AP (1966-69)
IV Plan
V Plan
AP (1978-80)
VI Plan
VII Plan
AP (1990-92)
VIII Plan
IX Plan

Fig. 2.4

ERM PROJECTS

TAKEN UP AND COMPLETED DURING PRE PLAN & PLAN PERIODS UP TO END OF IX PLAN (CUMULATIVE)



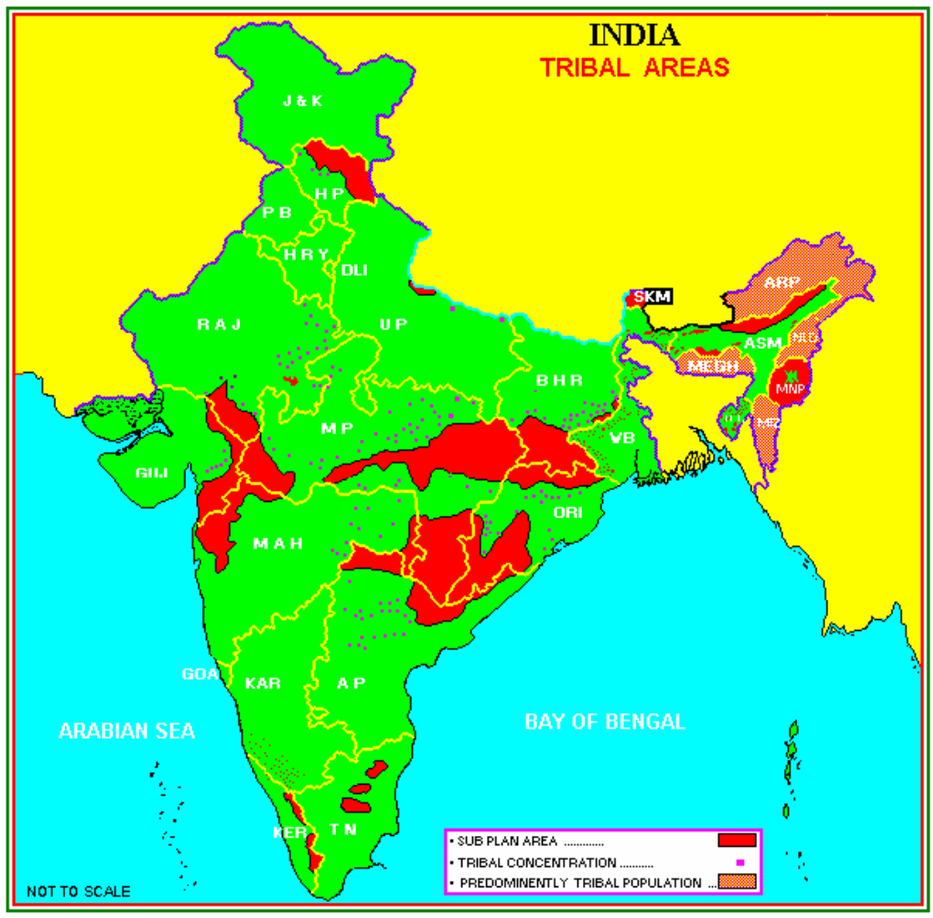


Fig.-2.5: Map of India - showing TSP Areas, Predominantly Tribal Areas and Pockets of Tribal concentration.

CHAPTER-III

RIVER MANAGEMENT

3.1 SYSTEMATIC COLLECTION AND STORAGE OF HYDROLOGICAL DATA

Central Water Commission at present operates National Network of 945 Hydrological Observation Stations. Out of these 945 stations, 246 are Gauge Sites, 282 are Gauge and Discharge Sites, 115 are Gauge Discharge and Water Quality Sites, 41 are Gauge Discharge and Silt Sites, while the remaining 261 are Gauge Discharge Silt and Water Quality Sites. The basin-wise distribution of these sites is detailed below in Table 3.1.

Table 3.1

Basin-wise Details of Hydrological Observation Sites

Sl. No.	Name of Basin	No. of Sites
1	Indus	26
2	Ganga, Brahmaputra, Meghna/Barak	489
3.	Godavari	83
4.	Krishna	73
5.	Cauvery	34
6.	Subarnrekha	8
7.	Brahmani – Baitarni	13
8.	Mahanadi	34
9.	Pennar	8
10.	Mahi	13
11.	Sabarmati	12
12.	Narmada	31
13.	Tapi	6
14.	West Flowing rivers from Tapi to Tadri	45
15.	West Flowing rivers from Tadri to Kanyakumari	21
16.	East Flowing rivers between Mahanadi and Pennar	26
17.	East Flowing rivers between Pennar and Kanyakumari	10
18.	West Flowing rivers of Kuchh and Saurashtra including Luni	13
	Total:	945

The basic data collected by field units is processed and validated at the Sub-Division, Division and Circle Level and authenticated data in the form of Water Year and Water Quality Year Books is published and then transmitted to CWC (HQ) for storage, updating, retrieval etc. The dissemination of data to bonafide users is processed as per the data request received in regional offices of CWC as well as at the Headquarter by Planning & Development (P&D) Unit and Information System Organisation (ISO) of CWC.

P&D Unit is maintaining Hydrological Data pertaining to Ganga, Brahmaputra and Barak Basins in computerized format. The data of these basins being of classified nature, is provided to the bonafide users on request following a set procedure and guidelines for release of classified data. Wherever required, the approval of MoWR is sought for release of such data. Computerised data is now available for other regions also after the implementation of the Hydrology Project.

The users of the data have been categorized as below:-

(i) Central/State Government offices
(ii) Public Sector Undertaking and Institutions/Societies working under the direct control of Central/State Governments and IITs.

(iii) Research Institutions/Scholars.

3.1.2 Hydrology Project

Under the Hydrology Project-I concluded in December 2003 a comprehensive hydrological Information System (HIS) comprising the physical infrastructure and human resource to collect process, store and disseminate data on hydrological, and hydro-meteorological quantity and quality variable has been established in the Central Water Commission covering the entire peninsular region of India.

Central Water Commission has developed a data storage and dissemination software containing Meta Data (information about availability data) of various data storage centers for all the ground water and surface water agencies. The catalogue has been hosted on the web. The address of the website is http//www.India-water.com. Catalogue provides information to the data user on-line about what kind of data, for what period is available with which agency? Through catalogue the data user can make a map/list based selection of the data required by him and can generate Data Request File (DRF) for the same. DRF is automatically e-mailed to all the concerned data storage centers for supplying the data.

Central Water Commission has submitted a proposal for taking up Hydrology Project Phase-II consisting of two major components – Institutional Strengthening and Vertical Extension. It is proposed to carry out the consolidation of HP-I, increasing awareness for data dissemination and knowledge sharing, logistical support etc. under the Institutional Strengthening. Under the vertical extension component “Development of Hydrological Design Aids including standardization of methodology/protocols” is a major activity envisaged. The estimated cost of the proposal is Rs. 2489.76 lakh without contingencies and Rs. 2962.98 lakh with contingencies.

3.2. FLOOD FORECASTING & WARNING SERVICES:

For techno-economic reasons, flood management measures, wherever planned and executed in our country, have been only against the flood of certain magnitude while the floods of higher magnitude do occur creating havoc. Accordingly, flood forecasting and warning system has been planned parallel to structural measures of flood management, as advance knowledge of incoming floods plays an important role in reducing flood damage as also better planning of rescue/relief operations. Flood forecast (Inflow Forecast) also helps in optimum regulations of (multipurpose) reservoirs with or without flood cushion.

Flood Forecasting activities in India in a scientific manner made a beginning in 1958 when the erstwhile Central Water and Power Commission (CW&PC) set up a Flood forecasting Unit (FFU) for issuing flood forecasts and warnings of floods in the Yamuna at the National Capital, Delhi. This service has since been expanded by CWC to cover almost all major flood prone inter-State river basins of India. At present there are 172 flood forecasting stations, 145 level forecasting and 27 inflow forecasting stations on major dams/barrages. It covers 9 major river systems in the country, including 69 river sub-basins. They pertain to 15 States viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tripura, Uttaranchal, Uttar Pradesh & West Bengal and one union territory Dadra & Nagar Haveli and the National Capital Territory of Delhi.

On an average, over 6000 forecasts are being issued every year by the Central Water Commission during flood season. Normally, these forecast are issued 12 to 48 hours in advance, depending upon the river terrain, the locations of the flood

forecasting sites and base stations. For the purpose of Flood Forecasting, hydrological data is being observed at more than 700 Gauge and Discharge sites, and hydrometeorological data over 500 rain gauge stations and communicated through a network of more than 530 wireless stations. Synoptic weather situations, weather forecast/heavy rainfall warnings etc. are also being collected from FMOs. (Flood Management Offices of IMD)

During the flood season 2004 (May to Oct.) 4889 flood forecasts were issued which included 4184 level forecasts and 705 inflow forecasts. Out of total 4889 forecasts, 4696(96.05%) forecasts were found within accuracy limit of ± 15 cms or ±20%

3.2.1 Flood Forecasting Performance During 2004:

During the flood season of 2004 (May to October), out of 145 level forecasting sites, unprecedented flood situations, where the highest flood level attained during the flood season exceeded their respective previous H.F.L. were witnessed at 10 flood forecasting sites viz. at Matizuri on the Katkhal, NT Road Crossing on the Pagladyia, Guwahati on the Brahmaputra, Dharamtul on the Kopilli, Jhanjharpur on the Kamla Balan, Basua on the Kosi, Ekmighat on the Adhwara Group, Benibad on the Bagmati, Wapi Town on the Damanganga and Daman on the Damanganga

In 2004, high flood situations i.e. where peak level was attained within 0.5m of previous HFL, were experienced at 15 forecasting sites i.e. 9 sites on the Brahmaputra and its tributaries viz Dibrugarh, Neamtighat, Tezpur, Goalpara, Dhubri, Kampur , Khowang, Numaligarh and Beki Road Bridge. 3 sites on Barak and its tributaries viz Annapurnaghat, Kalashahah, Kaimgang. One site Toofanganj on Raidak, one site Sikandarpur on Buri Gandak and one site Baltara on Kosi.

During the flood season 2004, all the 172 flood forecasting stations including 27 inflows forecasting site were operational from flood forecasting point of view. Out of these no forecast was issued / required at 69 (40%) sites including 8 inflow flood forecasting sites. On the whole, 4889 forecasts were issued for the remaining 103 (60%) flood forecasting sites, which includes 705 inflow forecasts. Out of these 4696 i.e. 96.05% forecasts including 654 (92.77%) inflow forecasts, were found within permissible limit of accuracy.

Graph showing the year-wise total number of forecasts issued and number of accurate forecasts is at Fig. 3.1.

3.2.2 Modernisation of Flood Forecasting Services

The Central Water Commission is making a constant endeavor in updating and modernizing the forecasting services. The forecasting of flood involves a number of stages, namely, data observation, collection, transmission, compilation and analysis, formulation of forecasts and their dissemination. To make the flood forecasts more accurate, effective and timely the modernization activities are being taken up on a continuous basis.

During IX Plan, telemetry system was installed in Chambal and Upper Mahanadi basins for real time data collection and transmission to forecast formulation centres. During X Plan telemetry system is proposed to be installed in Lower Ganga Basin (Damodar River), Krishna Basin, Godavari basin, Pennar basin, Lower Mahanadi Basin, Upper Brahmaputra Basin and Yamuna Basin. Tenders has been invited after approval of the tender document from the Ministry of Water Resources.

The use of computerized mathematical models for forecast formulation was introduced in CWC in the last two decades. Five such hydrological models viz. SSARR, HECIF, NIC, NAM-SYSTEM 11 (MIKE 11) AND CWCFFI were acquired under UNDP and Central Water Commission-DHI Schemes. Recently Window based MIKE-11modelling software has been procured under World Bank aided DSARP Scheme. Further MIKE-11/MIKE-Floods is being processed for procurement under "Modernisation of Flood Forecasting network including Inflow forecast" during the X Plan for more basins.

3.3 FLOOD SITUATION ASSESSMENT AND FLOOD DAMAGE

Central Water Commission is maintaining a network of 172 Flood Forecasting stations in the country on various Inter-State river basins to monitor the flood situation during the monsoon period. As per the information received from these flood-forecasting stations, there were flood situations in the States of Assam, Bihar, Orissa, Uttar Pradesh, West Bengal and Dadra & Nagar Haveli. A statement showing damage due to floods heavy rains throughout the country during the year 2004 is shown in Table 3.2. River Katkhal at Matizuri, river Pagladyia at NT Road Crossing, river Brahmaputra at, Guwahati river Kopilli at Dharamtul river Kamla Balan at Jhanjharpur, river Kosi at Basua, river Adhwara Group at Ekmighat, river Bagmati at Benibad and river Damanganga at Wapi Town and Daman crossed previous H.F.L . during the year 2004 and ttained new H.F.L of 22.67 m, 55.45 m, 51.46 m, 58.09 m, 53.01 m, 48.84 m, 49.52 m, 50.01 m, 23.76 m and 4.00 m respectively

3.3.1 Flood Bulletins:

Central Water Commission has been issuing Daily Flood Bulletins and Special Flood Bulletins during the flood season every year based on the information collected from affected State Governments and its own field formations. During this year's monsoon, 192 level forecast and 123 inflow forecast daily Flood bulletins were issued. In addition to that 26 Special Flood Bulletins depicting high flood situation were also issued.

3.4 FLOOD MANAGEMENT WORKS

The Rashtriya Barh Ayog (1980) assessed 40 M ha area ($1/8^{th}$ of total geographical area i.e. 329 M ha) as flood prone out of which 32 M ha.(80%) of flood prone area is protectable. Upto March 2003 an area of about 16.46 M ha has been provided with a reasonable degree of protection. The protection has been offered by means of construction of embankments (34398 km), drainage channels (51318 km.), town protection works (2400 Nos.) and by raising of villages (4721 Nos.) upto March 2004. The cumulative expenditure done under flood control upto March, 2004 is anticipated to be Rs. 8856.00 crores.

3.5 FLOOD PLAIN ZONING

The need for enactment of Flood Plain Zoning legislation has been emphasized in various National forums since 1957. A model bill for Flood Plain Zoning was circulated in 1975 for enactment by the State Assemblies and for implementation of its regulations. The Rashtriya Barh Ayog in their report of 1980 had also strongly recommended enactment of the Flood Plain Zoning legislation by the States on the lines of the Model Flood Plain Zoning Bill circulated to the States in 1975.

Efforts were made in the past to persuade the State Governments to expedite enactment of a suitable legislation. The X Plan Working Group on flood management also stressed upon the need of enactment of legislation for flood plain zoning. Central Water Commission has been continuously impressing upon the States for necessary follow-up action to implement flood plain zoning approach. To facilitate this effort, CWC has prepared pamphlets depicting essential features of flood plain management and circulated it to all the State Governments. Manipur and Rajasthan enacted the legislation in 1978 and 1990 respectively whereas it is still under consideration in the States of Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Orissa, Punjab, Tripura and West Bengal. Haryana, Delhi and UP consider that existing laws are sufficient to serve the intended purpose.

Prerequisite for implementation of flood plain zoning regulation is the availability of survey maps of suitably large scale to enable proper zoning of vulnerable areas. The Central Water Commission had initiated in 1978 a programme for such surveys under the Central sector through the Survey of India as a pilot scheme, to assist the State Governments in preparing flood risk maps. Out of the identified area of 1,06,000 sq km for flood risk mapping, survey in about 55,000 sq. km., to the scale 1:15,000 with contours at an interval of 0.3 to 0.6 m, have been completed in the States of Bihar, Assam, UP, West Bengal, Punjab, Haryana and J&K and sent to respective State Governments as well as to Ganga Flood Control Commission (GFCC) & Brahmaputra Board for preparation of flood risk zone maps

A Working Group under National Natural Resources Management System (NNRMS) Standing Committee on Water Resources (SC-W) for flood risk zoning of major flood prone rivers considering remote sensing inputs was constituted by MOWR during June 1999 to examine availability of data, maps reports etc. for a test case such as the flood plains of Ganga; prepare guidelines to undertake scheme of flood risk zoning using remote sensing & other data and formulate a pilot project proposal for implementation.

The Working Group finalised broad methodology to be followed in flood risk zoning and formulated guidelines for the same. Two flood plain reaches, one on main Ganga river and another in the Brahmaputra basin were selected for taking up pilot projects for flood risk through GFCC and Brahmaputra Board.

3.6 RIVER MORPHOLOGY

The report on Morphological studies of river Narmada has been completed. The data/reports for morphological studies of river Kosi and Gandak rivers have been collected processed and computerized. During the X Five Year Plan Morphological studies of all six flood prone rivers viz. Kosi, Gandak, Brahmaputra, Ganga , Ghaghra and Sutlej are to be carried out. The shifting of rivers in last thirty years is to be demarcated by Remote Sensing Techniques. Comprehensive report on river Kosi has been entrusted to NIH Roorkee.

Morphological studies of rivers Ghaghra and Satluj using Remote Sensingf Techniques has been awarded to NIH Roorkee. River Morphology Directorate monitors all such studies.

3.7 FOLLOW-UP ACTION ON RASHTRIYA BARH AYOG RECOMMENDATIONS

The Rashtriya Barh Ayog submitted its report in 1980, which contained recommendations covering the entire gamut of flood management activities in the country. Guidelines and instructions for the implementation were circulated to

Governments of States/UTs in September 1981 for expeditious action to implement these recommendations.

Status report incorporating a review of the status of implementation of various recommendations of RBA by the States/other Agencies was prepared in February, 1987 and circulated to all the states with a request to expeditiously implement the various recommendations.

The Working Group on flood management for the X Five Year Plan again emphasized the need to implement the 25 important recommendations on a priority basis in its report submitted during 2001. It has also recommended setting up an Integrated Commission for examination of the flood problem and suggesting measures to tackle the same.

Ministry of Water Resources set up an Expert Committee under the Chairmanship of Shri R. Rangachari for review of the RBA recommendations. The committee has submitted its report. The Committee has observed that in general the recommendations of RBA have not been implemented by the States. The Committee has identified 40 important recommendations for implementation on priority. The recommendations of the Committee have been accepted by the Ministry of Water Resources. MOWR has forwarded the recommendations to the states as well as central Government agencies for follow-up. CWC carried out the coordination and further follow-up activities during the year.

3.8 WATER QUALITY MONITORING

Central Water Commission is monitoring water quality of surface water at 371 key locations covering all the major river basins of India. CWC is maintaining a three tier laboratory system for the analysis of the parameters. The Level-I Laboratories are located at 258 field water quality monitoring stations on major rivers of India where physical parameters such as Temperature, Colour, Odour, Sp. Conductivity, Total Dissolved Solids, pH and Dissolved Oxygen of river water are observed. There are 24 Level-II Laboratories located at selected Divisional Headquarters to analyse 25 nos. physico-chemical characteristics and bacteriological parameters of river water. 4 Level-III/II+ Laboratories are functioning at Varanasi, Delhi, Hyderabad and Coimbatore where 41 parameters including Heavy Elements/Toxic parameters and Pesticides are analysed. The data generated is computerised in Data Base System and disseminated in the form of Hydrological Year Book, Status Reports and Bulletins. Water Quality Year Books are published and Water Quality Bulletins are issued regularly.

Level II+ Laboratory at Hyderabad has conducted 5th round of Analytical Quality Control Programme (AQC) for 25 CWC Water Quality Laboratories and 11 State Surface Water Quality Laboratories.

Ministry of Environment and Forest laid emphasis on water quality monitoring in an integrated manner by constituting the Water Quality Assessment Authority (WQAA) at national level under the provision of Environmental Protection Act through the extraordinary notification in the Gazette of India dated 22nd June, 2001 for co-ordinated effort in maintaining the quality of work of national water resources. The Chief Engineers/Superintending Engineers of CWC are the Member Secretaries of most of State Level Water Quality Review Committee (WQRC).

WQAA has constituted a working group to advise WQAA on the minimum flows in the rivers to conserve eco system. Member (RM), CWC is the Chairman of the Working Group.

3.9 COASTAL EROSION

Coastal erosion is a phenomenon experienced all over the world and the Indian Coast is not an exception. A vast portion of the Indian coastline is facing constant erosion due to various reasons, natural as well as man-made. As per National Hydrographic Office, Dehra Dun, the Indian Coastline is extending to a length of about 7516.60 kms. Almost all the maritime States/UTs are facing coastal erosion problem in various magnitudes.

In order to assist maritime States/UTs to protect vulnerable coastal areas from sea erosion, there are two schemes namely (i) National Coastal Protection Project (NCPP) under formulation for arranging external funding for coastal protection works and (ii) Centrally Sponsored Scheme currently under implementation by providing central assistance to maritime States for protection of critical stretches from sea-erosion.

3.9.1 Centrally Sponsored Scheme (CSS)

To tide over the immediate fund constraint faced by the States in completing anti-sea erosion measures on critical reaches, a Centrally Sponsored Scheme, “Critical anti-erosion works in coastal and other than Ganga Basin States”, estimated to cost Rs. 20.64 crore, is under implementation during the X Plan. So far, Ministry of Water Resources has released first instalment of Rs. 50 lakh to Karnataka, Kerala and Orissa States during the financial year 2003-04 and Rs. 1.00 crore to UT of Pondicherry during 2004-05.

3.9.2 National Coastal Protection Project (NCPP)

The Consolidated report for the National Coastal Protection Project (Phase-I), estimated to cost 1095.911 crore, was prepared and submitted to Ministry of Water Resources in December 2002 incorporating proposals of the States of Karnataka, Maharashtra, West Bengal, Tamil Nadu, Orissa and UT of Pondicherry. The proposals of other States/UTs (Andhra Pradesh, Goa, Gujarat, Kerala and UTs of Andaman and Nicobar Islands and Lakshadweep) could not be included in the National Coastal Protection Project (Phase I) due to non-compliance of CWC comments. Now Ministry of Water Resources has decided to reformulate the NCPP covering all the maritime States. The National Coastal Protection Project (NCPP) covering all the maritime States/UTs is under preparation.

CHAPTER-III

RIVER MANAGEMENT

3.1 SYSTEMATIC COLLECTION AND STORAGE OF HYDROLOGICAL DATA

Central Water Commission at present operates National Network of 945 Hydrological Observation Stations. Out of these 945 stations, 246 are Gauge Sites, 282 are Gauge and Discharge Sites, 115 are Gauge Discharge and Water Quality Sites, 41 are Gauge Discharge and Silt Sites, while the remaining 261 are Gauge Discharge Silt and Water Quality Sites. The basin-wise distribution of these sites is detailed below in Table 3.1.

Table 3.1

Basin-wise Details of Hydrological Observation Sites

Sl. No.	Name of Basin	No. of Sites
1	Indus	26
2	Ganga, Brahmaputra, Meghna/Barak	489
3.	Godavari	83
4.	Krishna	73
5.	Cauvery	34
6.	Subarnrekha	8
7.	Brahmani – Baitarni	13
8.	Mahanadi	34
9.	Pennar	8
10.	Mahi	13
11.	Sabarmati	12
12.	Narmada	31
13.	Tapi	6
14.	West Flowing rivers from Tapi to Tadri	45
15.	West Flowing rivers from Tadri to Kanyakumari	21
16.	East Flowing rivers between Mahanadi and Pennar	26
17.	East Flowing rivers between Pennar and Kanyakumari	10
18.	West Flowing rivers of Kuchh and Saurashtra including Luni	13
	Total:	**945**

The basic data collected by field units is processed and validated at the Sub-Divisions, Divisions and Circle Level and authenticated data in the form of Water Year and Water Quality Year Books are published and then transmitted to CWC (HQ) for storage, updating, retrieval etc. The dissemination of data to bonafide users is processed as per the data request received in regional offices of CWC as well as at the Headquarter by Planning & Development (P&D) Unit and Information System Organisation (ISO) of CWC.

P&D Unit is maintaining the Hydrological Data pertaining to Ganga, Brahmaputra and Barak Basins in computerized format. The data of these basins being of classified nature, is provided to the bonafide users on request following a set procedure and guidelines for release of classified data. Wherever required, the approval of MoWR is sought for release of such data. Computerised data is now available for other regions also after the implementation of the Hydrology Project.

The users of the data have been categorized as below:-

(iv) Central/State Government offices
(v) Public Sector Undertaking and Institutions/Societies working under the direct control of Central/State Governments and IITs.
(vi) Research Institutions/Scholars.

3.1.2 Hydrology Project

During 1995-96, the Government of India and nine States entered into a development credit agreement with the World Bank to implement "Hydrology Project" under a joint financing arrangement, whereby the Government of Netherlands provided related technical assistance in the form of a grant. The Hydrology Project Phase-I has been under implementation since 22 September, 1995. The total cost of the Project was Rs. 6020 million and CWC component was Rs. 734 million till the project completion date of December 2003.

The Hydrology Project aims at establishing a sustainable Hydrological Information System (HIS) for the Central and the State agencies participating in the project. A Hydrological Information System comprises the physical infrastructure and human resources to collect, process, store and disseminate data on hydrological, geo-hydrological and hydro-meteorological quantity and quality variables. The Hydrology Project Phase-I covers the entire Peninsular region of India and in CWC its activities extended to National Water Academy, Pune, CWC HQ at New Delhi and following 5 Regional Offices:

1. Cauvery and Southern Rivers Organisation (C&SRO), Coimbatore
2. Krishna and Godavari Basin Organisation (KGBO), Hyderabad
3. Mahanadi and Eastern Rivers Organisation (M&ERO), Bhubaneswar
4. Monitoring (Central) Organisation (Mon.-C), Nagpur
5. Narmada and Tapi Basin Organisation (N&TBO), Vadodara

The primary role of the Hydrological Information System (HIS) is to provide reliable data sets for long term planning, design and management of water resource and water use systems and for research activities in the related aspects. It provides the information to users in time and in proper form. The scope of HIS is not extended to provide data to users on a real time basis for short term forecasting.

Under the Hydrology Project, following major works have been carried out by the Central Water Commission:

(i) Optimisation of existing surface water observation network.
(ii) Upgradation of 254 existing Hydrological observation sites and equipping them with state of the art hydrological and navigational equipments.
(iii) Opening of 30 new observation sites and equipping them with state-of-the-art hydrological and navigational equipment.
(iv) Upgradation of 10 Level-II and 2 Level-II+ Water Quality Laboratories.
(v) Establishment of 48 Sub-Divisional Data Processing Centres (SDDPC) one in each sub-division, 13 Divisional Data Processing Centres (DDPC) one in each Division, for each Region (5 number) a Data Processing and Data Storage Centre (RDPC and RDSC) and at national level a National Data Centre (NDC).

(vi) Extensive institutional strengthening by training the personnel at various levels right from observations to data analysis and storage.
(vii) Standardisation of method of data collection, data validation and processing.
(viii) Construction of 248 site office buildings and 57 major buildings for the Sub-Division Offices, Division Offices, Circle Offices and Regional Offices.
(ix) Development of data storage and dissemination software named WISDOM

3.2. FLOOD FORECASTING & WARNING SERVICES:

RBA has assessed that about 40 M ha area of the country is flood prone. The 10th Plan Working Group has worked out this area as 45.64 M ha. For techno-economic reason flood management measures wherever planned & executed in our country have been only against floods of certain magnitude. However, floods of higher magnitude do occur, creating havocs. Accordingly, flood forecasting and warning system has been planned parallel to structural measures of floods management to give an advance knowledge of incoming floods, which plays an important role in reducing floods damage as also help in better planning of rescue/relief operations. Floods forecast also helps in optimum regulations of (multipurpose) reservoirs with or without floods cushions in them.

Scientific Flood forecasting activities in India made a beginning in 1958 when the erstwhile Central Water & Power Commission (CW&PC) set up a Flood Forecasting Unit (FFU) for issuing flood forecasts and Warnings of incoming floods in the Yamuna for the National Capital, Delhi. This service has since been expanded by CWC to cover almost all major flood prone interstate river basins of India. At present, there are 166 flood forecasting sites, out of which 139 are level forecasting and 27 are inflow forecasting sites on major dam/barrages. It covers the 8 major river systems in the country, which includes 65 river sub-basins. These pertain to 14 States viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Uttaranchal, Uttar Pradesh & West Bengal and one Union territory Dadra & Nagar Haveli and the National Capital Territory of Delhi.

On an average over 6000 forecasts are being issued every year by the Central Water Commission during flood season. Normally, these forecasts are issued for 12 to 48 hours in advance, depending upon the river terrain, the locations of the flood forecasting sites and base stations. The hydrological data is being observed at more than 700 Gauge and Gauge & Discharge sites, and hydro-meteorological data for over 500 rain gauge stations and the same is communicated through a network of more than 450 Wireless stations. Synoptic weather situations, weather forecast/heavy rainfall warnings etc. are also being collected from FMOs and incorporated as one of the parameters such as river stage, discharge etc. while framing the flood forecast.

3.2.1 Flood Forecasting Performance During 2003:

During the flood season of 2003 (May to October), out of 139 level forecasting sites, unprecedented flood situations, where the highest flood level attained during the flood season exceeded their respective previous H.F.L. were witnessed at 3 flood forecasting sites viz. at Ballia on the Ganga in the Ballia District of Uttar Pradesh and Bhagalpur & Kahalgaon (earlier known as Colgong) on the main river Ganga in the district of Bhagalpur in Bihar. In addition to the unprecedented flood situations, peak flood levels at 2

forecasting sites viz. Matizuri on the Katakhal in Assam and Alipingal Devi on the Mahanadi in Orissa just touched their previous HFL during the flood season 2003.

In 2003, high flood situations i.e. where peak level were attained within 0.5m of previous HFL, were experienced at 23 forecasting sites i.e. 4 sites on the Ganga viz Kannauj, Ghazipur in Uttar Pradesh and Patna (Gandhighat) and Hathidah in Bihar, 3 sites on the Ghaghra viz Ayodhya in U.P. and Gangpur Siswan & Chhapra in Bihar, 2 sites on the Gandak viz Khadda in U.P. and Hazipur in Bihar, 2 site on the Kosi viz Basua & Kursela, and Benibad on the Bagmati all the three in Bihar, 6 sites in Assam viz. Tezpur & Guwahati on the Brahmaputra, Kampur on the Kopli, Khowang on the Burhi Dihing, N.T. Road crossing on Jiabharali and Naglamoraghat on the Desang, 2 sites in West Bengal viz Mathabhanga on the Jaldhaka and Mekhliganj on the Teesta, 2 sites Hirakud Dam and Nimapara on the Mahanadi in Orissa, Daman on the Damanganga in Dadra & Nagar Haveli.

During the flood season 2003, all the 166 flood forecasting stations including 27 inflows forecasting site were operational from flood forecasts point of view. Out of these no forecast was issued / required at 27 (22.29%) sites including 5 inflow flood forecasting sites viz. Tajewala on the Yamuna, Jaikwaedi Dam on the Godavari, Nizamsagar on the Manjira, Prakashan Barrage on the Krishna, Dantiwada on the Banas. On the whole, 6600 forecasts were issued for the remaining 129 (77.71%) flood forecasting sites, which includes 611 inflow forecasts. Out of these 6368 i.e. 96.48% forecasts including 586 (95.91%) inflow forecasts, were found within permissible limit of accuracy.

Graph showing the year-wise total number of forecasts issued and number of accurate forecasts is at Fig. 3.1.

3.2.2 Modernisation of Flood Forecasting Services

Central Water Commission makes constant endeavour in updating and modernizing the forecasting services. Forecasting involves a number of stages, namely, data observation, collection, transmission, compilation and analysis of data, formulation of forecasts and their dissemination to the user agencies. To make the flood forecasts more accurate, effective and timely, modernization is a regular ongoing process of CWC's Flood Forecasting & Warning Network System.

The use of computerized mathematical models for data analysis, forecast formulation was introduced in CWC in the last two decades. At present Mike 11, hydrological model acquired under CWC-DHI Co-operation programme besides a number of other indigenously developed mathematical models using rainfall, water level, discharge data etc are in use and are being upgraded / re-calibrated after each monsoon season to derive the best possible result. In addition, the conventional methods are also in use. During the flood season 2003, the window-based MIKE-11 modeling software procured under the World Bank Aided DSARP Scheme, had also been used in Mahanadi and Chambal Basin. Additional basins, namely Krishna, Godavari, Mahanadi, Brahmaputra, Barak, Ghaghra, Rapti, Damodar & Yamuna will also be covered by telemetry for data collection, processing and mathematical models for forecast formulation during the X Plan.

3.3 FLOOD SITUATION ASSESSMENT AND FLOOD DAMAGE

Central Water Commission is maintaining a network of 166 Flood Forecasting stations in the country on various Inter-State river basins to monitor the flood situation during the monsoon period. As per the information received from these flood-forecasting stations, there was flood situations in the States of Assam, Bihar, Chhattisgarh, Gujarat, Madhya Pradesh, Maharashtra, Orissa, Uttar Pradesh and West Bengal. In addition as per the information collected from the National Disaster Management (NDM) website, the States of Arunachal Pradesh, Himachal Pradesh, Karnataka, Kerala, Meghalaya, Rajasthan and Uttaranchal were also under floods due to rains during southwest monsoon period of 2003. A statement showing damage due to floods / heavy rains throughout the country during the year 2003 is shown in Table 3.2. River Ganga at Ballia (UP), Bhagalpur (Bihar) and Colgong (Bihar) crossed its previous HFL during the year 2003 and attained new HFL of 60.25 m, 34.20 m and 32.80 m respectively at these sites.

3.3.1 Flood Bulletins:

Central Water Commission has been issuing Daily Flood Bulletins and Weekly News letters during the flood season every year based on the information collected from affected State Governments and its own field formation. During this year's monsoon, 77 Daily Flood Bulletins and 16 Weekly Flood News Letters depicting the flood situation and the flood damages in the country were compiled and issued.

3.4 FLOOD MANAGEMENT WORKS

The Rashtriya Barh Ayog (1980) assessed 40 M ha area ($1/8^{th}$ of total geographical area i.e. 329 M ha) as flood prone out of which 32 M ha.(80%) of flood prone area is protectable. Upto March 2002 an area of about 16.46 M ha was anticipated to be provided with a reasonable degree of protection. The protection has been offered by means of construction of embankments (34398 km), drainage channels (51318 km.), town protection works (2400 Nos.) and by raising of villages (4721 Nos.) upto March 2003. The cumulative expenditure done under flood control upto March, 2003 is anticipated to Rs. 8856.00 crores.

3.5 FLOOD PLAIN ZONING

The need for enactment of Flood Plain Zoning legislation has been emphasized at various National forums since 1957. A model bill for Flood Plain Zoning was circulated in 1975 for enactment by the State Assemblies and for implementation of its regulations. The Rashtriya Barh Ayog in their report of 1980 had also strongly recommended enactment of the Flood Plain Zoning legislation by the States on the lines of the Model Flood Plain Zoning Bill circulated to the States in 1975.

Table 3.2 - STATEMENT SHOWING DAMAGE DUE TO FLOODS / HEAVY RAINS DURING 2003

Sl. No.	Name of State	Area affected in M.ha.	Population affected in million	Damage to Crops		Damage to Houses		Cattle lost Nos.	Human live lost (Nos.)	Damage to public utilities in Rs.Crore	Total damages Crops, Houses & Public utilities in Rs.Crores
				Area in m. ha.	Value in Rs.Crore	Nos.	Value in Rs.Crore				
1	2	3	4	5	6	7	8	9	10	11	12
1	ANDHRA PRADESH	0.287	0.013	0.287	575.100	17468	1.885	1970	52	188.273	765.258
2	ARUNACHAL PRADESH	0.207	0.230	0.022	63.665	423	0.423	0.000	45	346.236	410.324
3	ASSAM	0.932	5.652	0.295	147.000	74638	18.692	4319	52	181.402	347.094
4	BIHAR	1.820	8.161	0.792	9.441	84424	37.567	131	297	11.919	58.927
5	CHHATTISGARH	0.074	0.684	0.074	45.091	78718	42.788	2793	30	110.657	198.536
6	GUJARAT										
7	GOA										
8	HARYANA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	HIMACHAL PRADESH	0.033	0.303	0.016	17.790	2924	60.068	452	89	87.964	165.822
10	JAMMU & KASHMIR										
11	JHARKHAND										
12	KARNATAKA	0.009	0.186	0.007	7.680	4286	61.184	27	31	1013.423	1082.287
13	KERALA										
14	MANIPUR										
15	MADHYA PRADESH	0.126	1.436	0.126	22.717	31536	7.367	214	18	51.600	81.684
16	MAHARASHTRA	0.031	0.015	0.022	73.544	4876	39.778	109	64	0.000	113.322
17	MEGHALAYA	0.002	0.090	0.002	0.230	820	0.813	367	1	0.064	1.107
18	MIZORAM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19	NAGALAND	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	ORISSA	0.478	3.565	0.478	Nil	144716	Nil	2270	60	Nil	Nil
21	PUNJAB	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22	RAJASTHAN	0.073	0.186	0.0001	0.320	7358	428.221	64	29	30.800	459.341
23	SIKKIM	0.0004	0.086	0.000	0.000	0.000	0.000	0.000	0.000	5.350	5.350
24	TAMIL NADU	Nil	Nil	Nil	Nil	647	0.079	134	75	0.064	0.143
25	TRIPURA										
26	UTTAR PRADESH	2.355	13.476	1.286	448.574	361323	99.859	3184	953	127.444	675.877
27	UTTARANCHAL	Nil	Nil	Nil	Nil	499	Nil	300	20	Nil	Nil
28	WEST BENGAL	0.015	0.152	0.004	Nil	5911	Nil	22	17	Nil	Nil
29	A & N ISLAND										
30	CHANDIGARH	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31	DAMAN & DIU										
32	D & N HAVELI	0.049	0.220	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
33	DELHI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
34	LAKSHADWEEP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35	PONDICHERRY										
	Total	**6.491**	**34.455**	**3.411**	**1411.152**	**820567**	**798.724**	**16356**	**1833**	**2155.196**	**4365.072**
		Nil -	Figures not reported by State and recorded as Nil.					0.000	-Data reported as Nil by the State Govt.		

Efforts were made in the past to persuade the State Governments to expedite enactment of a suitable legislation. The X Plan Working Group on flood management also stressed upon the need of enactment of legislation for flood plain zoning. Central Water Commission has been continuously impressing upon the States for necessary follow-up action to implement flood plain zoning approach. To facilitate this effort, CWC has prepared pamphlets depicting essential features of flood plain management and circulated it to all the State Governments. Manipur and Rajasthan enacted the legislation in 1978 and 1990 respectively whereas it is still under consideration in the States of Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Orissa, Punjab, Tripura and West Bengal. Haryana, Delhi and UP considers that existing laws are sufficient to serve the intended purpose.

Prerequisite for implementation of flood plain zoning regulation is the availability of survey maps on suitably large scale to enable proper zoning of vulnerable areas. The Central Water Commission had initiated in 1978 a programme for such surveys under the Central sector through the Survey of India as a pilot scheme, to assist the State Governments in preparing flood risk maps. Out of the identified area of 1,06,000 sq km for flood risk mapping, survey in about 55,000 sq. km., to the scale 1:15,000 with contours at an interval of 0.3 to 0.6 m, have been completed in the States of Bihar, Assam, UP, West Bengal, Punjab, Haryana and J&K and sent to respective State Governments as well as to Ganga Flood Control Commission (GFCC) & Brahmaputra Board for preparation of flood risk zone maps

A Working Group under National Natural Resources Management System (NNRMS) Standing Committee on Water Resources (SC-W) for flood risk zoning of major flood prone rivers considering remote sensing inputs was constituted by MOWR during June 1999 to examine availability of data, maps reports etc. for a test case such as the flood plains of Ganga; prepare guidelines to undertake scheme of flood risk zoning using remote sensing & other data and formulate a pilot project proposal for implementation.

The Working Group finalised broad methodology to be followed in flood risk zoning and formulated guidelines for the same. Two flood plain reaches, one on main Ganga river and another in the Brahmaputra basin were selected for taking up pilot projects for flood risk through GFCC and Brahmaputra Board.

3.6 RIVER MORPHOLOGY

A. Preparation of report on Morphological characteristics of rivers

- Special morphological study of river Kosi and Gandak has been undertaken by CWC during 2003-04. Under the study, status report on the Kosi and the Gandak rivers are being prepared for further study. With the help of remote sensing data, the river shifting characteristics have to be determined. Data collection on these rivers have been entrusted to field formations under the Chief Engineer, Lower Ganga Basin, Patna.

- A committee of officials from CWC, CWPRS, NIH, GSI, GFCC etc. has been proposed and the proposal has been submitted to the competent authority for approval in Sep., 2003. The committee will examine the status report and decide future course of action.

B. Other works/study

Silting in rivers in flood prone region is reported to be the cause of aggravation in flood problem in some areas. This has been looked into by a multi-disciplinary committee, which submitted its report in January, 2003. A Select Group under Chairman CWC was subsequently constituted to decide action points vis-à-vis recommendations of the committee. The action points have been decided and communicated to concerned departments for follow-up action.

In order to have thorough deliberations on the subject, a seminar on "Silting of Rivers – Problems and Solutions" was organized on 12th & 13th February, 2004 at India International Centre New Delhi and the recommendations have been circulated.

3.7 FOLLOW-UP ACTION ON RASHTRIYA BARH AYOG RECOMMENDATIONS

The Rashtriya Barh Ayog submitted its report in 1980, which contained recommendations covering the entire gamut of flood management activities in the country. Guidelines and instructions for the implementation were circulated to Governments of States/UTs in September 1981 for expeditious action to implement these recommendations.

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3.8 WATER QUALITY MONITORING

Central Water Commission is monitoring water quality at 376 key locations covering all the major river basins of India. CWC is monitoring a three tier laboratory system for the analysis of the parameters. The Level-I laboratories are located at 260 field water quality monitoring stations on major rivers of India where physical parameters such as Temperature, Colour, Odour, Sp. Conductivity, Total Dissolved Solids, pH and Dissolved Oxygen of

river water are observed. There are 24 Level-II laboratories located at selected Divisional Headquarters to analyse 25 nos. physico-chemical characteristics and bacteriological parameters of river water. There are 4 Level-III/II+ laboratories are functioning at Varanasi, Delhi, Hyderabad and Coimbatore where 41 parameters including Heavy Elements/Toxic parameters and Pesticides are analysed. The data generated will be computerised in Data Base System and disseminated in the form of Hydrological Year Book, Status Reports and Bulletins. Water Quality Year Books are published and Water Quality Bulletins are issued regularly.

Under Hydrology Project, 70 Water Quality Level-I laboratories, 8 Level-II laboratories have been upgraded with state-of-the-art equipment in addition to establishment of two new water quality Level-II laboratories. Besides one Level–II+ laboratory has been newly established and one Level-II laboratory has been upgraded to Level-II+ laboratory. Level-I laboratories are upgraded by providing quartz distillation plant, portable kit, pH meter, conductivity meter etc. Level-II laboratories are upgraded by providing U.V. Visible spectrophotometer, Ion meter, Flame photometer, Centrifuge Conductivity Meter, Binocular Microscope and in Level-II+ laboratories sophisticated equipment like Atomic Absorption Spectrophotometer, Ion meter, Gas Chromatograph, Top loaded electronic balance and microwave Digester have been provided. The staff have been given the training for analysis of pollution related parameters, operationalisation of instruments, Analytical Quality Control (AQC) and HYMOS based surface water quality data entry system.

Level II+ laboratory at Hyderabad is carrying out the work of Analytical Quality Control Programme (AQC) for all the surface water level-II and Level-II+ WQ laboratories which include A.P. (2 Nos.), Gujarat (2 Nos.), Karnataka (2 Nos.) Kerala (1 No.), Maharashtra (4 Nos.) and CWC's own 33 regional laboratories (12 Nos.).

Ministry of Environment and Forest laid emphasis on water quality monitoring in an integrated manner by constituting the Water Quality Assessment Authority (WQAA) at national level under the provision of Environmental Protection Act through the extraordinary notification in the Gazette of India dated 22nd June, 2001 for co-ordinated effort in maintaining the quality of work of national water resources. The Chief Engineers/ Superintending Engineers of CWC are the Member Secretaries of most of State Level Water Quality Review Committees (WQRC).

WQAA has constituted a working group to advise WQAA on the minimum flows in the rivers to conserve eco system. Member (RM) CWC is the Chairman of the working group.

3.9 COASTAL EROSION

The coastal erosion is a phenomenon experienced all over the world and Indian coast is also not exempted from it. A major portion of the Indian coast line has been facing constant erosion due to various reasons, natural as well as man-made. There has been a considerable increase in the development activities all along the coastline. Therefore, it is of utmost importance that the coastline is protected and safeguarded from sea erosion.

At present, there are two schemes under consideration of the Government of India to arrange financial assistance for maritime States/Union Territories for protection of vulnerable coastal areas from sea erosion. The first scheme is Centrally Sponsored Scheme for providing central assistance to maritime States to carry out Critical Anti-Erosion works and the second is National Coastal Protection Project (NCPP) for arranging external funding for coastal protection works. The brief description of the schemes is given below.

3.9.1 Central Assistance to maritime States

The Government of India had been providing Central Loan Assistance to the Kerala State for anti-sea erosion works since 1970-71. The amount provided till March, 1992 is around Rs. 52 crore. During the year 1991-92, an amount of Rs. 0.93 crore was also provided to Government of Karnataka. The Central Loan Assistance was discontinued beyond 1991-92 as per the decision taken in the 43rd meeting of National Development Council held in December, 1991. During 1995, the government of Kerala submitted a proposal for special Central Assistance for urgent anti sea erosion works. The Government of India sanctioned Rs. 3.00 crore as special Central Assistance as one time measure for completing anti-sea erosion works in Kerala by June, 1996. Central assistance amounting to Rs. 1.00 crore was provided for anti sea erosion works to the State of Tamil Nadu during the financial year 2000-01.

To tide over the immediate fund constraints faced by the States in completing anti-sea erosion measures on the critical reaches, Standing Finance Committee (SFC) approved in June, 2003 a Centrally Sponsored Scheme, " Critical Anti Erosion Works in Coastal and other than Ganga States" estimated to cost Rs.20.64 for implementation during X Plan. Centrally Sponsored Scheme has also been approved by full Planning Commission and fund were released to the Karnataka, Kerala and Orissa States during the year.

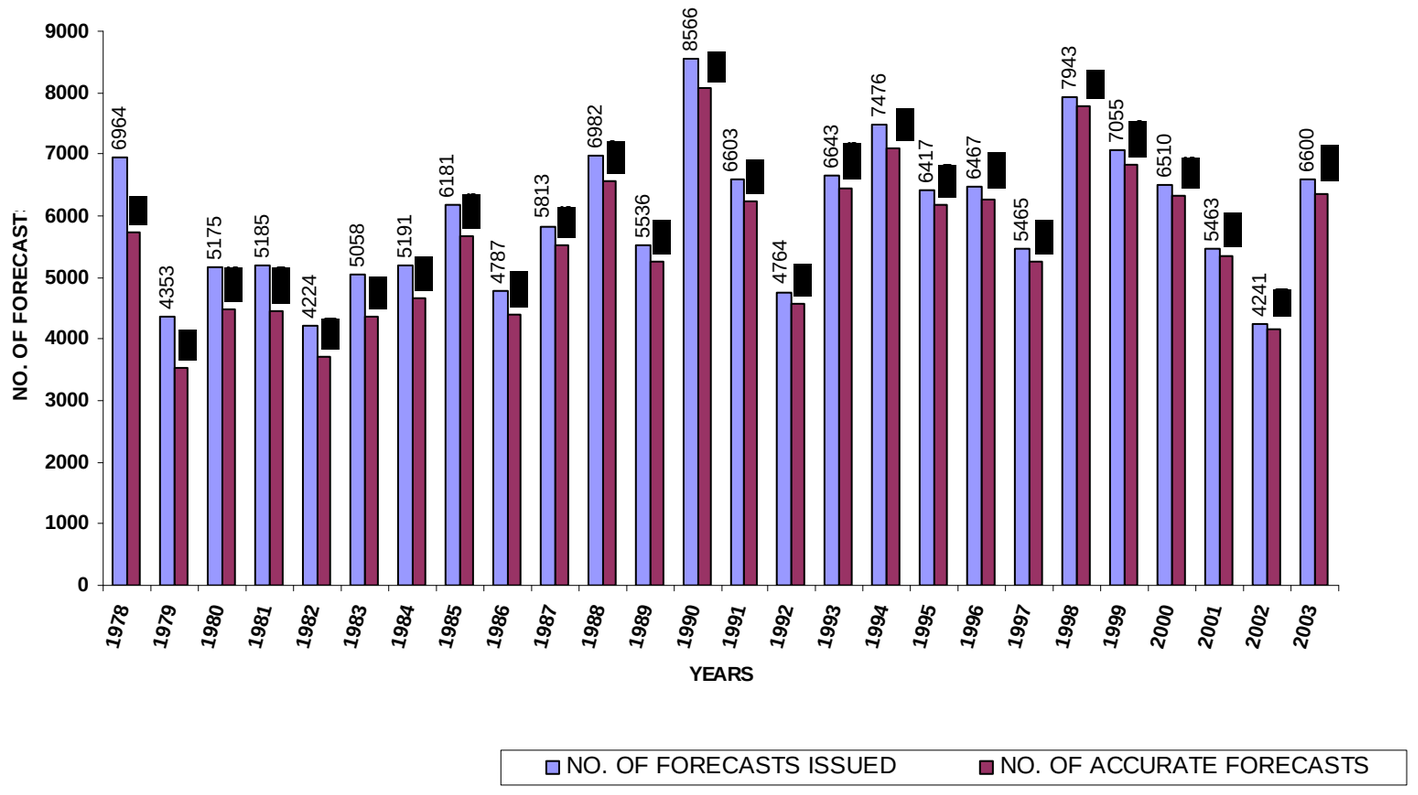
3.9.2 National Coastal Protection Project (NCPP)

With the discontinuation of Central Loan Assistance, the State Govt./ Union Territories have been facing financial difficulties in funding the anti sea erosion works. Realizing the set back received in the progress of coastal protection works in the maritime States, the Beach Erosion Board(now named as Coastal Protection & Development Advisory Committee) in its meeting requested the maritime States to formulate the proposals for protection of vulnerable coastal reaches from sea erosion in their respective States for inclusion in the consolidated National Coastal Protection Project (NCPP) for external assistance.

The consolidated report of National Coastal Protection Project (Phase-I), estimated to cost Rs. 1095.91 crore was prepared and submitted to MoWR in December 2002 incorporating proposals of the States of Karnataka, Maharashtra, Orissa, Tamil Nadu, West Bengal and U.T. of Pondicherry. The proposal of the remaining maritime States/UTs (Andhra Pradesh, Goa, Gujarat, Kerala and UTs of Andaman & Nicobar Islands & Lakshadweep) which are likely to take more time for finalization due to delay in State TAC clearance and non-compliance of CWCs comments by States Govts./UTs will be taken up under National Coastal Protection Project (Phase-II).Activities for preparation of NCPP were continued during the year.

FLOOD FORECASTING PERFORMANCE (FROM 1978 - 2003)

Fig.3.1



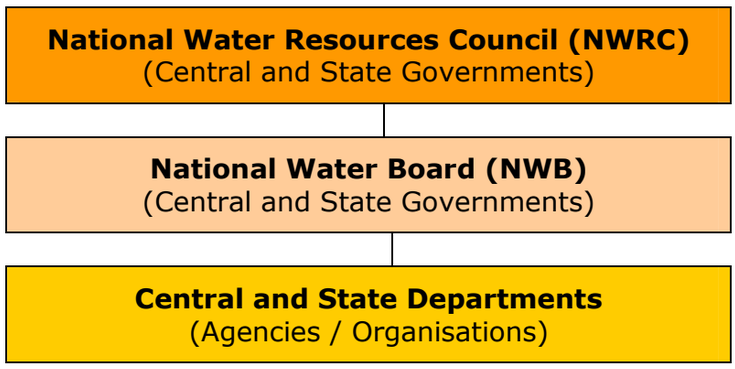
CHAPTER-IV

BASIN PLANNING

4.1 NATIONAL WATER PLANNING

The uneven distribution of water in time and space and the recurring occurrence of floods and droughts in various parts of the country have underscored the need for a national perspective in water resources development involving participation of all concerned. Planning of water resources development and utilisation is a multi-level process involving Central and State Governments, Non-Governmental Organisations and beneficiaries with intense interaction among them.

An outline of the Organisational setup at the apex is shown below**.**



4.2 NATIONAL WATER RESOURCES COUNCIL

National Water Resources Council (NWRC) was set up in March 1983 as a National apex body with the Hon'ble Prime Minister as Chairman. The composition of the Council is shown in Fig. 4.1. The council has held five meetings so far.

After deliberations and subsequent emergence of consensus in the 5th meeting of the National Water Resources Council held on 1st April, 2002, the National Water Policy, 2002 was adopted by the Council which directed for its circulation among all concerned. The Policy is titled as "National Water Policy-2002".

4.3 FOLLOW-UP ACTION OF NWP

Consensus was reached during the fifth meeting of NWRC for the followings:-

(a) Formulation of water policy for individual states.
(b) Formulation of an operational action plan with an aim to achieve the desired objectives of the policy.

Accordingly, the Action Plan for implementation of National Water Policy 2002 was adopted in 12th National Conference of Water Resources and Irrigation Ministers held on 5th February 2003 under the chairmanship of the Hon'ble Union Minister of Water Resources. The Action Plan broadly includes

the proposed action points for every provision of the National Water Policy (2002) and identifies the Ministries/Departments who are to provide vital inputs towards its implementation. The proposed time frame for implementation of the Action points is also indicated. The Action Plan has been circulated to all State Govts./UT Administrations as well as to all CWC field offices for implementation of identified action points. Certain action points have also been identified for immediate action in CWC head office.

Role of Central Water Commission in Implementation of Action Plan

Details of action taken on action points in the Action Plan for implementation of National Water Policy (2002) as identified for initiating immediate action by Central Water Commission are as follows:

- Creation of hydrological, sediment and water quality data banks under Hydrology Project in peninsular India..

- CWC has sent the base papers on the action points to the State Governments to take appropriate action and incorporate provisions in the State Water Policy suitably. The base papers as mentioned above, will serve as guidelines for the states.

- MoWR has constituted a `Core Group' under the chairmanship of Member(WP&P), CWC with the view of promoting benchmarking of irrigation projects in the States/UTs by way of providing guidance, developing methodology, evolving work programme, co-ordinating activities and extending assistance in other related aspects of benchmarking. Technical and financial assistance is being provided by the MoWR and CWC to promote this activity. Four meetings of the `Core Group' have been convened so far. As per the decision taken in the third meeting of `Core Group', all states/UTs have been requested to initiate benchmarking of irrigation systems at least with one irrigation system in their States/ UTs.

  As per provision in the Plan Scheme titled "Impact Evaluation and Benchmarking of Irrigation Systems in India", four National Level and twenty Project Level Workshops on Benchmarking of Irrigation Projects are to be conducted during the X Five Year Plan. First National Levels Workshop on Benchmarking of Irrigation System in India under this scheme was jointly organized by North Eastern Regional Institute of Water & Land Management (NERIWALAM) and CWC during 29-30th October 2003 at Tezpur (Assam). Another workshops was conducted at Bhubaneswar during February 2004.

- Draft Dam Safety Act, 2002 duly approved by MOWR has been circulated to States for enacting legislation in respective Assemblies. Once this is done, legislation in the Parliament at the centre can be taken up. The States are being pursued and reminded to enact the legislation at the earliest. Secretary, MOWR had taken the meetings with various Secretaries of States during Aug/ September, 2003 and requested for speedy legislation. The response in clear terms has not been received from any state.

- A Group of Experts in the Ministry of Water Resources under the Chairmanship of Additional Secretary, Ministry of Water Resources with Chief Engineer (BPMO), CWC as member-secretary was constituted to examine the various issues relating to Public Private Partnership in Water Resources Management. The terms of reference of the Committee are as follows:

  i) To frame guidelines for implementation of water resources projects by the Public-Private Partnership.
  ii) To identify the areas/ projects in which Public- Private Partnership could be implemented.
  iii) To work out details of incentives for private sector participation.
  iv) Major clearances required both statutory and non statutory, and clearing authorities.
  v) To work out procedures for clearance of projects to be taken up by the private sector.
  vi) To suggest structures of water charges and its collection.

The Group has held four meetings so far and is in the process of finalizing its report.

4.4 NATIONAL WATER BOARD

To review the progress achieved in the implementation of the National Water Policy and to report the progress to the National Water Resources Council from time to time, the Government of India has constituted a National Water Board in September 1990 under the Chairmanship of Secretary (WR). The Secretaries of some concerned Union Ministries, Chairman (CWC) and Chief Secretaries of State / Union Territories are its Members and Member (WP&P), CWC is the Member-Secretary. The organizational structure of Board is shown in Fig. 4.2.

The Board has held eleven regular and two special meetings so far. In the 11th meeting of the Board held on 14th August 2002, the main agenda items for the discussion were draft Action Plan for Implementation of National Water Policy – 2002, draft National Policy Guidelines for Sharing/Distribution of Waters of Inter State Rivers amongst States and River Basin Organisations. Regarding draft National Policy Guidelines for Sharing/Distribution of Waters of Inter State Rivers amongst States, the Chairman, National Water Board decided to form a working group under the Chairmanship of the Chairman, Central Water commission with the Chief Engineer (IMO), CWC as Member Secretary. The representatives from eight states namely Punjab, Rajasthan, Andhra Pradesh, Karnataka, Bihar, Chhattisgarh, Madhya Pradesh, and Tamil Nadu are its members. The working group is to examine draft National Policy Guidelines for Sharing/Distributions of Waters of Inter State Rivers amongst states taking in to consideration views of all states and come up with draft guidelines. There were two meetings of Working Group on 31st May, 2003 and 18th December, 2003. The draft National Policy Guidelines have been circulated to States for getting their comments/views. The draft National Policy Guidelines is under finalization.

4.4.1 River Basin Organisation

National Water Board formed a Committee on River Basin Organisation, under the Chairmanship of Additional Secretary, MoWR with Commissioner (PP), MoWR as Member Secretary. The representatives from eight states namely Maharashtra, Tamil Nadu, Uttar Pradesh, Jharkhand, Madhya Pradesh, Gujarat, West Bengal and Orissa are its members. The Committee is to deliberate upon the mechanism for working out in detail, the model(s) of RBOs appropriate for meeting the objectives of sustainable and optimal development of water resources of the country. The Committee has held three meetings on working out the model framework of establishing RBOs. A national seminar on RBOs, was held by NWA and IWRS at Pune in July 2003 and another one on same subject was organized by MoWR on 27-28th January 2004 at New Delhi.

4.5 INTER–BASIN TRANSFER OF WATER & INTERACTION with NWDA

The National Water Development Agency (NWDA) is engaged in carrying out water balance studies, link canal studies for diversion of surplus waters to water deficit areas including inter-basin transfers and field surveys and investigations for preparation of feasibility reports of the link canals for water resources development with a national perspective. The various reports prepared by the NWDA are examined in CWC with regard to methodology of the studies, inter-State angle etc.

Chairman, Member (WP&P) and Member (D&R), CWC are Members of Society and Governing Body of NWDA.

4.6 PILOT STUDY "INTEGRATED RIVER BASIN PLANNING & MANAGEMENT – A DEMONSTRATION STUDY ON SABARMATI RIVER BASIN UNDER HYDROLOGY PROJECT"

A pilot study namely, "Integrated River Basin Planning & Management – A demonstration study on Sabarmati River Basin (Gujarat portion)" using RIBASIM software (developed by DELFT Hydraulics, Netherlands) leading establishment of Decision Support System for analyzing various developmental and management issues has been carried out jointly by Water System Engineering Dte., BPMO, CWC and Narmada Water Resources, Water Supply and Kalpser Deptt, Govt. of Gujarat. The study was carried out under Hydrology project-I funded by the World Bank. The study has provided exposure and experience in the use of modeling tools (Decision Support System) in studying the various developmental possibilities/ prioritization with respect to a set of objectives taking into account the physical and managerial opportunities, constraints and limitations and for assessing impact of any new infrastructure, operational and demand management measures of the basin. The study has been completed and the report on the study is under printing.

4.7 PODIUM MODEL

4.7.1 Introduction

Podium is a policy dialogue model, which has been developed by International Water Management Institute, Colombo, Sri Lanka and Central Water Commission, India. The present model predicts based on "what if

Analysis" about the food grain requirement, water requirement, water balance situation and availability or deficit of surface water and ground water in the year 2025 based on 1995 data. The model can be suitably rectified if the prediction is to be made for other year with other base year data. As most of input data are available for the year 1995 and some predictions are available for the year 2025, the model has been framed accordingly. For making the prediction for 2025 certain assumptions like population growth, per capita cereal intake, irrigated areas, rainfed area, etc. have been made. The main objective of the model is to create various scenarios of food grain requirements, water requirement and water balance situations based upon various assumptions e.g. if populations growth rate comes down to 1.8% then what will be the surface water situation in 2025, if the irrigated area is increased by about 20% then what will be the situation, if yield increases with the help of Biotechnology then what will happen. The user can also carry out sensitivity analysis by exploring various available options. In the model the unit for analysis is a sub-basin or a basin, even though analysis can be done based on administrative boundaries i.e. state-wise.

4.7.2 Main Contributions of CWC in modification of PODIUM software developed by IWMI, Colombo

1. The model `PODIUM for India" had the facility of operating it state-wise only. The model was modified to operate basin wise as well as state wise. Maximum sixty river basins can be analysed in the model. For each river basin five scenarios can be saved at a time in the model.
2. Initially model was considering only one crop season in a year, which was a major shortcoming in the Indian context. Now the model can take into account two crop seasons. Further, it can also take into account the perennial crops like sugarcane etc.
3. The percolation losses due to Paddy, Recharge of Ground water have been accounted for in the model.
4. The Return flow into the rivers from various uses has been suitably accounted for.
5. The evaporation from reservoirs, which was taken up lumpsum in the model, has now been computed based on the percentage of live storage in the reservoirs.
6. At the National level cereal requirement were computed based on daily calorie intake per capita. The food grain requirements are now computed based on food grain requirements in grams/ day/ capita.
7. The model has also been improved with inclusion of the quantity of water required for non-consumptive use viz. navigation, environmental and ecological purposes etc. so as to know the total water balance in the basin/ state.
8. The basin wise water summary has been incorporated to indicate the surpluses/ deficits of water in the region.
9. The following graphs have been incorporated in the model.
    a) Pie-diagram showing sectoral water requirements in 1995 and 2025.
    b) Bar diagram showing water availability and use along with the water surplus or deficit in the basin for surface as well as ground water.

c) Pie diagram showing percentage of water use for various purposes viz, agriculture, domestic, industrial and evaporation from reservoirs.

10. Earlier it was not possible to make changes in already created scenarios and to delete it. Now it has become possible to make any changes in already created scenarios and even it can be deleted.
11. Now the data can be entered directly in the data sheets from any other MS Excel sheets. Earlier it was not possible.

During the year, the above activities were further carried out.

4.7.3 Use of Podium Model

- The PODIUM model is very useful for any kind of study related with river basin management.
- Model can be used by Politicians, Administrators, Policy makers and Researchers.
- Very useful tool for making long term Policy decisions to meet the demand of people.
- Model can help the Policy makers in assessing the various needs of the growing populations.
- Policy makers can evaluate various available options to □ulfil the demand of society.
- Permutations and combinations of various options can be evaluated with the help of model.

4.7.4 Country Policy Support Programme (CPSP)

CPSP was launched by International Commission of Irrigation and Drainage (ICID) in July 2002 and five countries namely, India, China, Pakistan, Turkey & Brazil have been identified for the studies. The CPSP is now being carried out in India and China through the national committees of ICID. CPSP is meant for serving as a support programme for guiding the water related polices in three sectors viz. food, people and nature in an integrated manner. The aim of CPSP is being realized through compilation and updation of knowledge base, assessment of water requirements in two sample river basins, use of integrated models like PODIUM, holding of broad based consultations at basin and at national levels, and high level policy meetings with the Govts and funding institutions for implementation of policy. In India, two sample river basins viz. Sabarmati (Gujarat) in west coast and Brahmani (Orissa) in east cost were selected for the detailed assessments. The Brahmani basin is rich in water resources while the Sabarmati basin is a water deficit basin having intensive agricultural and industrial development. The study of Brahmani and Sabarmati basins were completed using PODIUM model and the reports are under finalization.

4.7.5 DOMESTIC WATER REQUIREMENT AND ITS AVAILABILITY IN URBAN AREAS

On the request of Ministry of Urban Development, a Steering Committee under the chairmanship of Secretary (Water Resources) was constituted by the Ministry of Water Resources in 2001 for estimation of the

domestic water requirements of the population in all the urban areas with population exceeding one million as well as identification of the water resources, which could be tapped to meet the demand of these areas. Chairman, CWC is the Co-Chairman of the Steering Committee and Chairman, CGWB; Member (RM); CWC; Joint Secretary (UD), MOUD; Advisor (CPHEEO), MOUD; Director (NIH), Director (HUDCO) and Commissioner (PP), MOWR are the Members and Chief Engineer (BPMO), CWC is the Member Secretary of the Committee. The Regional Committees under the chairmanship of Regional/Field Chief Engineers of CWC consisting of Regional Director, CGWB, Chief Engineer (Major/Medium Irrigation) of State Governments, Chief Engineer (PHED) of State Governments as members and Director of the Regional Office of CWC as Member-Secretary were also constituted to assist the Steering Committee in preparation of the status Report. 35 Urban Agglomerations (UAs)/Cities having population of more than one million as per the Census 2001 were identified for preparation of the status report.

By the end of the financial year 2003-2004, 26 reports received from the Regional Committees were sent to MoWR.

NATIONAL WATER RESOURCES COUNCIL

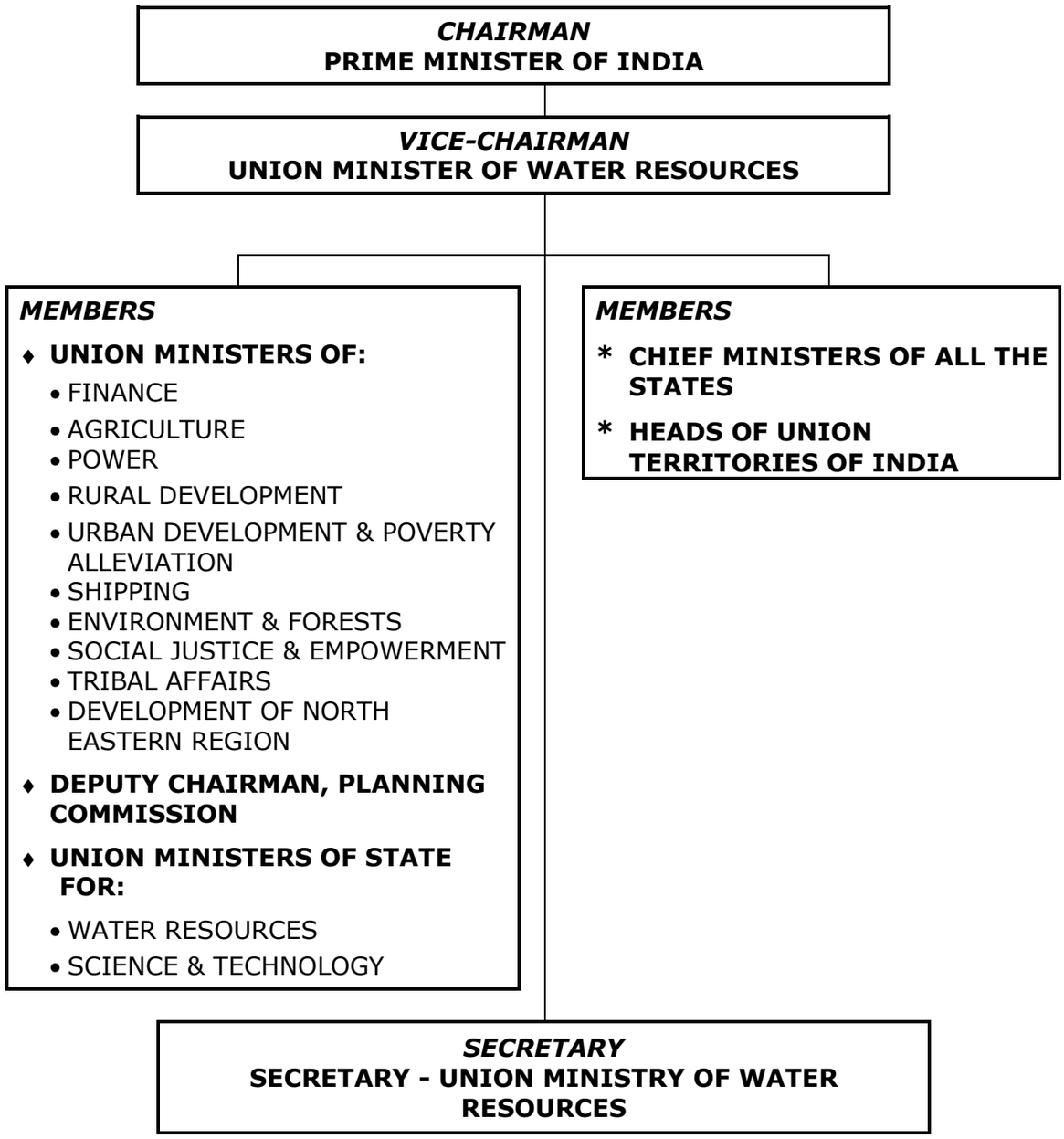


Fig. 4.1

NATIONAL WATER BOARD

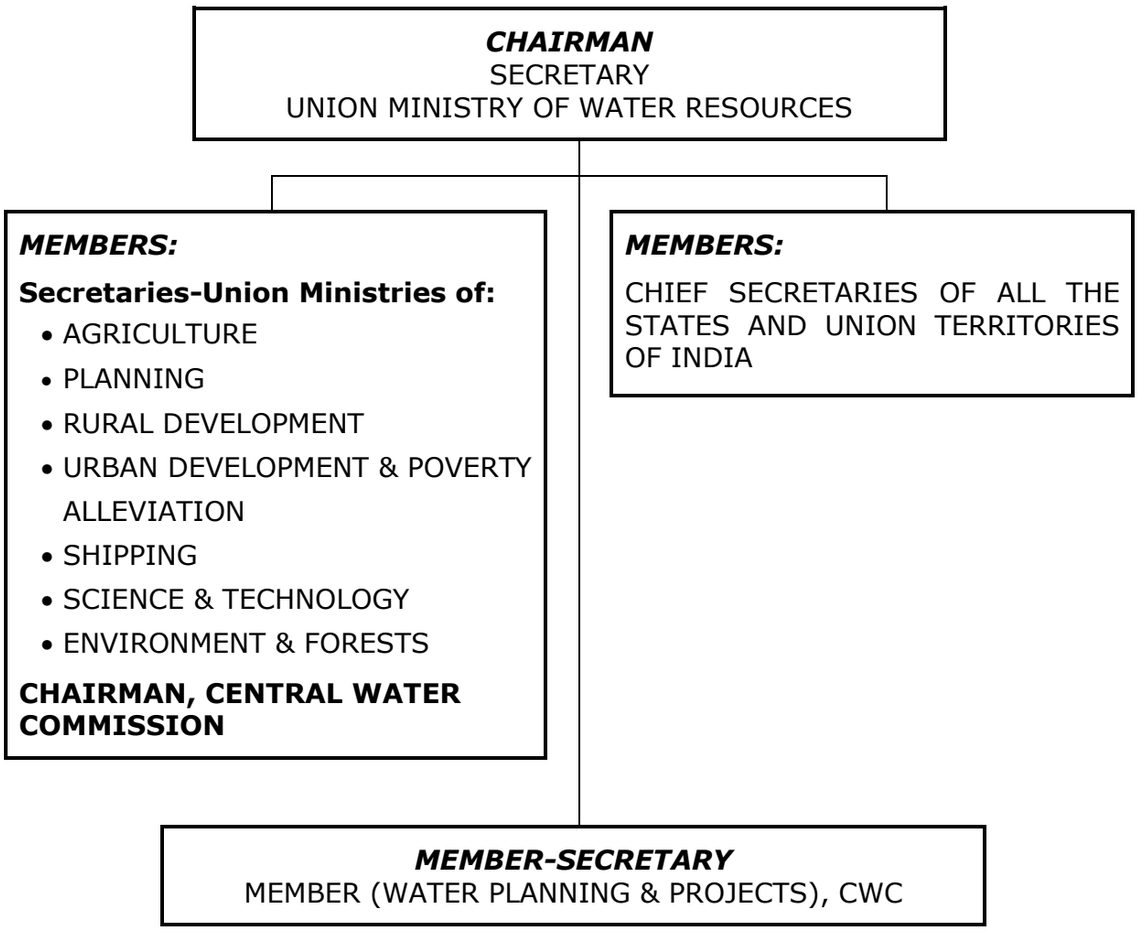


Fig. 4.2

CHAPTER–V

DESIGN & CONSULTANCY

5.1 GENERAL

Design and Research wing plays a pivotal role on design and consultancy of water resources projects at Central Water Commission. Apart from technical appraisal of water resources development projects prepared by different agencies, various units of the wing are actively associated with Design Consultancy, Technical Studies, Design & Research and Development Activities in the water resources sector and river valley projects.

Major activities of D&R wing include:

1. Appraisal of Multipurpose river valley projects.
2. Planning and Design of hydraulic structures of water resources projects.
3. Hydrological studies;
4. Review and planning of safety aspects of dams and Monitoring; and
5. Coordination of Research, development and training.

5.2 DESIGN OF HYDRAULIC STRUCTURES

D&R wing is actively involved in the design of almost all the major water resources projects either through consultancy or during the process of technical appraisal.

Following four design units have been established to cater to specific requirements and to attend to special design related problems of different regions.

1 .Design (North & West) unit

2. Design (North - West & South) unit

3. Design (East & North East) unit

4. Design (Narmada Basin)

Each of the units have specialised Directorates such as Hydel Civil Design (HCD), Concrete & Masonry Dam Design (CMDD), Embankment Design (ED), Gates Design (GD) and Barrage and Canal Design (BCD) etc.

5.2.1 Project Appraisal

Design aspects in DPRs of 123 projects submitted by various State Governments and other agencies were technically examined in D&R Wing during the year 2003-04. This includes one project each from Nepal & Myanmar and two projects from Afghanistan.

5.2.2 Detailed Design and Preparation of Drawings

Design units of CWC carried out designs in respect of 117 projects during the year 2003-2004 as per details given below:

S No.	Category	No. of Projects
1.	Projects at construction stage.	64
2.	Projects at investigation and planning stage (for which detailed project reports are being prepared)	41
3.	Projects with special problems	12

State-wise break up of all the 117 projects is shown in Fig. 5.1 and list of Projects is in Annexure 5.1.

Some of the prestigious/important projects, which are presently being designed/handled in D&R wing, are as follows:

i) Pancheshwar Multipurpose Project & Poornagiri Re-regulating Project (Indo – Nepal)

Under the Indo-Nepal bilateral co-operation, the scope of Pancheshwar multipurpose project is being actively discussed and defined to enable finalisation of the Detailed Project Report. The treaty between His Majesty's Government of Nepal and Government of India as signed in 1996 lays down the framework for integrated development of the Mahakali River including Pancheshwar Project, Sarda Barrage Project and Tanakpur Barrage Project. Several meetings of the Joint Group of Experts took place afterwards. DPR Chapters and Drawings have been prepared.

The Pancheshwar project also envisages a re-regulating dam for which two alternatives viz. at Poornagiri and Rupaligad were considered. In the Nepalese DPR, the Re-regulating Project has been proposed at Rupaligad, which was not favoured by Indian side initially. Instead, the India side had proposed Poornagiri as the Re-regulating Project (1020 MW). This has been reviewed in the Ministry of Water Resources and it has been decided to consider both the alternatives. Geo-physical investigations for Rupaligad Project are to be carried out and the DPR will be prepared after receipt of the results of geo-physical investigations. However, draft DPR has been prepared taking Re-regulating dam at Poornagiri.

ii) Tala HE Project, Bhutan.

The project envisages construction of a 91m high and 130m long diversion dam across river Wangchu near Honka 3 km down stream of the existing Chukha H.E. Project to divert 142.5 cumec of water into 22.40 km long head race tunnel to generate 1020 MW (6 x 170 MW) power under a design head of 820 m. CWC is the design consultant for specification/construction stage works. The excavation/construction of all civil components of the project are in full swing and the necessary design and drawings for the same are being issued to the project authorities as per site requirements.

iii) Nathpa Jhakri HE project

Nathpa Jhakri HE project a run-off scheme with an installed capacity of 1500 MW (6 units of 250 MW each) in Himachal Pradesh is a Joint Venture between Government of India and HP.

The project is currently under construction. It comprises of 60.5 m high concrete dam on Sutlej river at Nathpa. The length of dam is 185.45m. It has many unique features including the construction of a huge underground desilting complex with 4 chambers (525m. long, 16.31 m. wide and 27.5m. deep) and head race tunnel of 10.15 m. diameter and 25.3 km long.

Central Water Commission is the principal consultant and also provided design and drawings for a few important structures. Member (D&R) is a member of Board of Directors of NJPC (JVSNL). The project is externally aided by World Bank. This project was dedicated to the nation on 14th October, 2003 with the commissioning of its 1st unit of 250MW. Other 5 units of the project are scheduled to be commissioned by June, 2004.

Examination of plugging of Adit-II of Nathpa Jhakri H.E. Project (HP) and plug details with access arrangements from Chamber- III to Chamber-IV have been carried out.

iv) Western Yamuna Canal Hydro Electric Project (Stage II) – Haryana

Western Yamuna Canal Hydro Electric Project (Stage II) envisages utilisation of a drop of 10.5 m. to generate 16 MW of power. A power house is being constructed at RD 1235 of power channel having a length of 2510 m. The discharge of 202.5 cumec is utilised for power generation. The power channel is diverted at 70 degree from left bank of Western Yamuna Canal. All the construction drawings have been prepared in D&R wing. The project is likely to be commissioned shortly.

v) Tehri Dam Project

Tehri Dam Project is the first multi-purpose river valley project taken up for construction on river Bhagirathi to tap its vast potential and is being executed by Tehri Hydro Development Corporation (THDC). It envisages construction of a 260.5m high earth and rock fill dam which would be the fourth highest dam in the world. The design engineering and consultancy including construction drawings for dam and various spillway components like Chute Spillway, Left and Right Bank Shaft Spillways etc. are being handled in D&R wing. An inspection gallery has been provided in the core of fill dam joining left and right abutments, which is an unique feature in fill dam undertaken for the first time in India. The original design of this gallery as per a Russian Design by HPI, Moscow was reviewed and modified construction drawings have been issued.

Member (D & R), CWC is a member of the Board of Directors of THDC and Chief Engineer (N&W) represents CWC as an Expert in Technical Advisory Committee of THDC.

vi) Indira Sagar Project

Indira Sagar is a multipurpose project on the Narmada river near Punasa Village, district East Nimar (Khandwa) in Madhya Pradesh. The Project envisages construction of a 92m high and 653m long concrete gravity dam with a surface power house of 1000 MW installed capacity (8x125MW) and a 249 km long canal to provide irrigation in 1.23 lakh ha of C.C.A. in the districts of Khandwa & Khargone. On completion, a reservoir of 9.75 BM^3 live storage capacity will be created. The consultancy for Dam, Power House, Control structure/Head Regulator (Punasa facilities) and 3 x 5 MW Canal Head Power House have been provided. The designs/drawings stand completed as on 29.2.2004.

vii) Sardar Sarovar Project

Sardar Sarovar project envisages construction of 1210m long, 163m high (above deepest foundation level) concrete gravity dam across the river Narmada, two power houses with total installed capacity of 1450 MW and 458 km. long Main Canal which envisages irrigation for 17.92 lakh ha and drinking water to 8215 villages and 135 urban centres. Consultancy for complete planning, design and construction drawings for both river bed and Canal Head Power Houses, is being provided by Narmada Basin Project Unit. The design and drawings are targeted to be completed by March'2005. Narmada Basin Project Unit is also associated with monitoring of the progress of construction of RBPH as per Revised Implementation Schedule (RIS 2000), through identifying bottlenecks and suggesting remedial measures.

viii) Koteshwar HE Project (Uttaranchal)

Koteshwar HE project is an integrated part of Tehri Power Complex. The project envisages construction of gravity dam across Bhagirathi River and a surface power house with an installed capacity of 4x100 MW. The powerhouse will be located on the right bank of the river near village Pindaras of Tehri District. The reservoir created by Koteshwar dam shall also act as a lower reservoir for a pumped storage scheme as well as balancing reservoir for Koteshwar Hydel scheme.

D&R wing provides design consultancy in respect of main concrete dam, saddle dam, river bed power house and canal head power house including intake and tail race etc.

ix) Tehri Pumped Storage Scheme (4x250 MW) Uttaranchal

Tehri Pumped Storage scheme has been envisaged to generate 1000 MW of peaking power for enhancing system reliability and also to provide balancing load to the thermal base generation during off peak hours. The reservoir created by the Tehri Dam would function as upstream reservoir for this Project, while Koteshwar Dam reservoir shall be the lower reservoir. D&R wing is extending technical support right from its formulation stage as a retainer consultant.

5.2.3 Water Resources Development Projects in North Eastern Region

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

At present, there are 9 projects at construction stage for which design consultancy is being provided by D&R wing of CWC. In addition, there are 16 projects for which Detailed Project Reports (DPR) are under preparation.

Detailed hydrological studies and design works in respect of these projects are in progress in D&R wing as per the list as given below:

A. Arunachal Pradesh

1. Deopani Multi Purpose Project
2. Jiadhal H.E. Project
3. Nuranang Chu Chu Project
4. Tawang Chu H.E. Project
5. Nyukcharong Chu Project
6. Dibang Multipurpose Project
7. Siang Middle Project

B. Assam

8. Harang Sub-basin Drainage Scheme - Construction Stage
9. Karbi Langpi HE Project - Construction Stage
10. Kulsi Dam Project
11. Lohit Dam Project
12. Pagladia Irrigation Project - Construction Stage

C. Manipur

13. Khuga Multipurpose Project - Construction Stage
14. Thoubal Multipurpose Project - Construction Stage

D. Meghalaya

15. Greater Shillong Water Supply Scheme - Construction Stage
16. Jadukata Dam Project (Stage-I & II)
17. Myntdu HE Project - Construction Stage

E. Mizoram

18. Kolodyne HE Project Stage - I - Construction Stage
19. Kolodyne HE Project Stage - II
20. Tuirini HE Project
21. Tuivawl HE Project

F. Sikkim

22. Teesta HE Project Stage – II
23. Teesta Low Dam Project Stage –IV
24. Rangit H.E. Project Stage - II

G. Tripura

25. Kalasi Barrage - Construction Stage

Under the 50,000 MW initiative launched by the Prime Minister, Pre-feasibility Reports for potential projects in various parts of North East were under preparation by various consultants appointed by CEA. CWC is playing a major role in the preparation of these reports by way of hydrological studies, project layout etc.

5.3 HYDROLOGICAL STUDIES

CWC has carried out hydrological studies in respect of almost all the projects in the country. At present studies in respect of 29 projects are in hand.

Hydrological Studies Organisation (HSO) has come up with Indian version of regional models for rational estimation of design flood. Sub-zonal reports for estimating design flood for use in areas with insufficient hydrological and hydrometeorological data have been brought out by CWC which are extensively used by various state Governments and Central Government Department/Organizations.

HSO provided assistance to the Govt. of Rajasthan in the review studies of design floods for various projects identified for rehabilitation under Rajasthan Water Sector Restructuring Project.

5.3.1 Development of flood estimation model for ungauged catchment

The economic and time constraints do not allow the water resources planner to collect hydro-meteorological data at all locations. The small and medium catchments where cross drainage structures Roads & Railway bridges, minor hydraulic structures are planned needs estimation of design flood. HSO has come up with Indian version of regional models for rational estimation of design flood. Such models are available for 23 sub-zones out of 26 sub-zones into which the country has been divided. These models are updated time to time with the availability of additional data.

a) Two such reports in the Lower Narmada and the Tapi Sub zone 3(b) and the Upper Narmada Sub zone 3(c) were revised during the year.

b) Data is being collected for the Barak Sub zone 2 (c) for which no report has been prepared so far. The model studies have been taken up.

5.3.2 Preparation of PMP Atlas

The preparation of PMP Atlases for Ganga, Brahmaputra & Barak, Indus and Krishna Basins are being taken up through consultants. The work of Krishna and Indus Basins have been awarded to the Consultants.

5.4 REVIEW AND PLANNING OF SAFETY ASPECTS OF DAMS

Chief Engineer (Dam Safety Organization) is looking after issues related to Dam Safety and is dealing with:

- Instrumentation in Dams and Power House Caverns besides other hydraulic structures.
- Special Analysis like Dam Break Modelling and foundation problems.
- Computer Aided Design and Special Analysis.
- Monitoring and Rehabilitation of Large dams.

5.4.1 Dam Safety Assurance and Rehabilitation Project [DSARP] – Phase II

After seeing the performance and benefits obtained from the Dam Safety Assurance and Rehabilitation Project which was assisted by the World Bank (Credit 2241-IN), it was proposed to extend the dam safety activities to the other States owning significant number of large dams. Based on the details received from the 11 participating States namely Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Kerala, Maharashtra, Tamil Nadu, Uttar Pradesh, Uttaranchal and West Bengal, a scheme has been prepared for an estimated cost of Rs. 718.99 crore and submitted to MOWR for taking up with the World Bank. The proposal has been cleared by Planning Commission and DEA and sent to the World Bank for consideration.

In addition to above proposal, following three Plan Schemes have been approved by the Ministry of Water Resources and are in operation under Dam Safety Organization:

i) "Up gradation of facilities & skills in CWC regarding Dam Safety & Rehabilitation in India". Approved for Rs 8.00 crore.
ii) "Setting up of specialized units HE Designs, Pumped Storage and Instrumentation." Approved for Rs. 2.99 crore.
iii) "Up gradation & Modernization of Computerization/Information System". Approved for Rs. 12.00 crore.

The Central Water Commission would expand its existing responsibilities in dam safety monitoring, including training programmes, hydrologic analysis and modernization.

5.4.2 Dam Safety Act

The draft Dam Safety Act was circulated to various State Governments and the matter was pursued with the States to bring in the legislation at the earliest. Maharashtra and Bihar had informed that the act was under active consideration of the respective Governments and will be shortly introduced in the legislature for passing.

Government of Kerala has recently passed an act titled "The Kerala Irrigation and Water Conservation Act – 2003" to consolidate and amend the laws relating to construction of Irrigation works, conservation and distribution of water, etc. This was examined with reference to the Dam Safety issues.

5.4.3 Technical examination of seismic and foundation aspects of river valley projects

15 river valley projects were techno- economically appraised with respect to foundation engineering and seismicity aspects.

5.5 SPECIAL STUDIES

- Dam Break Analysis is carried out to prepare the inundation map and disaster management plan in the unlikely event of dam failure. It estimates the maximum water level along the river channel downstream of the dam in the event of hypothetical failure of the dam. During the year, the dam break study for Rami Irrigation Project, Gujarat, Phulwaria Dam, Bihar and Tipaimukh H.E. Project, Manipur has been completed and study report sent to project authorities concerned for formulation of disaster management plan accordingly.
- The seepage and settlement problems of Ranjit Sagar Dam (Punjab) were examined and suggestions / comments were offered to the project authorities.
- FEM analysis for sluice liner design of Wangkha dam completed for Tala HE Project, Bhutan.
- The adverse impact of Omkareshwar Project on the functioning of slotted roller bucket of Indira Sagar Project as informed by Dr. Y. K. Murty, Consultant, World Bank was studied in detail with the help of Model Study Reports, Dam Review Panel Reports and Design Calculation and a note on the same has been sent to Ministry of Water Resources.
- Structural rehabilitation of 91m high Rihand Dam has been referred to Central Water Commission. Chief Engineer, Design (N&W) is a member of the Structural Behaviour Monitoring Committee. Preparatory works are in progress.

5.6 CENTRAL WATER COMMISSION LIBRARY

Library & Information Bureau, CWC is one of the most prestigious technical reference library on the subject of Water Resources Engineering and other related allied subjects with huge collection of more than one lakh books and over 2.5 lakhs technical journals on account of subscription to most of the reputed international and national journals.

In order to continually improve the facilities available to the users, the following activities are being undertaken:

a. Construction of CWC Library Building has been taken up through CPWD at R.K. Puram, New Delhi. The new building has adequate provisions for display, reading rooms and stack-rooms alongwith auditorium and space for seminars/meetings etc.
b. CWC Library was recently upgraded from Category II to Category III and placed under the charge of a professional librarian, namely Library & Information Officer.
c. CWC Library was computerised by M/S C-DAC, as a part of Plan Scheme "Upgradation & Modernisation of Computerisation/Information System", which will provide intranet/internet based on-line facilities such as search of subject/title/keyboard/author, issue status, return schedule and other reference services etc.

LIST OF ACTIVE CONSULTANCY PROJECTS IN D&R WING DURING 2003-04

ANDAMAN & NICOBAR

1. Choudhary Nallah Project
2. Indira Nallah Water Supply Scheme.
3. Kamsarat Water Supply Scheme

ANDHRA PRADESH

4. Medapalli Flood Protection Scheme
5. Kinnerasum Dam
6. SRBC Owk Reservoir Complex
7. Srisailam Left Bank H.E Project

ARUNACHAL PRADESH

8. Dibang Multipurpose Project
9. Deopani Multi Purpose Project
10. Jiadhal H.E. Project
11. Nyukcharong Chu H.E. Project
12, H.E. Projects on Nuranang Chu
13. H.E. Projects on Tawang Chu
14. Siang Middle Project
15. Sissiri M.P. Project
16. Subansiri Lower H.E. Project

ASSAM

17. Harang Sub-basin Drainage Scheme
18. Kulsi Project
19. Pagladia Dam Project
20. Lohit Dam Project
21. Karbi Langpi H.E. Project

BIHAR

22. Durgavati Reservoir Scheme
23. Eastern Gandak H.E. Project
24. Sone Western Link Canal
25. Dehri-on- Sone H.E. Project.

CHHATTISGARH

26. Matnar H.E. Project
27. Mongra Irrigation Project

GUJARAT

28. Sardar Sarovar Project
29. Daulatpura Weir of Kadana H.E.Project

HARYANA

30. Hathnikund Barrage
31. Western Yamuna Canal Project Stage - II
32. Gosunda Dam Project

HIMACHAL PRADESH

33. Largi H.E. Project
34. Nathpa Jhakri Power Project
35. Shah Nehar Irrigation Project

JAMMU & KASHMIR

36. Igo, Mercellong HE Project
37. Kirthai HE Project Stage – I
38. Kirthai HE Project Stage - II
39. Mohra H.E. Scheme
40. Ujh Level Crossing

41. Re-regulating Basin USHP

42. Lower Jhelum H.E. Project

43. Parnai HE Project

JHARKHAND

44. Amanat Barrage

45. Garhi Reservoir Project

46. Gumani Barrage

KARNATAKA

47. Danimalai Tailing Dam

48. Kudremukh Iron Ore Project-Lakhya Dam

MADHYA PRADESH

49. Bansagar Project

50. Bansagar Canal Project

51. Hasdeo Barrage

52. Indira Sagar Project

53. Rajiv Sagar Project

54. Jobat Project

55. Kutni Feeder Reservoir Project

56. Mahi Susidiary Dam

57. Mahi Main Dam

58. Mahan (Gulab Sagar) Project

59. Upper Beada Project

60. Lower Goi Project

61. Malanjkhad Project

62. Pillowa Dam Project

63. Rajghat Dam Project

64. Rajghat Canal Project (Bhutan Barrage)

65. Sagar Water Supply Project

66. Rani Awanti Bai Sagar Project (Bargi Dam)

67. Sindh Project Phase-II (Medikheda Dam)

68. Sindh Project Phase-II (Mohini Pick up Weir)

69. Tawa Dam

70. Tigra Dam

71. Man Project

MANIPUR

72. Khuga Multipurpose Project

73. Thoubal M.P. Project

MEGHALAYA

74. Greater Shillong Water Supply Scheme

75. Myantdu H.E. Project

76. Jadukata Dam Project (Stage-I)

77. Jadukata Dam Project (Stage-II)

MIZORAM

78. Kolodyne HE Project

79. Kolodyne HE Project Stage - II

80. Tuirini H.E. Project

81. Tuivawl H.E.Project

NAGALAND

82. Doyang HE Project

83. Diku Project

ORISSA

84. Naraj Barrage Project

85. Upper Indravati HE Project

86. Barsua Irrigation Scheme

87. Barsua Tailings Dam

PUNJAB

88. Ranjit Sagar Dam

RAJASTHAN

89. Mansi Wakal Project

90. Bisalpur HE Project

91. Panchana Dam Project

SIKKIM

92. Teesta Low Dam Project Stage IV

93. Teesta H.E. Project Stage II

94. Rangit H.E. Project

TAMIL NADU

95. Pykara Ultimate HE Project

96. Kadam Parai H.E.Project

TRIPURA

97. Kalasi Barrage

UTTAR PRADESH

98. Rihand Dam Project

UTTARANCHAL

99. Tehri Dam Project
100. Koteshwar H.E. Project

WEST BENGAL

101. Farakka Barrage Project

PROJECTS IN NEIGHBOURING COUNTRIES

BHUTAN

102. Rehabilitation of Mini Hydel Schemes

103. Tala HE Project

NEPAL

104. Pancheshwar Multi Purpose Project.

105. Saptakoshi Multipurpose Project

SPECIAL PROBLEMS

ANDHRA PRADESH

106. Tungabhadra Canal

JAMMU & KASHMIR

107. Lower Jhelum H.E. Project

108. Baglihar H.E. Project

109. Upper Sindh H.E.Project

JHARKHAND

110. Gumani Barrage

MADHYA PRADESH

111. Bansagar Project

112. Gulab Sagar Project

113. Sindh Phase – II

114. Shaheed Chandra Shekhar Azad Sagar Pariyojna

115. Indira Sagar Project

UTTAR PRADESH

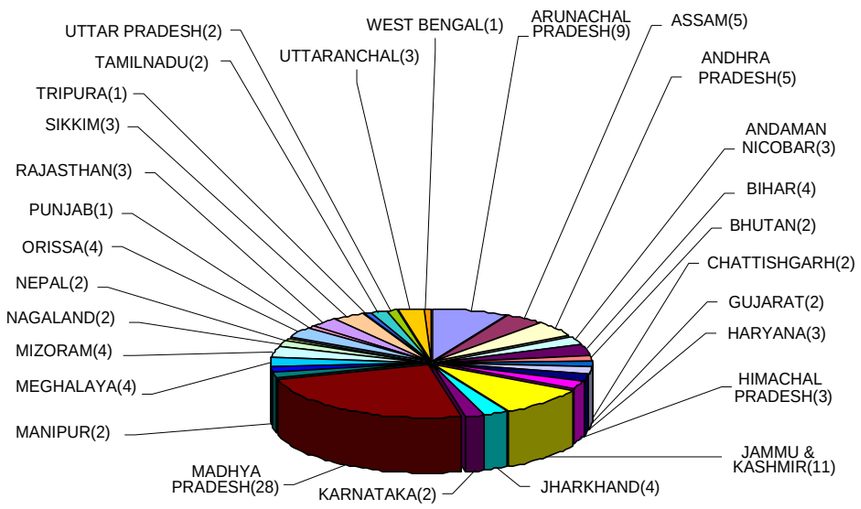
116. Rihand Dam Project

UTTARANCHAL

117. Maneri Bhali H.E. Project

Fig. 5.1

CONSULTANCY PROJECTS IN D&R WING



CHAPTER-VI

WATER MANAGEMENT, RESERVOIR SEDIMENTATION & POST PROJECT EVALUATION

6.1. MONITORING OF RESERVOIR STORAGE

During the year 2002-2003 Central Water Commission monitored storages of 70 important reservoirs of the country having total live storage capacity of 130.553 BCM. In the year 2003-04 Almatti reservoir in Karnataka was included in the monitoring system of CWC, making total number of monitored reservoirs to 71. The FRL capacity of 25 reservoirs from among the list of 70 reservoirs was also revised. Thus the total designed live capacity at FRL in the year 2003-04 including Almatti and considering revised FRL capacity of 25 reservoirs became 131.28 BCM.

Table 6.1
Storage status of current year vis-à-vis previous year

Description			Water Year	
			2002-03	2003-04
Number of Reservoirs			70	71
Total Designed live storage in BCM			130.553	131.28
Actual Storage	On June, 1 *(start of water year)*	In BCM	15.697	14.299
		In % of storage at FRL	12%	11%
		In % of 10 Years Avg. Storage	67%	64%
	On Sept, 30 (*End of Monsoon Period*)	In BCM	66.39	78.75
		In % of storage at FRL	51%	60%
		In % of 10 Years Avg. Storage	68%	81%
	On May, 31st *(end of Water Year)*	In BCM	14.552	16.834
		In % of storage at FRL	11%	13%
		In % of 10 Years Avg. Storage	64%	77%

54 additional reservoirs each having storage capacity of 0.250 BCM or more were identified for inclusion in the monitoring system. The proposal, when implemented, would bring the total no. of reservoirs under monitoring to 125 with combined storage capacity of 156.69 BCM which is about 74% of the total capacity of 213 BCM created so far. Efforts were being made to collect requisite information from state/project authorities to bring these projects under monitoring system of CWC.

A bulletin on the status of reservoir storages was issued every week. The weekly bulletin contained current storage position vis-à-vis storage status on the corresponding day of the previous year and average of last 10 years on the corresponding day. The information presented in the bulletin was also used by the Crop Weather Watch Group constituted by Ministry of Agriculture for reviewing the crop planning strategy based on the availability of water in the reservoirs.

6.2 CAUVERY WATER BULLETIN:

Weekly storage position of five important reservoirs in the Cauvery basin is also monitored and a bulletin was issued every week. This bulletin incorporated the designed live storage capacity, live storage of current year, last year and average of last 10 years of the respective week in four reservoirs of Karnataka State (Kabini, Hemavathy, Harangi, Krishnaraja Sagar) and one reservoir in the state of Tamil Nadu (Mettur). Bar Charts (i) indicating Monthly / Weekly flow as per Cauvery Water Dispute Tribunal's (CWDT) award, observed flow at Billigundulu G&D site of CWC upstream of Mettur reservoir and inflow in Mettur reservoir and (ii) Combined storage position of four reservoirs in the State of Karnataka and that of Tamil Nadu were also supplemented along with the bulletin. Four such bulletins were issued every month. Special bulletins were also prepared at the time of meeting of Cauvery Monitoring Committee headed by the Secretary (WR).

6.3 RESERVOIR SEDIMENTATION

6.3.1 Hydrographic Survey of Important Reservoirs:

The scheme initiated in the VIII Plan was continued. In all, capacity survey of 19 reservoirs was carried out upto March 2003 under the scheme at a total cost of Rs. 4.26 crore. Reports of 16 reservoirs were completed in all respects and the reports of three reservoirs were carried over to the first year of X Plan for finalization.

Another SFC covering 15 more reservoirs for capacity survey during X Plan at an estimated cost of Rs. 329 lakhs was sanctioned in February 2003. Capacity Survey work in respect of three reservoirs namely Watrak (Gujarat), Warna (Maharashtra) and Ravisankar Sagar (Chhattisgarh) was taken up during 2003-04. Field survey work has been completed by the end of November, 2003. The final reports are expected in 2004-05. For balance 12 reservoirs, capacity survey has been planned during 2004-06.

6.3.2 Reservoir Sedimentation Studies using Remote Sensing

The plan scheme "Studies on reservoir sedimentation and other Remote Sensing applications" has been sanctioned by the Ministry of Water Resources as a continuing scheme of IX Plan during X Plan at an estimated cost of Rs. 1383.80 lakhs. The scheme comprises of four components and Remote Sensing Directorate is executing one of the components namely "Remote Sensing Applications in Water Resources Development and Management". The progress for the year 2003-04 upto March 2004 is as under:

- "Command Area Study of Ghatprabha project" a spillover study of IX Plan completed.
- Training Programme on Image processing and GIS fundamentals including Applications for Water Resources Development organized at RRSSC, Bangalore in October, 2003.
- During 2003-04, Sedimentation studies of 25 reservoirs using satellite Remote Sensing were taken up. Draft reports of 8 reservoirs and analysis of 3 reservoirs completed. The work for the remaining 14 reservoirs is under progress.

6.4 IDENTIFICATION OF WATERLOGGED, SALINITY / ALKALINITY AFFECTED AREAS USING REMOTE SENSING TECHNIQUE.

Two spill-over studies of IX Plan Scheme on "Assessment and monitoring of waterlogged and salinity/alkalinity-affected areas using Remote Sensing Technique" in Western Yamuna canal (Haryana), and Kosi Command (Bihar) were taken up and the final reports were received from the consultant. Copies of the reports were sent to the concerned States for taking the necessary reclamation measures against waterlogged, saline and alkaline areas as shown in the reports.

To update the status of the data of the Working Group Report, 1991, by Ministry of Water Resources, on waterlogging, salinity & alkalinity, a study on "Assessment of Waterlogged and Salinity and/or Alkalinity affected areas in irrigated commands throughout India using Remote Sensing Technique" costing Rs. 300.00 lakhs was taken up by the consultant "Regional Remote Sensing Service Centre" (RRSSC), Jodhpur. An advance payment of Rs. 90.00 lakh was made to the consultant in October, 2003 and study is under progress.

6.5 SYSTEM PERFORMANCE OVERVIEW OF COMPLETED IRRIGATION PROJECTS

CWC is carrying out Performance Evaluation of completed irrigation projects. During 2003-04, the Report on *"Performance Evaluation Study of Augasi Pump Canal Project, Banda (UP)",* which was taken up by IPO Directorate, CWC was finalized and findings circulated to the concerned Project Authorities for follow-up action and giving feed back on the corrective actions taken. Another study on the *Performance Evaluation of Gandipalem Project, in Nellore District (A.P.) w*as also taken up during 2003-04, which is under progress.

Preliminary Draft Standard on "*Guidelines for Performance Evaluation of Completed Irrigation Projects* (Major & Medium)" was prepared & sent to B.I.S..

A pamphlet on "Performance Evaluation Studies of completed irrigation projects in India" (April, 2003) was brought out on the occasion of Water Resources Day, 2003. A publication entitled "Water Around Us" was prepared to generate awareness among the people towards importance of water saving.

6.6 BENCHMARKING OF IRRIGATION PROJECTS

Benchmarking of irrigation projects is gaining momentum and CWC is playing an active role as a co-ordinator as well as a facilitator by way of providing technical support to State Governments. A Core Group for Benchmarking of Irrigation Systems in India has been set up by MOWR under the Chairmanship of Member (WP&P), CWC for this purpose. As per provision in the Plan Scheme titled "Impact Evaluation and Benchmarking of Irrigation Systems in India", four National Level and twenty Project Level Workshops on Benchmarking of Irrigation Projects are to be conducted during the X Five Year Plan. First National Level Workshop on Benchmarking of Irrigation

System in India under this scheme was jointly organized by the North Eastern Regional Institute of Water & Land Management (NERIWALAM) and CWC in October 2003 at Tezpur (Assam). Another workshop was conducted at Bhubaneswar in February 2004.

Draft Guidelines for Water Audit and Water Conservation was prepared and a National Workshop was held on in January, 2004 for finalisation of these guidelines.

6.7 SOCIO / AGRO ECONOMIC & ENVIRONMENTAL IMPACT STUDIES OF COMPLETED IRRIGATION PROJECTS:

Performance evaluation of completed projects are undertaken by CWC through consultants. It encompasses system performance, agro-economic, socio-economic and environmental impacts of completed irrigation projects. During X Plan, studies of ten completed irrigation projects are targeted to be accomplished.

Performance evaluation studies of Kanchi Weir (Jharkhand), Samrat Ashok Sagar Irrigation project (MP), Sukla Irrigation project (Assam) and Salki Irrigation Project (Orissa) were awarded to respective state WALMIs during 2003-04. Proposal for Itiadoh Irrigation Project (Maharashtra) received from WALMI, Aurangabad was under process.

CHAPTER-VII

APPRAISAL OF PROJECTS

7.1 PROJECT APPRAISAL

One of the important activities assigned to Central Water Commission is techno-economic appraisal of irrigation, flood control and multipurpose projects proposed by State Governments. This task is performed and coordinated by Project Appraisal Organisation (PAO). After establishment of techno-economic feasibility of the project, the Advisory Committee of Ministry of Water Resources (MOWR) on Irrigation, Flood Control and Multipurpose Projects headed by Secretary, Water Resources (WR) considers projects for acceptance and thereafter recommends the projects for investment clearance to the Planning Commission. Besides these, the power projects proposed by State Electricity Boards / Private Sector Organisations are also scrutinised in CWC from the view point of hydrology, civil design, inter-state issues and cost angles and for establishing water availability for cooling and other purposes in case of thermal projects. Technical aspects of water supply schemes are also appraised when referred to by the State Governments.

A similar function is discharged by the Project Preparation Organisation (PPO) under a Chief Engineer in respect of Major, Medium Irrigation and Water Resources Consolidation Projects, which are posed for external assistance.

7.2 APPRAISAL OF MAJOR IRRIGATION PROJECTS

Major Irrigation Projects with Culturable Command Area (CCA) of more than 10,000 hectares are examined for various aspects in specialised Directorates in CWC and in the Ministries of Water Resources, Agriculture, Environment & Forests and Tribal Affairs. In case of multipurpose projects, examination in Central Electricity Authority is also done for the power components. The existing procedure for scrutiny and examination of irrigation and multipurpose projects by Central Water Commission and acceptance by the Planning Commission for inclusion in the State Development Plan has been revised and simplified. Now Preliminary Report, prepared in brief, covering basic planning aspects are examined first and 'In Principle' consent of CWC for DPR preparation is communicated on the basis of soundness of proposals. Clearances for Environment, R&R plans and concurrence of State Finance etc. are to be obtained and submitted along with DPR so that once cleared by the Advisory Committee, the investment clearance of the Planning Commission would follow soon and the project can be started without waiting for different clearances from different sources. The revised procedure is applicable w.e.f. October 2001.

During the year 2003-2004, 38 New Major and 29 Revised Major Irrigation Projects were under appraisal in Project Appraisal Organisation. In principle consent for 4 Major Irrigation Projects proposals were communicated during the year 2003-04. A Pie Chart showing state-wise distribution of new major irrigation projects is shown at Fig. 7.1.

7.3 APPRAISAL OF MEDIUM IRRIGATION PROJECTS

For Medium Irrigation Projects (CCA 2,000 to 10,000 hectare), State Governments are required to submit only a Performa report to the Appraisal and Monitoring Units of the CWC's field formations. The remaining procedure for appraisal remains as stated in 7.2. During the year 2003-2004, 49 New Medium and 21 Revised Medium Irrigation Projects were under appraisal in various Regional Offices for which necessary assistance was provided by PAO, CWC. However, after appraisal, projects are put up by the PAO to the Advisory Committee for consideration and acceptance. Pie Chart showing the State wise distribution of new medium irrigation projects is shown in Fig 7.2.

7.4 INTERACTION WITH STATE/PROJECT AUTHORITIES

To expedite the appraisal process, Central Water Commission officers interact regularly with State Govt. Engineers and interstates review meetings are convened to resolve issues having a bearing on project clearance. The State Governments have also been advised to process the projects through State Central Design Organisation and to set up State Level Multidisciplinary Committee so that the scope and extent of scrutiny at the Centre can be minimized.

7.5 MEETING OF THE ADVISORY COMMITTEE

In November 1987, the Ministry of Water Resources reconstituted the Advisory Committee for Irrigation, Multipurpose and Flood Control Projects with Secretary (WR) as Chairman and Chief Engineer (PAO), CWC as Member Secretary. The Committee is entrusted with the function of examining proposals scrutinised in the CWC and conveying the decision on the techno-economic viability of the projects. During the year 2003-2004 the Advisory Committee met on 04.08.2003 and 19.02.2004 under the Chairmanship of Secretary (WR) and considered 20 projects out of which 4 major and 1 Flood control projects were deferred and 15 projects were accepted comprising 6 major, 7 medium irrigation and 2 flood control projects. The details of the projects are in Table-7.1.

Out of 15 projects (as per Table-7.1) accepted by the Advisory Committee, 13 are irrigation projects which will provide additional annual irrigation benefits of 1256350 hectare in the States of Andhra Pradesh, Bihar, Chhattisgarh, Maharashtra and Uttar Pradesh. Two flood Control Schemes in the states of Bihar and Uttar Pradesh will provide protection to an area of 18138 hectare thereby saving on an average of about Rs. 21.418 crore annually. State wise distribution of projects accepted by TAC during the current year is enclosed at Fig 7.3.

Table-7.1
Projects Approved by TAC during 2003-04

Sl. No.	Name of the State	Name of the Project	Estimated Cost (Rs. in Cr.)	Annual irrigation in Hectare
1.	Andhra Pradesh	Thotapalli Barrage Scheme (New Major)	415.87	78443
2.	Andhra Pradesh	Peddagedda Reservoir Project (New Medium)	32.12	4858
3.	Bihar	Restoration Works of Eastern Gandak Canal (New-Major)	294.00	662000
4.	Bihar	Mokama Tal Drainage, Raising and Strengthening of Jamidari Bandh (74 Nos.) (Flood Control)	26.17	00
5.	Chhattisgarh	Minimara (Hasdeo) Bango Multipurpose Project (Revised-Major)	1312.32	433500
6.	Chhattisgarh	Mongra Irrigation Project (New Medium)	83.46	9431
7.	Maharashtra	Tarali Irrigation Project (New Major)	504.96	19498
8.	Maharashtra	Dhom Balakwadi Tunnel Irrigation Project (New-Major)	475.29	12620
9.	Maharashtra	Kirmiri Darur Lift Irrigation Scheme (New Medium)	27.89	2443
10.	Maharashtra	Sonapur Tomta Lift Irrigation Scheme (New Medium)	32.18	2441
11.	Maharashtra	Chilhewadi Irrigation Project (New Medium)	146.24	7138
12.	Maharashtra	Pothra Nalla Irrigation Project (New Medium)	63.08	9380
13.	Uttar Pradesh	Providing Kharif channels in Hindon - Krishni Doab (Revised-Major)	92.52	11600
14.	Uttar Pradesh	Revised Pathrai dam project (Revised-Medium)	53.53	2998
15.	Uttar Pradesh	Project Estimate for Construction of Amwa Khas Retire Ring Bund from Km. 0.10 to 1.10. (Major Flood)	10.37	00
		Total	**3570.00**	**1256350**

7.6 APPRAISAL OF POWER PROJECTS

Twenty three Hydroelectric and eighteen Thermal Power Projects were also under appraisal. During this year, six Hydel Project having total installed capacity of 1526 MW and six Thermal Power Projects having total installed capacity of 2450 MW were examined by CWC and finally cleared by CEA.

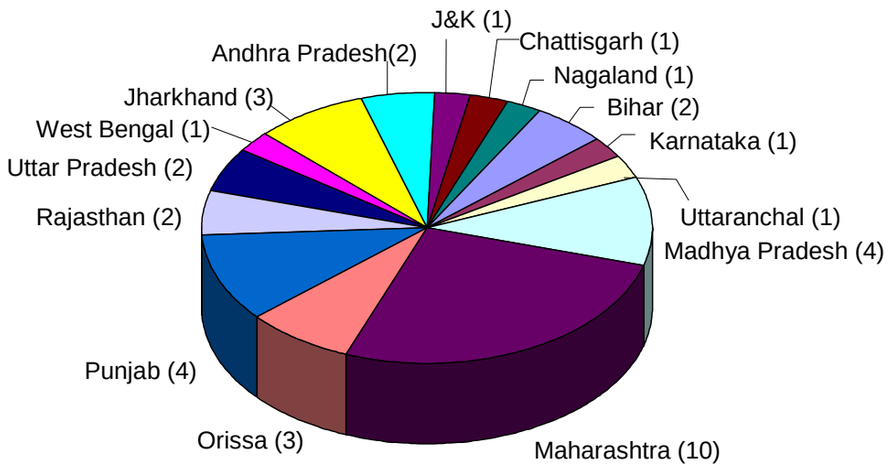
7.7 APPRAISAL AND CLEARANCE OF FLOOD MANAGEMENT PROJECTS

The Flood Management Organisation under Chief Engineer (FM) with five Directorates covering all aspects of Flood Management of the Country is functioning under River Management Wing of Central Water Commission. One of the important responsibilities assigned to Flood Management Organisation is the examination of Major, Medium and Minor Flood Management and Multi

purpose projects having flood control aspects, formulated and submitted by the State Govts. to establish their techno-economic viability. The projects are examined and put up to the Technical Advisory Committee for acceptance, thereafter proposal are sent to the Planning Commission to accord investment clearance. Assistance of Finance Wing of the Ministry of Water Resources and specialised Directorates of Central Water Commission is taken in respect of Major Flood Management Projects estimated to cost Rs. 7.5 crore or more and involving flood control, river bank protection and drainage congestion aspects. The Medium Flood Management Projects estimated to cost Rs 3 crore and above but less then Rs 7.5 crore are examined in Flood Management Organisation of the states and are directly sent to the Planning Commission for investment clearance. In the year 2003-04, 35 Flood Management schemes/Master Plans were cleared.

Fig. 7.1

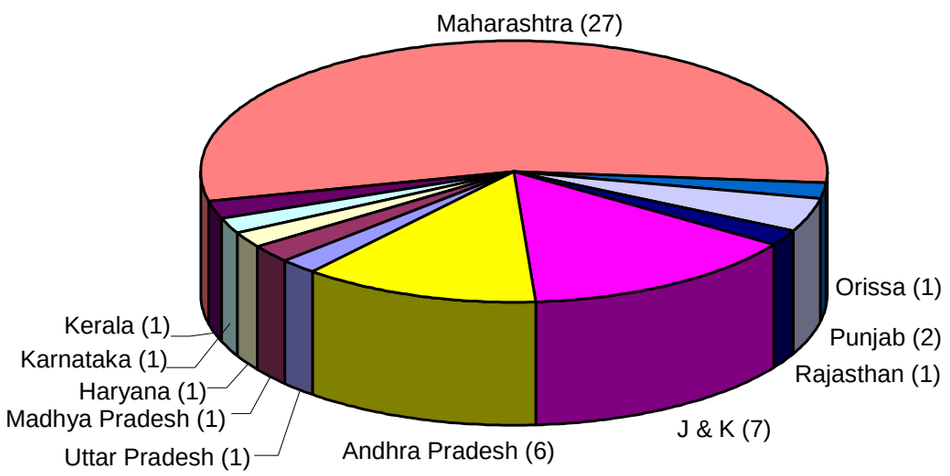
NEW MAJOR IRRIGATION PROJECTS UNDER APPRAISAL
(AS ON 31.03.2004)



Total Projects - 38

Fig. 7.2

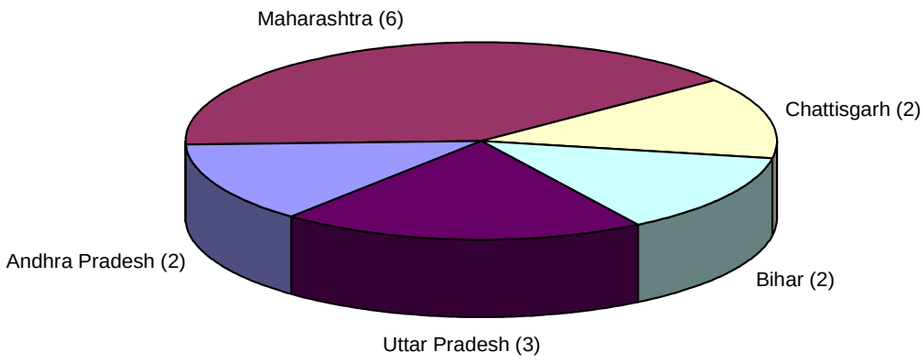
NEW MEDIUM PROJECTS UNDER APPRAISAL
(AS ON 31.03.2004)



Total Projects - 49

Fig. 7.3

PROJECTS ACCEPTED BY ADVISORY COMMITTEE OF MOWR
(DURING '2003 – 04')



CHAPTER–VIII

MONITORING OF PROJECTS

8.1 MONITORING OF MAJOR AND MEDIUM PROJECTS

The main objective of monitoring is to ensure achievement of physical and financial targets, identification of the inputs required, analysis of the reasons for any shortfalls/bottlenecks and suggest remedial measures etc., with an objective to complete them in a time bound manner and to achieve the targets of creation of irrigation potential. The CWC monitors projects at central level under three tier monitoring system recommended during the conference of State Irrigation Ministers (1975 & 1976). Initially, a few projects were identified for monitoring.

The regionalisation of CWC in 1995 made it possible to bring large number of the ongoing Major and Medium projects under the ambit of monitoring. As per the present arrangement, Inter-state, Externally Assisted and Centrally Sponsored projects are being monitored by monitoring units at the headquarters and the other projects by various field units of CWC.

Out of 146 Major, Medium and ERM projects taken up for monitoring by CWC during 2003-2004, 15 projects (9 Major & 6 ERM) are being monitored from headquarters by the Project Monitoring Organisation (PMO) comprising of five Monitoring Directorates under a Chief Engineer. The remaining 131 projects (84 major projects, 44 medium projects and 3 ERM projects) are being monitored by the field units of CWC.

As per the consensus emerged during the 50th meeting of the National Development Council chaired by the Hon'ble Prime Minister of India, 30 on-going pre- fifth/ fifth Plan major projects were identified by the Planning Commission for close monitoring to expedite the progress so that these projects are completed during the Xth Plan. Keeping this in view, CWC has taken steps to identify Nodal Officers of CWC field units in the rank of Directors and Deputy Directors who are assigned one or two specific project(s) for vigorous monitoring. These nodal officers are responsible for expediting progress effectively. Out of these 30 Projects, 25 Projects were already included in the list of 146 Projects and 5 were additional projects.

All the projects identified for monitoring are visited by CWC officers once a year. Thereafter, based on field visit and discussions with the State Govt Officials, a detailed status report is prepared highlighting various constraints impeding construction & suggestions for remedial measures etc. to draw the attention of the State Govt. to expedite progress for early completion of the projects. The overall co-ordination regarding monitoring of projects is done by the PMO. Charts showing the State-wise distribution of ongoing Major, Medium and ERM projects monitored by CWC Head Quarter or Field units are given in Figures 8.1, 8.2 and 8.3

8.2 MONITORING INFORMATION SYSTEM

CWC maintains a monitoring information system created from data received through quarterly progress reports, which are furnished by the State/Project authorities. This ensures continuous interaction with the implementing agencies to monitor the follow- up actions taken by them on the decisions taken for critical activities of construction. Monitoring has significantly contributed towards ensuring achievement of targets and in sorting out various critical issues ranging from construction planning, project staffing, land acquisition problems, quality control aspects etc. CWC is also instrumental in obtaining the required plan allocations to the projects during Annual Plan discussions in the Planning Commission so as to enable the project authorities to adhere to the scheduled construction programme.

8.3 STATEWISE STATUS REPORTS OF IRRIGATION DEVELOPMENT

The Project Monitoring Organisation creates data bank by preparing state-wise yearly status reports on the irrigation development of Major and Medium projects in each State. These reports give an overview of the surface water resources, ultimate irrigation potential created and utilised, expenditure incurred and other related aspects. The critical issues requiring attention of the state / project authorities are also highlighted in the status reports.

8.4 MONITORING OF EXTERNALLY ASSISTED PROJECTS

World Bank as well as its soft lending affiliate, International Development Association (IDA) have been providing credit to the major and medium Irrigation Projects since long. JBIC (Japan Bank for International Co-operation) is also funding a few major / medium irrigation projects in the country. While these projects were executed by the States, the need arose for their close monitoring by the Centre for achieving construction and investment targets as per the criteria laid down by the external funding agencies and to remove bottlenecks, if any, encountered during construction.

Monitoring of all externally aided schemes is entrusted to CWC, which includes two "Water Resources Consolidation Projects (WRCP)" in Orissa and Tamil Nadu and two "Water Sector Restructuring Project" in Rajasthan & Uttar Pradesh comprising of several major and medium projects covering issues of interdisciplinary nature.

8.5 ACCELERATED IRRIGATION BENEFITS PROGRAMME (AIBP)

A special scheme named 'Accelerated Irrigation Benefits Programme (AIBP)' was launched in 1996-97, for providing central loan assistance to the States for accelerating the implementation of large irrigation and multipurpose projects. The loan assistance under this scheme is extended to selected irrigation projects in the country, with the objective to accelerate the implementation of those projects, which are beyond resource capability of the States or are in advanced stage of construction. This scheme is being implemented under the overall charge of MOWR, with Central Water Commission assigned the responsibility to comprehensively monitor the projects receiving CLA. Since 2001-02, Fast Track Programme under AIBP was also launched in which 100% balance cost of the projects in advanced stage

were proposed to be included. During 2003-04, 103 projects (90 under normal AIBP and 13 under FTP) received CLA under AIBP (both Normal & Fast Track) and are being monitored by CWC.

Overall, 180 major/medium irrigation projects have received Central Loan Assistance of Rs. 14347.69 crore since its inception till 31.3.2004. The year-wise disbursement of funds under the ABIP Scheme is given in Table 8.1. 29 projects have since been completed. Out of the remaining 151 projects, CLA to 10 nos. is discontinued and the remaining 141 projects are under AIBP monitoring presently. The state-wise distribution of AIBP Projects monitored during 2003 – 04 is at Fig. 8.4. Details of CLA released under AIBP-Normal and Fast Track are shown in Fig. 8.5 and 8.6 respectively.

Table-8.1
Year wise CLA disbursement

Year	CLA in Rs. Crores disbursed under		
	Normal AIBP	**FTP**	**Total**
1996-97	500.000		500.000
1997-98	952.190		952.190
1998-99	1119.180		1119.180
1999-2000	1392.065		1392.065
2000-01	1791.605		1791.605
2001-02	2081.366	472.860	2554.226
2002-03	2628.283	386.855	3015.138
2003-04	2529.904	493.380	3023.284
Total	**12994.593**	**1353.095**	**14347.688**

8.6 Performance Evaluation of AIBP

Among the projects under AIBP, as many as 76 projects are benefiting the drought prone area of the country. Out of these 76 projects, 8 are benefiting KBK districts of Orissa and irrigation potential created in KBK district upto 3/2003 as a result of AIBP is 34.261 Th ha out of the total potential the of 2.2 M ha created under AIBP upto 3/2003. Since 1996-97, 29 projects under AIBP have been completed by 3/2004 out of which 9 projects are of pre-fifth/fifth plan period.

Additional irrigation potential created in the country from AIBP schemes from 1996-97 to 2002-03 is of the order of 2.2 M ha. As a result of AIBP, the achievement of potential creation during IX Plan i.e. 1997 to 2002 has been higher as compared to average potential creation during previous plan periods. The potential created during IX Plan is of the order of 4.09 M ha from Major & Medium Irrigation against the average potential creation per plan of 2.68 M ha. Contribution in potential creation during IX^{th} Plan from AIBP is 1.7 M ha, which is 42% of the total potential created during IX Plan. This is reckoned to be one of the greatest achievements of the AIBP schemes.

Comparing the scenario of investment made in AIBP and the corresponding benefits accrued in terms of the cost per ha. of potential creation, it is seen that the results are quite encouraging. The total investment in AIBP upto March 2003 including the State share is Rs. 11324.404 crore including the corresponding State share Rs. 6238.541 crore. Against this, the potential created in the corresponding period is 2.2 M

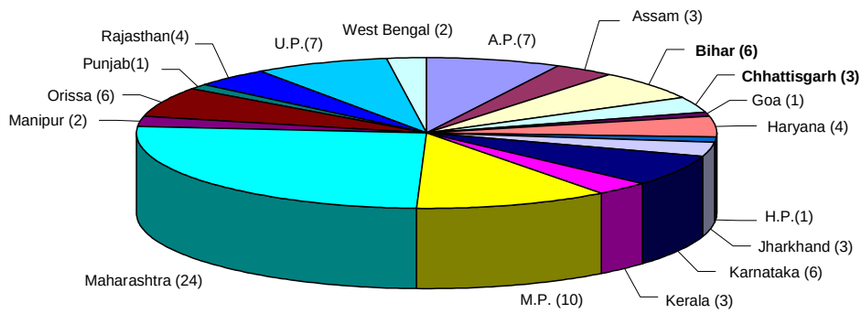
ha. Accordingly, the cost per ha. of potential creation comes to around Rs. 80,000/-, which is considered quite reasonable.

8.7 Monitoring of CAD Projects

CWC has also been interested with the monitoring of works of 69 CAD projects being implemented in various States throughout the country. During 2003-04, 42 projects out of 69 have been monitored. Till now more than 50 half yearly status/progress reports have been submitted to MOWR. These reports have been examined and comments have been conveyed to the field units wherever necessary.

Fig. 8.1

MAJOR PROJECTS MONITORED DURING '2003 – 04'
(FIELD UNITS & HEAD QUARTER)



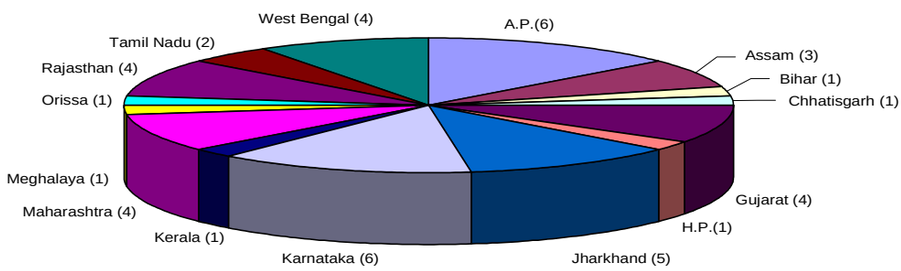
Total Projects - 93

Monitored from HQ - 9

Monitored by Field Units - 84

Fig.8.2

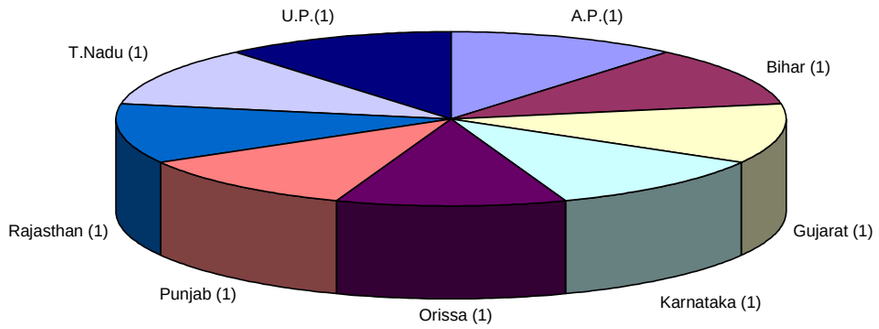
MEDIUM PROJECTS MONITORED DURING '2003 – 04'
(FIELD UNITS)



Total Projects - 44

Fig. 8.3

ERM PROJECTS MONITORED DURING '2003 – 04'
(FIELD UNITS & HEAD QUARTER)

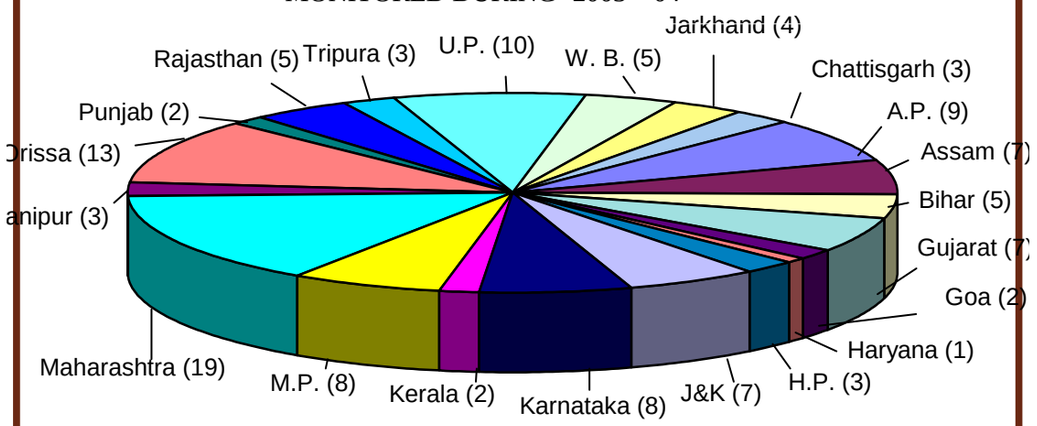


Total Projects - 9

Monitored from HQ - 6 Monitored by Field Units - 3

Fig. 8.4

MAJOR, MEDIUM & ERM PROJECTS UNDER AIBP
MONITORED DURING '2003 – 04'

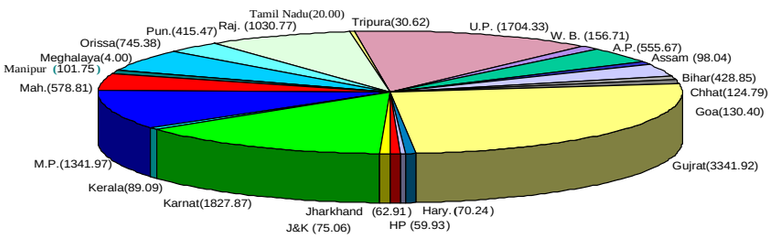


Total Projects - 126

Major - 65 Medium - 48 ERM - 13

Fig. 8.5

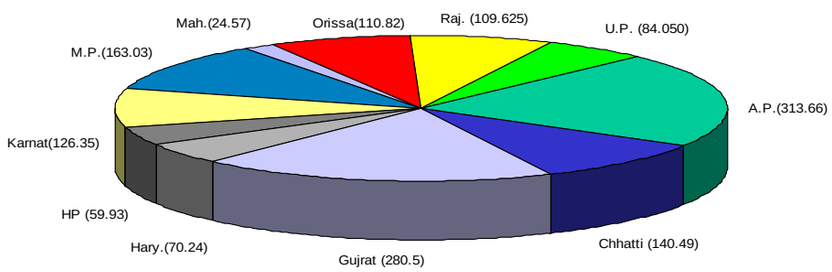
STATEWISE CUMULATIVE CLA RELEASED UNDER NORMAL AIBP
(upto 31.03.2004)



TOTAL CLA Released 12994.593 **Crore**

Fig. 8.6

STATEWISE CUMULATIVE CLA RELEASED UNDER FAST TRACK AIBP
(upto 31.03.2004



TOTAL CLA Released 1353.095 **Crore**

CHAPTER-IX

CONSTRUCTION EQUIPMENT PLANNING AND MANAGEMENT

CWC is actively involved in various aspects of construction equipment planning and management which involves techno-economic appraisal of project reports from plant planning angle, consultancy in equipment planning, monitoring the equipment performance, assistance in procurement of equipment and spare parts, man power planning, contract management, costing/estimating and data processing.

9.1 PROJECT APPRAISAL:

During the year, 33 project reports of Irrigation, Power and Multipurpose projects of various states of the country were technically examined from plant planning angle. Out of this, 24 project reports were recommended for acceptance with provision worth Rs. 11331.63 lakhs in respect of earthmoving and construction equipment. In respect of the remaining 9 project reports, the observations / comments were conveyed to the project authorities for compliance and further review.

9.2 CONSULTANCY

Assistance in preparation of DPR of Matnar run-off-the-river scheme, Chhattisgarh was rendered to Planning & Investigation Division, CWC, Faridabad. Finalised construction methods, carried out equipment planning and prepared construction schedule for the project. A write-up on the same was also prepared and furnished for inclusion in the DPR.

Assistant was rendered to NEEPCO Ltd., Shillong in preparation of updated Cost Estimate of Tuivai HE Project by furnishing current budgetary prices, life/repair norms and hourly use rates of construction equipment.

Hourly Use Rates (HURs) of seven items of Construction Equipment were estimated as per CWC guidelines and furnished to PA(S) Dte. to enable finalization of Cost Estimates of Amir Ghazi Dam, Quargah Reservoir and Khanabad Irrigation Projects in Afghanistan.

Consultancy/ assistance was rendered to North Eastern Investigation Division-III, CWC, Itanagar in preparation of chapter on 'Construction Methodology and Equipment Planning' of DPR on Deopani Multipurpose Project, Arunachal Pradesh. The construction methodology and equipment planning for the project and analysis of rates were examined for equipment selection, their output and various assumptions and norms considered and observations conveyed.

Assistance was rendered to Irrigation and Flood Control Deptt., Govt. of NCT of Delhi in procurement by drawing/vetting Technical Specifications of the following equipment:

(a) Dragline (1.91 cum. bucket capacity with 15.2 m boom).
(b) Crawler Dozer, 300 hp.

Assistance was rendered to various central/state departments like Himachal Pradesh State Electricity Board, WAPCOS Ltd., KSEB, THDC and field Offices of CWC in preparation of cost estimates by furnishing current budgetary prices and life/repair norms of construction equipment.

9.3 MONITORING PROGRAMME AND UTILISATION OF EQUIPMENT.

In order to monitor the utilisation of heavy earthmoving and construction equipment available in river valley projects, CWC collects the data on a quarterly basis on equipment performance. The data is analysed in P&M Dte. of CMO unit with a view to identify reasons for low performance/utilisation of equipment.

8 quarterly returns were received during the year 2003-04 from Punjab State and all have been analysed.

9.4 DISPOSAL OF SURPLUS EQUIPMENT AND SPARE PARTS IN WATER RESOURCES SECTOR.

The Irrigation Department of Uttar Pradesh and Uttaranchal have large number of earthmoving and construction equipment and their spare parts lying as surplus/unserviceable with various irrigation projects throughout the State. The State Government of U.P. has constituted eleven and State Govt. of Uttaranchal has constituted two Disposal Committees in which an officer of Central Mechanical Organisation is a member. During the year 2003-2004, eighteen meetings of the Committees were held in which reserve prices for 1079 items of unserviceable equipment/machinery valued at Rs. 123.33 lakhs were fixed. Representative from CWC attended these meetings. Assistance is also being rendered in fixation of reserve price of equipment, vehicle and other miscellaneous items of the field formation and head quarter of CWC for disposal.

9.5. MANPOWER PLANNING

9.5.1 Preparation of reports on Manpower Planning

A draft of 9th report titled "Expenditure and employment statistics of major and medium irrigation projects (under construction)" covering the period from 1988-89 to 1993-94 was approved by Advisory Group (MPP). It is to be published and distributed during 2004-05

9.5.2 Coordination with Institute of Applied Manpower Research

Chief Engineer (CMO), CWC has been nominated as a member of the Standing Committee on Research Programme (SCRP) of the Institute and reviewed four quarterly progress reports of the Institute. Three Publications of the Institute were collected and studied by manpower planning cell. Chief Engineer (CMO) attended one meeting of SCRP.

9.6 OTHER ACTIVITIES

Chief Engineer (CMO) has been nominated as the member of Study Group for Possible Mechanisation of Construction in Inter Linking of Rivers (ILR) Programme (SGMC). The Group has been constituted under the chairmanship of the Vice-Chairman of the Task Force for ILR Programme to deliberate upon the ways and means for speedy implementation of the ILR Programme.

First Meeting of the Group was held on October 30th, 2003 at the Office of the Task Force- ILR, New Delhi and was attended by Chief Engineer, CMO. The Terms of Reference for the Study Group (SGMC) were finalized during the meeting.

The construction equipment planning aspects of Krishna (Nagarjunasagar)- Pennar (Somasila) Link Project were studied and a report prepared**.** The link is a part of the Mahanadi – Godavari - Krishna - Pennar – Vaigai – Gundar peninsular river links system formulated for inter-basin transfer of water from surplus river basins to deficit basins. The study highlighted the quantum of work involved in the project and corresponding construction equipment required.

CHAPTER-X

INTERSTATE MATTERS

10.1 INTERSTATE RIVER WATER DISPUTES

Central Water Commission continues to provide technical assistance to Ministry of Water Resources to settle interstate water disputes among the states amicably through negotiations. During the year, assistance was rendered in respect of the following:

10.1.1 Cauvery Water Dispute

The Tribunal set up for resolving the Cauvery river water allocation dispute in 1990, continued the adjudication proceedings during the year. However, for implementation of the interim orders of the Cauvery Water Dispute Tribunal (CWDT), Cauvery River Authority and a Monitoring Committee under it were constituted in August 1998. The Cauvery River Authority is headed by the Prime Minister and Chief Ministers of the basin states are its members. Secretary, MOWR is the Member-Secretary. The Cauvery Monitoring Committee is headed by the Secretary, MOWR and Chief Secretaries of the basin states along with one Chief Engineer from each basin state and Chairman, CWC are its members. Chief Engineer (IMO), CWC was nominated as the Member-Secretary of the Monitoring Committee.

The Cauvery River Authority has so far held six meetings, last being on 10.2.2003. The Cauvery Monitoring Committee has so far held 20 meetings. Four meetings were held during 2003-04; last being on 19.01.2004.

In the Seventeenth meeting of the Cauvery Monitoring Committee held on 9th June 2003, the Committee discussed the issue of formulation of distress sharing formula for Cauvery waters. A Sub-Group of technical experts representing all the basin States and headed by Commissioner (Projects), MOWR was set up to discuss the issue and suggest a practical distress sharing formula. The Sub-Group of Technical Experts held three meetings at New Delhi on 24.6.2003, 7.7.2003 and 18.8.2003.

The distress sharing formula was discussed in the Eighteenth and Nineteenth (Emergency) meeting of the Cauvery Monitoring Committee held on 7.8.2003 & 1.9.2003 at New Delhi. The Chairman requested the member States for acceptance of the distress sharing formula reviewed by the Sub-Group of Technical Experts. Chief Secretaries of Tamil Nadu, Pondicherry and representative of Government of Kerala agreed to the formula put forward by the Chairman of the Committee. The State of Karnataka, however, did not agree to the acceptance of the proposed formula.

The Twentieth Meeting of the Cauvery Monitoring Committee was held on 19.1.2004. After discussion it was decided that a composite note on the distress

sharing formula put forward in the Nineteenth Cauvery Monitoring Committee meeting along with the views of Karnataka including the drought conditions prevailing in the State for the last three years would be placed before the Cauvery River Authority for further necessary action.

10.1.2 Ravi & Beas Water 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 further reference was made to the Tribunal comprising a slow-motion reference by the Central Government and references received from the Governments of Punjab, Haryana and Rajasthan seeking explanation/guidance on certain points in the report. 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.

On 15th January 2002, the Supreme Court directed the State of Punjab to continue the digging of SYL Canal portion, which has not been completed as yet and make the canal functional within one year from 15th January 2002. The Govt. of Punjab filed a suit in the Supreme Court on 13.1.2003 to seek discharge from the obligation under the Decree dated 15.1.2002. During 2003-04, various points raised in the suite were examined in CWC and views were sent to MoWR for filing reply in Supreme Court. The Government of Punjab requested Government of India for constitution of fresh tribunal under section 4(1) of the Inter State Water Disputes Act, 1956. The matter was examined in CWC and views sent to MoWR in March, 2004.

10.2 INTER-STATE MEETING ON DRINKING WATER SUPPLY PROBLEM IN JAGDALPUR TOWN IN CHHATTISGARH

It was reported by Government of Madhya Pradesh (now Chhattisgarh) in 1999 that during the past years, monsoon flows in Indravati river are progressively dwindling due to peculiar phenomenon of diversion of Indravati River through "Jauranalla" a small rivulet which joins Kolab-Sabari River and consequently causing drinking water supply problems in Jagdalpur town and downstream villages in Madhya Pradesh.

As per the provisions of the GWDT Award vide Annex-IV under Annex-'A' i.e. Agreement dated 9.12.1975 between the States of Orissa and Madhya Pradesh, Orissa is to ensure at its border with Madhya Pradesh a flow of 45 TMC in Indravati and its tributaries at 75% dependability for use by Madhya Pradesh. However there is no specific stipulation regarding monthly quantum to be made available.

Three inter-state meetings of Secretaries of Orissa, Chhattisgarh and Regional Chief Engineers of CWC were taken by Member (WP&P) up to the

period May 2002. Important decisions taken were (i) two diversion structures (one across Jauranallah and other across Indravati) would be constructed (ii) sharing the cost at 50:50 basis would be taken up with the respective Governments (iii) the 9.39 TMC water requirement placed by Chhattisgarh State would be re-examined (iv) Government of Orissa would consider taking up repair works of the banks of river Indravati on priority basis and temporary measures for diverting flows into Indravati river as already agreed will continue.

In pursuance of the decision taken during the 4th inter-State Meeting held on 8th April 2003 Chief Engineer (IMO), Chief Engineer, Design, (E&NE) and Director, BCD, CWC visited the site and held discussion with the officers of Governments of Chhattisgarh and Orissa during 24-30th April, 2003. An inter-State meeting at the level of Engineer – in – Chief, Water Resources Department, Governments of Chhattisgarh and Orissa was held on 24th December 2003 at Raipur. Among other points, the water supply problems faced by Jagdalpur Town and downstream areas were also discussed. Important outcome of the meeting on this issue are:

(i) Control structures should be constructed at the earliest for which water share will be 50:50 on interim basis
(ii) CWC may be requested to take up the design work and Chhattisgarh would pay the consultancy charges to CWC
(iii) To divert 50% of the flows at the junction point of Jauranalla on Indravati river by putting sand bags at the mouth of Jauranalla during lean season (November to June)

10.3 RIVER BOARDS ACT, 1956

Under Entry 56 of List-I of the Constitution, the River Boards Act, 1956 was enacted for the establishment of River Boards for the regulation and development of Inter State River and River Valleys. The Central Government can constitute a River Board under the provision of the River Boards Act, 1956 with the concurrence of the State Governments. The Central Govt. has however not been able to constitute any River Board under this Act so far. The role of the River Boards as envisaged in the said Act is only advisory in nature. The National Committee for Integrated Water Resources Development Plan has recommended the enactment of a new Act called the "Inter State Rivers and River Valley (Integrated and Participatory Management) Act" in place of existing River Board Act, 1956.

10.4 INTER-STATE DISPUTE ON MANDOVI RIVER BASIN

Mondovi is an inter-state river originating in Karnataka and after flowing in Goa drains in Arabian Sea. A small portion of Catchment area lies in Maharashtra also. The Government of Karnataka in the past prepared proposal for diversion of Mandovi water outside the basin. Ministry of Water Resources in April 2002 conveyed 'in principle' clearance for diversion of 7.56 TMC of water

from Mandovi basin to the adjoining Malaprabha sub-basin (Krishna basin) for drinking water purposes. In view of the strong protest from the Government of Goa, MOWR during September 2002 kept the 'in principle' clearance in abeyance. The Government of Goa also sought for constitution of a tribunal for adjudicating the dispute.

Subsequently, Union Minister for Water Resources took an inter-state meeting during December 2002, during which it was decided that Government of Goa and CWC officials could make joint efforts to reconcile the discrepancies in the data and yield figures and the assessment of yield should be completed by March 2003. Subsequently as desired by Government of Goa, as a special case MOWR during July 2003 permitted to give all the raw gauge data of Gangim site. Government of Goa has been requested for an expeditious collection and examination of the data.

10.5 PARAGODU PROJECT PROPOSED BY GOVERNMENT OF KARNATAKA ON CHITRAVATHI RIVER OF PENNAR BASIN

The Government of Karnataka has initiated construction of a minor project on the river Chitravathi, a tributary of the river Pennar which is an inter-state river (Karnataka and Andhra Pradesh). The project envisages providing drinking water facility to 88 villages and 2 towns by constructing an anicut. According to the Government of Andhra Pradesh, the construction of the project will adversely affect the drought-hit Anantapur District in Andhra Pradesh.

A central team led by Member (WP&P), Central Water Commission visited the project site along with the representatives of Andhra Pradesh and Karnataka.

The matter was discussed to sort out the issues in an inter-state meeting convened by the Chairman, CWC on 27th June, 2003 where representatives of the Government of Andhra Pradesh and Karnataka were present. The Chairman CWC observed in the meeting that the Paragodu project as proposed by the Government of Karnataka is a drinking water project and its parameters required to follow the existing National norms for drinking water projects. Informing Government of Karnataka in this regard, they have been requested for a copy of the Project Report complying with these norms. WRD, Government of Karnataka has submitted a revised project report in January, 2004. The revised report was sent to the ministries of Urban Development & Poverty Alleviation & Rural Development besides specialized directorates of CWC. The examination of the project from inter state angle has been done so far.

10.6 CONTROL BOARDS FOR INTERSTATE PROJECTS

10.6.1 Bansagar Control Board

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

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

Bansagar Dam on Sone river, a joint venture of the states of Madhya Pradesh, Uttar Pradesh and Bihar is being executed by Water Resources Deptt., Madhya Pradesh under the directions of the Bansagar Control Board. The Execution of the canals and power systems are being carried out by the respective states independently. The benefits and cost of the dam including land acquisition and rehabilitation are to be shared by Madhya Pradesh, Uttar Pradesh and Bihar in the ratio of 2:1:1.

So far 68 meetings of the Executive Committee have taken place. The 66th (Special), 67th & 68th (Special) meetings were held on 16.7.2003, 3.11.2003 and 5.1.2004. In the 66th & 67th meetings, the committee discussed about the delay in the execution of the piers and Spillway Bridge and erection of radial crest gates of Bansagar Dam and approved three tenders. In the 68th meeting the committee discussed re-schedulement plan for the work of piers and spillway and allowed NPCC to continue the works. 1st meeting of Bansagar Reservoir Regulation Committee was held at New Delhi on 16.7.2003 under the Chairmanship of Chairman, CWC and the committee directed the party states to supply 10- daily release pattern and other relevant data to Director (Reservoir Operation.), CWC for preparation of Operation Manual.

10.6.2 Betwa River Board

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

The Union Minister of Water Resources is the Chairman of the Board and Union Minister of Power, Union Minister of State for Water Resources,

Chief Ministers and Minister-in-charge of Finance, Irrigation and Power of the two states are Members.

Chairman, CWC is the Chairman of Executive Committee of Betwa River Board. As per Betwa River Board Act 1976 subject to the general superintendence and control of the Board, the management of affairs of the Board shall vest in the Executive Committee and the Chairman and other members of the Committee shall assist the Board in such manner as the Board may require. Subject to the rules and the directions of the Board, the Executive Committee may exercise any power and do any act or thing which may be exercised or is done by the Board. Chairman, Executive Committee has been delegated with emergency powers to take decision on urgent proposals, subject to ratification by the Executive Committee in its next meeting.

So far 75 meetings of the Executive Committee of BRB have taken place. 75th meeting of Executive Committee was held on 23.3.2004. Committee discussed and approved the financial, technical and administrative matters of the Board.

10.7 INTERSTATE COMMITTEES

Brief description of activities of some of the important Inter-state committees is given below.

10.7.1 Ghaggar Standing Committee

The Ghaggar Standing Committee was constituted in February 1990 to examine and coordinate irrigation, flood control and drainage works in the Ghaggar basin and lay down priority for their implementation and to accord clearance to individual schemes in the Ghaggar basin from the Inter State angle.The Members of the Committee are from the Ministry of Water Resources, Northern Railway, Central Water Commission and Irrigation Department of the States of Punjab, Haryana and Rajasthan. 14th meeting of the Ghaggar Standing Committee was held on 21-8-2003 under the Chairmanship of Member (RM) at Sewa Bhawan, R.K.Puram. Hon'ble MP's from the co-basin states participated in the meeting. A special (15th) meeting was held on 5-1-2004 to consider clearance of schemes for flood protection works on river Ghaggar and Tangri prepared by Govt. of Punjab to be taken up with funding from NABARD from interstate angle.

To prepare Master Plan of Ghaggar basin a sub-committee was constituted under Ghaggar Standing Committee in its 7th meeting held on 20-8-98. The 5th meeting of Sub-Committee was held on 10-10-2003 at Patiala under Chairmanship of Chief Engineer (FM), Central Water Commission. The committee decided that the co-basin states should furnish proper feedback on the proposals of Master Plan and cooperate on the early finalisation of the Master Plan.

10.7.2 Yamuna Standing Committee

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

The Members of the Committee are from GFCC, Northern Railway, Central Water Commission, Ministry of surface Transport and Irrigation Deptt. of States of Haryana, U.P. and N.C.T. of Delhi. 63rd & 64th meeting of Yamuna Standing Committee was held on 6-6-2003 & 29-10-2003 respectively at Sewa Bhawan, R.K.Puram, New Delhi under the Chairmanship of Member (RM), CWC. The minutes of the meeting were finalised and circulated among the Members of the Committee.

10.7.3 Sahibi Standing Committee.

After unprecedented flood in the Sahibi basin during 1977, affecting large areas in the States of Rajasthan and Haryana and National Capital Territory of Delhi, the Central Water Commission prepared an integrated Master Plan of Sahibi Nadi Najafgarh Nallah drainage basin.
The broad recommendations in the Master Plans were:

(a) Tying of Dhansa bund to High Ground in Haryana territory.

(b) Increasing capacity of Najafgarh drain.

(c) Construction of Masani Barrage in Haryana.

(d) Construction of Ajmeripura Dam in Rajasthan.

(e) Constructions of Supplementary drain in Delhi.

Sahibi Standing Committee was constituted by Ministry of Agriculture and Irrigation, Department of Irrigation vide resolution No. FC-17(1)/70 dated 12-7-78 to oversee the implementation of all the elements of the Master Plan of Sahibi Nadi-Najafgarh Nallah and to ensure the regulation of flows at control points for the best interest of all concerned States.

The composition of the Committee is as follows:

- Member (RM), Central Water Commission as Chairman and
- Director (FM-I), Central Water Commission as Member-Secretary along with
- Representatives of Haryana, Rajasthan & Delhi States.

The main functions of the Committee are: -

- To finalise details of various proposals included in the Master Plan.

- To oversee the implementation of co-ordinated programme so as to ensure its timely completion.
- To direct regulation of the control structures during critical situations taking into account the interest of various affected areas.
- To examine and approve all future flood control drainage and irrigation (Major, medium as well as minor) projects in all the State, which may affect the hydrological balance in the Sahibi catchment, and all drains feeding the Sahibi Nadi and Delhi area.

The major achievement of the Committee is that the various problems faced by the State due to the flood in Sahibi basin have been discussed in the meeting specially the construction of Masani barrage in Haryana and proposed construction of Ajmeripura dam in Rajasthan. These matter are still to be decided.. The 1st and last (16th) meeting of the Committee was held on 10-8-1978 and 1-11-2001 respectively. During the year, follow-up actions on the decisions taken in the last meeting were continued.

10.7.4 Committee on Special Remedial Works for Flood Protection Embankments of Sutlej and Ravi.

Committee on Special remedial works for the Flood Protection Embankment of the Sutlej and Ravi was constituted in Dec., 1989 by the Ministry of Water Resources under the Chairmanship of Chief Engineer (FM), Central Water Commission to technically examine proposals for special remedial works for Flood Protection Embankment on the Sutlej and Ravi submitted by the Govt. of Punjab after verification of developments in the field to monitor the utilisation by Punjab of the Central Assistance utilised for such works by periodic inspection of ongoing and completed works. The Members of the Committee are from Ministry of Water Resources, CWPRS, Pune, Central Water Commission, Ministry of Defence and Irrigation Department of the States of Punjab. Committee Co-opted members from B.S.F., CPWD and Ministry of Home Affairs during 1996.

Report of the 23rd and 24th meeting held on 11-6-2003 & from 9-3-2004 to 12-3-2004 under the chairmanship of Chief Engineer (FMO) was prepared and sent to all the Members of the Committee and Ministry of Water Resources.

10.7.5 JOINT OPERATION COMMITTEE ON RIHAND RESERVOIR

Rihand is a major tributary of river Sone. Rihand Hydro-electric Project (6x50 MW) was constructed by U.P. Government in 1962. The live storage capacity of Rihand reservoir is 5650 MCM at FRL of 268.224 m. The releases from Rihand Power House are utilized for irrigation in Bihar, through the Sone Barrage at Indrapuri. An agreement on sharing of release from Rihand Project was signed between U.P and Bihar in 1973.

Ministry of Water Resources set up a Joint Operation Committee for Rihand reservoir in 1992. Generally, one meeting of JOC takes place every year. The 13th meeting of JOC was held on 19th September 2003 at CWC New, Delhi. The operational plan for the coming months was finalized during the meeting.

10.8 DAMODAR VALLEY RESERVOIR REGULATION COMMITTEE

The regulation of the Damodar Valley Corporation (DVC) reservoirs to meet the requirements of water for various uses like domestic water supply, kharif irrigation, hydel power and industry besides carrying out flood moderation during the monsoon season in accordance with the Regulation Manual accepted by the participating Government has been made the responsibility of CWC as envisaged in the ACT No. XIV of 1948 (accepted by the Dominion Legislature). This task is being successfully carried out as per the directions of the Damodar Valley Reservoirs Regulation Committee (DVRRC) chaired by Member (RM), CWC with representatives each from Govt. of Bihar, Govt. of West Bengal, Govt. of Jharkhand and DVC. Superintending Engineer, Hydrological Observation Circle, CWC, Maithon is the Member-Secretary of the Committee. The day-to-day advice is being issued by the S.E., CWC stationed at Maithon and the actual gate operation is being accordingly done by the Damodar valley Corporation Authority. A total of 108 nos. meetings are held so far. During the year 2003-04 two meetings, i.e. 107th, and 108th of the DVRR Committee were held on 29.04.2003 at Kolkata and 13.11.2003 at Maithon.

CHAPTER-XI

ENVIRONMENTAL MANAGEMENT OF WATER RESOURCES PROJECTS

11.1 ENVIRONMENTAL MANAGEMENT

11.1.1 National Environmental Monitoring Committee for River Valley Projects (NEMCRVP)

National Environmental Monitoring committee for River Valley Project (NEMCRVP) was constituted in February, 1990 for monitoring the implementation of environmental safeguards of irrigation, multipurpose and flood control projects. The committee has selected 85 projects for monitoring, out of which 17 are for close monitoring. Member (WP&P), CWC is the Chairman of NEMCRVP, which comprises of the representatives from Ministries of Agriculture & Cooperation, Environment & Forests, Water Resources, Tribal Welfare besides Planning Commission and CWC. Chief Engineer (EMO), CWC is the Vice-Chairman and Director (EM) is the Member-Secretary (Fig-11.1). Environmental Management Directorate works as Secretariat for this NEMCRVP. Out of 17 projects to be monitored closely, the committee has so far visited 16 projects, 7 of these projects have been visited more than once. Besides these, 20 more projects out of 85 projects identified for Environmental Monitoring have also been visited, with one project visited twice. 52 meetings and 50 visits of NEMCRVP have been arranged during the last 14 years.

Three-tier monitoring system viz., National Environmental Monitoring committee for River Valley Project (NEMCRVP), State Environmental Monitoring Committees (SEMCs) and Project Environmental Management Committees (PEMCs) is coordinated by CWC for monitoring the environmental safeguards stipulated at the time of clearance of the projects and proper activation of SEMCs and PEMCs. SEMCs have been constituted by State Governments under the chairmanship of Secretary (Water Resources/Irrigation Department) and members from various concerned Departments/ Organisations and NGOs. SEMCs have been constituted in almost all the States and PEMCs have been constituted for 68 projects selected by NEMCRVP. In addition, 35 PEMCs have also been constituted for the non-selected projects. PEMCs play a vital role in the implementation of environmental safeguards stipulated for the Project.

During 2003-04, NEMCRVP visited Nandur Madhmeshwar Project and Ghatghar Pump Storage Project (Maharashtra) and 49th & 50th Meeting of the National Committee was organized at these projects. NEMCRVP also visited Bawanthadi Multipurpose and Gosikhurd Irrigation Projects (Maharashtra) during the year and 51st and 52nd meeting of NEMCRVP were held at these projects. The meetings were chaired by Chief Engineer (EMO) & Vice Chairman of NEMCRVP. The Committee also visited R&R sites at Girola,

Manegaon Garra; and Khappa; Compensatory Afforestation works at Ambazari and Gorewada and Nilaj and Catchment Area Treatment works near Saoner and Fulzari. The Committee discussed implementation of environmental safeguards stipulated in environmental clearance of these projects.

Gerussapa Hydel Project (Karnataka), Ranjit Sagar Dam Project (Punjab) and Shahnehar Irrigation Project (HP) were visited by Director (EM) & Member-Secretary, NEMCRVP to oversee implementation of environmental safeguards. He also participated in the meeting chaired by the Chief Secretary (Uttaranchal) at Dehradun regarding monitoring of Vishnu Prayag Hydel Project, to oversee the status of implementation of the observations of the NEMCRVP, during its 43rd meeting.

11.2 ENVIRONMENTAL IMPACT ASSESSMENT

11.2.1 Environmental Impact Assessment (EIA)

Environmental Evaluation Study of Mahi Project was completed and the report was under print. Reports on Jakham Irrigation Project (Rajasthan) and Barapani HE Project (Meghalaya) are in the final stages.

11.2.2 EIA Studies in Progress

EIA Reports of 18 projects for Expert Committee on River valley and hydroelectric projects referred to CWC by Ministry of Environment and Forests have been examined and comments prepared. These projects were discussed in five meetings of the Expert Committee and 12 projects have been recommended for environmental clearance.

During the year, feasibility reports/DPRs of 14 projects have been examined from environmental angle for granting "In principle" consent of CWC. Two projects have been accepted for detailed examination.

11.3 RESETTLEMENT & REHABILITATION

The Rehabilitation & Resettlement (R&R) aspects of displaced/affected persons of Water Resources Projects are monitored by the Rehabilitation and Resettlement Directorate of the Central Water Commission. In this regard data on R&R measures submitted by the Project Authorities is being compiled. Norms/Acts/Policies adopted by the State Governments on R&R of displaced/affected persons of major/medium irrigation and multipurpose projects are collected and analysed. In respect of 214 existing/ongoing major & medium reservoir projects, data on rehabilitation measures have been collected and a database has been generated/ updated. During the year, Director(R&R) visited Muvattupuzha Valley Irrigation Project (Kerala), Rengali Project (Orissa) & Priya Darshini Jurala Projct (AP) for on the spot assessment of implementation of R&R programmes by the State

Govt./Project Authorities and prepared a Status report on R&R of PAPs of Upper Indravathi Project (Orissa), Muvattupuzha Valley Irrigation Project (Kerala) and Rengali Project (Orissa), which was circulated to all concerned.

The publication on a) Resettlement and Rehabilitation of Project Affected Persons of Water Resources Development Projects and b) Status Report on implementation of R&R Action Plan in respect of Water Resources Projects were Prepared and circulated during this year.

COMPOSITION OF NATIONAL ENVIRONMENTAL MONITORING COMMITTEE FOR RIVER VALLEY PROJECTS (NEMCRVP)

CHAIRMAN
Member (Water Planning & Projects)
Central Water Commission

VICE-CHAIRMAN
Chief Engineer (Environment Management Organisation)
Central Water Commission

MEMBERS

Sr. Joint Commissioner (PP)
M/o Water Resources

Representative
M/o Environment & Forests

Representative,
Water Resources Division, Planning Commission

Representative,
M/o Agriculture & Cooperation

Representative,
M/o Tribal Affairs

Regional Chief Engineer,
Central Water Commission (As A Special Invitee)

MEMBER SECRETARY
Director (Environmental Management), CWC

Fig.11.1

CHAPTER-XII

EXTERNAL ASSISTANCE

12.1 EXTERNAL ASSISTANCE FOR DEVELOPMENT OF WATER RESOURCES

External Assistance flows to the country in various forms; as multilateral or bilateral aid, loan, grants and commodity aid from various foreign countries and other donor agencies. The main source of external assistance in India has been the International Bank of Reconstruction and Development (IBRD), commonly known as the World Bank and its soft lending affiliate, the International Development Association (IDA). In addition to the World Bank, other funding agencies such as International Fund for Agriculture Development (IFAD), United States Agency for International Development (USAID), European Economic Community (EEC), UNDP and Japan Bank of International Cooperation (JBIC), formerly Overseas Economic Cooperative Fund (OECF), have also been providing assistance for implementation of irrigation projects. Projects have also been funded through bilateral support of France, Australia, Canada, Germany and the Netherlands. The Ministry of Water Resources and its organizations assist the State Governments in tying up the external assistance from different funding agencies to fill up the resources gaps both in terms of funds and technological update for rapid development of country's water resources.

12.1.1 Role of Central Water Commission

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

(a) Arranging external assistance for water sector projects.
(b) Techno-economic examination of the projects posed for external assistance and coordination with state and concerned departments/ministries such as CGWB, MOE&F etc.
(c) Monitoring of physical and financial progress of externally aided projects and fixing of arbitrators for resolving disputes in the execution of projects.

Central Water Commission is monitoring the progress of Major & Medium Irrigation Projects only. So far 40 such projects have received assistance from World Bank, 2 from USAID, 2 from IFAD, 5 from JBIC and one from EEC.

12.2 WORLD BANK ASSISTANCE

The World Bank continues to be the primary source of external assistance in the Water Resources sector. The World Bank assistance is in the form of credit or loan. The World Bank financing policies for irrigation

projects changes from time to time. Initially it financed individual irrigation projects and then changed to financing composite projects in which a group of Major, Medium and Minor irrigation projects were financed under a single credit/loan agreement. It then started financing Water Resources Consolidation Projects in which irrigation sector of the whole state was involved under one credit/loan agreement. In 1994 Haryana became the first such state to get Water Resources Consolidation Project finalised followed by Tamil Nadu and Orissa. Now the policy of World Bank has shifted to finance Water Sector Restructuring Projects in which the emphasis is on irrigation sector reforms of the whole state. Rajasthan and Uttar Pradesh are two beneficiary states where water sector restructuring projects were launched in 2002.

12.2.1 Closed Credit/Loan Agreements

Out of 40 World Bank aided projects, 34 projects have been closed and the assistance utilised is as follows:

Sl. No.	Name of the State	No. of Projects	Assistance in Million US Dollar	
			As per SAR	Utilised
1	Andhra Pradesh	4	500.00	397.39
2	Bihar	2	142.00	158.61
3	Gujarat	7	921.50	805.82
4	Haryana	3	519.00	505.98
5	Karnataka	2	451.00	291.96
6	Kerala	1	80.00	79.08
7	Madhya Pradesh	2	360.00	318.18
8	Maharashtra	4	453.00	480.75
9	Orissa	4	254.00	207.44
10	Punjab	2	294.00	290.06
11	Tamil Nadu	2	58.00	61.97
12	Uttar Pradesh	1	125.00	126.76
	Total	**34**	**4157.50**	**3724.00**

12.2.2 On Going Credits /Loans Agreements

Sl. No	Name of Project	Credit / Loan No.	Agency	Time Slice		Estimated Cost (in Rs. M)		Assistance (in US $ M)	
				Start-ing month	Clos-ing month	Total (As per SAR)	Latest ending 03/04	Total	Uti-lized ending 03/04
1	Tamil Nadu Water Resources Consolidation, Project	Cr.2745-IN	IDA	12/95	09/04	11433.00	10620.00	282.90	197.59
2	Orissa Water Resources Consolidation, project	Cr.2801-IN	IDA	01/96	09/04	14099.98	14271.96	290.90	232.75

3	Third Andhra Pradesh Irrigation Project.	Cr.2952-IN Ln.4166-IN	IDA IBRD	07/97	07/04	18897.08	21912.31	150.00 175.00	142.52 94.90
4	Andhra Pradesh Economic Restructuring Project,	Ln.4360-IN Cr.3103-IN	IBRD IDA	02/99	09/05	11292.00	9622.52	142.00 28.30	91.37 26.41
5.	Rajasthan Water Sector Restructuring Project	Cr.3603-IN	IDA	03/02	03/08	8305.07	8305.07	140.00	10.50
6.	Uttar Pradesh Water Sector Restructuring Project	Cr.3602-IN	IDA	03/02	10/07	8351.00	8351.00	149.20	7.78

In addition to above, during 1995-96, the Government of India and nine States entered into a development credit agreement with the World Bank to implement "Hydrology Project" under a joint financing arrangement, whereby the Government of Netherlands provided related technical assistance in the form of grant. The Hydrology Project Phase-I has been in implementation since 22 September, 1995. The total cost of the Project was Rs. 6020 million and CWC component was of Rs. 734 million till the project completion date of December 2003.

12.3 JAPAN BANK OF INTERNATIONAL COOPERATION ASSISTANCE

In water resources sector JBIC provides financial assistance to major, medium and minor Irrigation Projects in the form of loan with the objective of increasing production of agriculture by mainly funding construction of civil works in the Irrigation system. The main components of these projects are as follows:-

- Construction of civil work
- Training
- Consulting Services
- Agriculture Intensification Programme
- On farm development.

The time slice for utilization of the assistance is 5 to 6 years. The loan carries service charge of 0.1% per annum and interest @ 2.3% per annum on the principal disbursed & outstanding. The loan is to be repaid over a period of 20 years after a grace period of 10 years.

12.3.1 CLOSED AGREEMENTS

Out of 5 JBIC aided projects, 2 projects have been closed and the assistance utilised is as follows:

Sl. No.	Name of the State	No. of Projects	Total Assistance (As per Agreement)	Assistance utilised
			Yen M	Yen M
1	Orissa	2	7513.00	6713.83

12.3.2 ON GOING AGREEMENTS

Sl. No	Name of Project	Loan No.	Time slice		Estimated Cost		Total Assist-ance (M Yen)	Assist-ance utilized ending 03/2004
			Start-ing month	Clos-ing month	Total as per agree-ment (Rs. M)	Latest ending 03/04 (Rs. M)		
1	K.C. Canal Modernisation Project, Andhra Pradesh	ID-P-113	03/96	02/05	10336.60	10336.60	16049	13377.86
2	Rajghat Canal Irrigation project Madhya Pradesh	ID-P-126	04/97	03/04	5525.47	5929.61	13222	8152.86
3	Rengali Irrigation Project Left Bank Canal, Orissa	ID-P-135	02/98	12/04	4494.70	3777.22	7760	6104.35

12.4 EUROPEAN ECONOMIC COMMUNITY ASSISTANCE

EEC provides financial assistance to Irrigation Project (major, medium or minor) in the form of grant. The criteria for assistance to the project are as follows:

1. No specific cost
2. Must involve the beneficiaries in project management, operation and maintenance.

One major & medium project aided by EEC has been closed and the assistance utilized is as follows:-

Sl. No.	Name of the State	No. of Projects	Total Assistance (As per Agreement)	Assistance Utilised
			ECU M	ECU M
1	Rajasthan	1	45.00	39.60

12.5 WATER RESOURCES CONSOLIDATION PROJECTS

The Water Resources Consolidation projects (WRCPs) are the new generation irrigation projects assisted by the World Bank. The WRCPs deal with the irrigation sector in its entirety and State as a whole to realize the basic objectives postulated in the National Water Policy. The World Bank has extended credit assistance on a larger scale under separate Water Resources consolidation Project (WRCP) individually to three States namely Haryana, Orissa and Tamil Nadu, who were the main participants of NWMP-1. The main objectives of WRCP are:

1. Improving institutional and technical capability of managing the State's water resources.
2. Planning of water resources by considering river basin as a unit across all uses of water.
3. Improving agricultural productivity through rehabilitation and completion of irrigation schemes and farmers' participation.
4. Assuring sustainability of infrastructure and the environment etc..

In WRCPs, the major thrust is on improving irrigation systems through renovation and modernisation of existing irrigation and drainage schemes and associated system improvements linked with farmer participation. Priority is given to the schemes where Water Users Associations (WUAs) are established and where water services are unreliable and inequitable, resulting in agricultural productivity substantially below potential. For agricultural intensification, a package of agricultural practices is also provided under the project. The project also involves an institutional reorganization to build up the capabilities of irrigation departments and farmer organisations.

12.6 WATER SECTOR RESTRUCTURING PROJECT

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

1. To set up an enabling institutional and policy frame work for water sector reform in the state for integrated water resources management.
2. To strengthen the capacity for strategic planning and sustainable development and management of the surface and ground water resources.
3. To initiate irrigation and drainage sub-sector reforms in the state to increase the productivity of irrigated agriculture through improved

surface irrigation system performance, and strengthened agriculture support services involving greater participation of users and the private sector in service delivery.

CHAPTER-XIII

INTERNATIONAL COOPERATION WITH NEIGHBOURING COUNTRIES

13.1 Cooperation between India and Nepal:

- Under the bilateral scheme "Flood forecasting and warning system on rivers common to India & Nepal", there are 42 hydrometeorological stations in Nepal territory and 18 stations in Indian Territory. Both the sides exchange data during flood season. A joint Task Force (JTF) and a Committee on Flood Forecasting (CFF) has been constituted for improving the existing flood forecasting scheme and a comprehensive flood forecasting master plan has been submitted in this regard by the Joint Task Force.

- In pursuance to the decision taken 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 (India) districts was constituted. Hydrological aspect of flood inundation problems in these districts were studied and assistance provided during Indo-Nepal joint meetings. Director, Hydrology(S) represents CWC in the High Level Technical Committee of Experts.

- With a view to discuss important issues pertaining to cooperation in the field 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 functioning with the mandate to act as an Umbrella Committee of all committee and group. Assistance was provided to the MoWR in connection with the activities of the Indo-Nepal Joint Committee on Water Resources (JCWR) and Joint Group of Experts (JGE).

- Under the Indo-Nepal bilateral co-operation, the scope of Pancheshwar multipurpose project is being actively discussed and defined to enable finalisation of the Detailed Project Report. The Mahakali treaty between His Majesty's Government of Nepal and Government of India as signed in 1996 lays down the framework for integrated development of the Mahakali River including Pancheshwar Project, Sarda Barrage Project and Tanakpur Barrage Project. Required field investigation for Pancheshwar multipurpose, with irrigation and incidental flood control benefits, have been completed and draft DPR taking re-regulating dam at Poornagiri prepared.

- During the goodwill visit of the Hon'ble Prime Minister of Nepal to India in December, 1991, HMG, Nepal and the Government of India reached an understanding to take up the joint studies/investigations to finalise the parameters of the Sapta Kosi High Dam Project and to prepare a Detailed Project Report at the earliest. Following the above understanding, a Joint Committee of Experts (JCE) was constituted, which was reconstituted in November, 1992 and renamed as Joint Team of Experts (JTE). The Indian side of JTE was again reconstituted in April, 2003 with Member (RM), CWC as its Team Leader and Member (HE)/Chief Engineer (CEA), Chairman/ Member, GFCC, JS&FA, MoWR, Commission (ER), MoWR and JS (NB), MEA as its Members with Chief Engineer (LGB), CWC, Patna as its Member Secretary. 5th Meeting of JTE was held in Kathmandu in June, 2003, wherein it was decided to establish Joint Project Office (JPO) in Nepal for taking up investigation and preparation of DPR of Sapta Kosi High Dam Multipurpose Project and Sun Kosi Storage-cum-Division Scheme.

13.2 Cooperation between India and China:

In light of the flash floods in the Brahmaputra and the Sutlej rivers due to heavy rains in Tibet (China) during the monsoon of 2001, it was felt necessary to set up a flood forecasting and warning system between India and China. The MOU and the implementation plan for transmission of data by the two sides has been signed in respect of three stations namely, Yanghen, Nugesha and Nuxia on Siang River located in China. Data from these stations are being received from the monsoon season of 2002. Historical data of last ten years have also been received from China, which is being used for development of flood forecasting model.

13.3 Cooperation between India and Bangladesh:

An arrangement exists since 1972 between India and Bangladesh for transmission of water level, discharge of rivers and rainfall data from India to

Bangladesh during the monsoon season (15th May to 15th Oct.) for improving the flood forecasting and warning system.

There are 13 sites in India for which data is being supplied to Bangladesh during the flood season (15th May to 15th October). Out of the 13 sites for which data is transmitted to Bangladesh, direct point to point exchange of data through wireless is made for 5 sites and data for 8 sites are sent through IMD as per the agreed arrangement.

The following arrangements are being followed as mutually agreed in the joint Indo-Bangladesh meeting held in August 2000.

Water level and discharge data of Pandu on the river Brahmaputra, twice daily at 0800 hrs. and 2000 hrs. IST.

Actual and forecast level of Goalpara/Dhubri/Silchar on the river Brahmaputra and the Barak respectively at or above warning level, twice daily at 0800 hrs. and 20.00 hrs. (IST)

In addition, the rainfall data when it exceeds 50 mm at Jalpaiguri, Coochbehar, Siliguri, Dhubri, Goalpara, Silchar and Torsa is also to be transmitted.

Point to point communication of water level continuously throughout the flood season, thrice a day at 0900 hrs., 1300 hrs. and 1800 hrs(IST) are as under:

- Manu at Kailashahar to Moulvi Bazar (Bangladesh)
- Gumti at Amarpur to Commillee (Bangladesh)
- Barrak at Badrapurghat to Sychet (Bangladesh)
- Actual and forecast level of Tista at Domohani to India (Bangladesh)
- Jaldhorka (Dhorla) at NH-31 to Kurigram (Bangladesh)
- Torsa (Dudhkumar) at Ghughumari to Kurigram (Bangladesh)

13.3.1 Joint Scientific Studies

During the lean period from 1st January 1997, the discharge observed at the Farakka site on the Ganga in India and at the Hardinge Bridge in Bangladesh indicated a regression pattern at Hardinge Bridge. The discharges received at Hardinge Bridge have been less than the release made at Farakka.

In view of the above, the Joint Committee in its meeting held on 20th April, 1997 recommended that a joint scientific study be made to identify the reasons/discrepancies and in the 32nd meeting of JRC a joint scientific study team was set up consisting of institutions/offices from both the countries as members of JSST.

13.3.2 Joint Observation of Ganga Water

The Joint observation team stationed at Farakka and Hardinge Bridge conducts joint observation from 1st January to 31st May every year as per procedure and guidelines framed by the Joint Committee on sharing of Ganga/Ganges water.

13.3.3 Joint Observation of Teesta Water:

The 4th Meeting of Joint Committee of Experts (JCE) on sharing of Teesta waters between India and Bangladesh was held at New Delhi on 27-28 August 2002.

The terms of reference for the Joint Scientific Study on the availability and requirement of Teesta waters in both the countries and Interim Agreement for sharing of Teesta water between Bangladesh and India were discussed in detail. The 5th meeting of JCE held at Dhaka in January 2003 to discuss unresolved issues in detail.

The Sixth meeting of JCE was held on 29th September, 03 at New Delhi for a logistic solution of sharing Teesta waters.

13.4 Cooperation between India and Bhutan:

A scheme sponsored by Ministry of External Affairs of Government of India to carry out Hydro-meteorological Observations in Bhutan on the rivers common to India and Bhutan is in operation since 1955. The exchange of data are not only useful for formulation of flood forecast to the stations located in India on these rivers but also for assessing Water resources potential. The data are transmitted on real time basis.

Under the scheme 19 nos. of hydro-meteorological stations and 8 nos. of wireless stations were set up. Subsequently these sites were handed over to Royal Govt. of Bhutan. Later on, during the year 1979 it was decided to formulate a separate scheme for setting up of flood forecasting system on rivers common to India and Bhutan. Accordingly, a scheme for collection and transmission of Hydro-meteorological data for the purpose of flood forecasting in India was approved and is being continued from VI plan period onwards. Presently, the network consists of 35 hydro-meteorological /meteorological stations located in Bhutan and being maintained by Royal Govt. of Bhutan. A Joint Experts Team consisting of officials from the Government of India and Royal Govt. of Bhutan to monitor this scheme was setup during 1979 which meets at regular intervals to review the progress and other requirements.

During the year, rehabilitation of work of Chenary Mini Hydel project was completed, field investigation for permanent remedial measures for Chukha Dam and its associated structures and geological & foundation

investigation and sub-surface exploration for preparation of for Punatsangchu H.E. project were taken up and are under progress and necessary designs and drawings in respect of Tala H.E. Project, Bhutan were provided.

13.5 Cooperation between India and Pakistan

Co-operation in the field of exchange of river data on a regular basis exists between India and Pakistan. India has also been communicating flood message to Pakistan during the period from 1st July to 10th October every year. The arrangement of communicating flood flow data to Pakistan of the Indus River System is via priority telegrams / broadcasting / telephones.

As per the stipulations of Indus Water Treaty (1960), flood messages in respect of river Chenab and river Tawi are transmitted telegraphically on priority basis to Commissioner (Indus), Pakistan during the flood season every year. These messages are sent by M&A Directorate / Chenab Division, CWC, Jammu. Commissioner (Indus, MoWR) is provided all the technical support by CWC to look after these bilateral arrangements.

Assistance was also provided to MOWR in respect of projects located in J & K and covered under the provisions of the Indus Treaty with Pakistan such as Baghlihar and Krishna Sagar H.E. Projects.

CHAPTER-XIV

COMPUTERISATION AND MODERNISATION

14.1 SYSTEM MANAGEMENT

The Computer Centre under Information System Organisation continued to provide technical support to various user Directorates in application and operational use of standard softwares and upgradation of data bank on water resources and related statistics. The centre also organises training programmes on application and operational use of standard softwares including use of Internet. Two courses were organised during the year.

14.2 WATER RESOURCES DATA

14.2.1 Hydrological Data

An integrated centralised data bank of hydrological data for non-classified basins has been created by Hydrological Data Directorate under Information System Organisation to ensure quick availability of the data to the users interested in further analysis of the data. The data bank was updated.

Under Hydrology Project I, the modernisation and computerisation of various field offices were undertaken. A dedicated data storage unit at New Delhi with real time connection to the Regional data centres has been setup. The Meta data of the various peninsular basins is available on line.

14.2.2 Water and Related Statistics

Database containing information on Water and Related Resources such as Rainfall in different Meteorological sub-divisions of the country, Water Resources Potential in the River basins of India, Basin-wise and State-wise Storage in India, State-wise Ultimate Irrigation Potential, Basin-wise Hydrological and Sediment Observation and Water Quality Stations of Central Water Commission, Flood Damages - Area Affected has been created in CWC. In addition to above, information/data indicated below has also been included in the database.

- Resources Utilisation including Plan-wise/State-wise Potential Created, Potential Utilised, Achievements of Irrigation Potential of Major & Medium Irrigation Projects (Surface Water)
- Production Related Performance & Economic Efficiency
- Financial Performance of State-wise and Plan-wise Financial Expenditure on Major & Medium Irrigation
- Social and Environmental performance of Major and Medium Irrigation Projects covered under Tribal Sub-Plan Area (All India Financial Progress and Physical benefits) has been compiled and being updated regularly.

14.3 DOCUMENTATION OF DATA

The following publications were finalized/ under finalisation:

(i) Water and Related Statistics- 2004.
(ii) Integrated Hydrological Data Book (Non-Classified Basins) 2003.
(iii) Country Wise Water & Related Statistics for selected countries, 2003.
(iv) Hand Book on Water & Related Information, 2003.
(v) Pricing of Water in Public System in India.

14.4 COMPUTERISATION ACTIVITIES IN CWC

Information technology is making rapid strides, and the capabilities and facilities becoming available on desktop are reaching levels that could not have been imagined few years back. The infrastructure for upgradation of Computerisation and Networking in CWC has been developed.

A scheme namely "Up-gradation & Modernisation of Computerisation / Information System in CWC" has been approved by MOWR for inclusion in the Xth five year Plan. Specific progress made in the implementation of this plan scheme are described below.

a) Hardware Resources:

i) Routing configuration of a 641-node network at Sewa Bhawan and West Block I & II has been done. The existing nodes having network cards have already been integrated and have been provided with internet connectivity through proxy server stationed at Sewa Bhawan. IP addressing based on V-Lans has also been established.
ii) Plotter system has been installed in D&R wing for facilitating preparation of drawings on computers.

b) Upgradation of Software and CAD / CAE Technology:

i) Upgradation of Finite Element Analysis facilities and augmentation of capabilities in the field of Non-Linear finite element analysis packages is completed. This includes upgradation / procurement of FEM packages such as NISA, IDEAS, NASTRAN, MARC etc.
ii) Implementation of CWC Intranet Software is in progress through M/s Centre for Development of Advanced Computing (C-DAC).
iii) Implementation of the Autocad Drafting package has been completed.
iv) Development of a state of art Information collection and dissemination package for CWC Hq Intranet is being developed by M/s C-DAC. The Shell programme is ready and has been tested with dummy data. Efforts are being made for entering actual data.

The scheme also envisages computerisation and modernisation of the Information Management in CWC including the Publication and Publicity units and Library.

CHAPTER-XV

TRAINING

15.1 TRAINING

In order to develop knowledge, technical and managerial skills of CWC personnel, Training Directorate arranges and co-ordinates training programmes/seminars/ workshops in water related fields for in-service officers of CWC and other Central Govt. Departments / Organisations and State Governments at all levels. These programmes are held both within and some outside the country, and officers of CWC are deputed to various National and International seminars, conferences, workshops etc. It also provides support to other professional organisations and societies and co-sponsors some of the National level seminars, conferences, workshops etc. Training Directorate, CWC also arranges Apprenticeship Training for fresh engineering graduates/ diploma holders/ vocational certificate holders in collaboration with Board of Apprenticeship Training, Kanpur. A few students of engineering degree courses are also given practical training in CWC every year. The training programmes organised during the year are given in Annexure XV-1.

15.2 INDUCTION TRAINING

Induction training to Assistant Directors recruited through UPSC is also being conducted by Training Directorate and National Water Academy of CWC located at Pune. The 18th Induction training course of 21 weeks duration for the newly recruited Assistant Directors was organised jointly by National Water Academy, Pune and Training Directorate, CWC in which 13 officers participated. This course commenced at NWA, Pune on 5th August, 2003 for 14 weeks duration and remaining 7 weeks duration was organised at CWC HQ. One field visit to Tehri HE Project site was also organised for the benefit of the officers.

15.3 NATIONAL WATER ACADEMY

National Water Academy, earlier named as Central Training Unit (CTU) was set up by the Ministry of Water Resources, Govt. of India under CWC, in the year 1988 to impart training to the in-service engineers of various Central/ State agencies involved in the Water Resources Development and Management. CTU was established under USAID assistance and strengthened with the subsequent assistance received from the World Bank under Hydrology Project.

To facilitate increased training activities, CTU has been upgraded to National Water Academy. This project was largely assisted by the World Bank at a total cost of Rs. 9.65 crore. The National Water Academy started

functioning in its new campus from May 2001 as the principal training centre in the field of Water Resources Development and Management.

National Water Academy provides adequate facilities to trainee officers by way of computers, library, accommodation, lodging, boarding and transport. NWA conducts long term as well as short term training courses on regular basis for in-service engineers, academicians and other professionals engaged in water sector.

During the year 2003–04, NWA conducted 32 training programmes of long as well as short duration. 818 officers from state/central agencies were trained during this year with total man-days of 1750. In addition to core faculty of National Water Academy, guest faculty comprising of officers from Central Water Commission, Ministry of Water Resources, CSMRS, CWPRS, University of Pune, local Engg. Colleges, NGOs, TISS (Tata Institute of Social Sciences), NRSA, GSI, Wild Life Institute of India (MOEF), Retd. CWC and State Engineers and eminent personalities from various fields were also to deliver lectures on invited to handle various subjects.

Advisory Board of NWA under the Chairmanship of Chairman, CWC held its Eleventh Meeting on 4th December, 2003 and reviewed the various activities of NWA. The Co-ordination and Monitoring Committee and the Purchase Committee of National Water Academy under the Chairmanship of Chief Engineer, NWA also met from time to time and took decisions regarding construction and infrastructural development of NWA.

Various training courses, workshops and seminars organised by NWA at Pune during 2003-04 is given at Annexure XV-2.

15.3 OTHER TRAINING PROGRAMMES/CONFERENCE/SEMINAR ETC.

The consolidated details of CWC officers deputed on training, seminars, workshops, conferences etc, within the country and abroad during the year 2003 – 2004 are given below.

Sl. No.	Name of activities	No. of Participants
1	Sponsoring officers for training, seminars/ workshops etc. in India organised by other organisations	284
2	Sponsoring officers for training, seminars/ workshops/delegations etc. abroad	18

15.4 OTHER ACTIVITIES

i) CWC engages certain number of graduate/diploma/10+2 passed vocational trainees for a period of one year under Apprenticeship Act

1961. During the year 2003-2004, 73 graduate engineers/Diploma holders/Vocational Certificate holders were imparted training.

ii) As part of interaction with academic institutions, on the job practical training of 4 to 6 weeks, 50 engineering and secretarial practices students from various institutions were imparted practical training.

iii) Organised lectures on various subjects for the benefit of CWC officers under study circle.

iv) Two CWC officers were deputed for "48th Postgraduate Diploma Course in Water Resources Development" at WRDTC, IIT, Roorkee and one for "32nd Postgraduate Diploma Course in Hydrology" at IIT, Roorkee.

Annexure XV-1 (a)

Courses Organised by Central Water Commission during the year 2003–2004

Sl. No.	Name of the Course	No. of days	Venue of the Course	No. of Officers/ officials Nominated
1.	Hindi Workshop	5	New Delhi	30
2.	Training on O&M Matters	3	Lucknow	30
3.	Review of Design flood of Existing Projects	4	Pune	13
4.	Programme on SWDES	5	Coimbatore	10
5.	Window Explorer, Internet Explorer and MS Office	5	New Delhi	10
6.	Quality Control Aspects of Irrigation Projects	5	Kalindi Bhawan	19
7.	Use of Mike 11	5	Jaipur	10
8.	Hindi Workshop	5	Hyderabad	30
9.	Use of Computers and Hindi Word Processing	5	New Delhi	17
10.	Techno Economic Appraisal of Water Resources Projects	3	Nagpur	44
11.	Appreciation Course on Wireless Installation, Operation and Maintenance	5	Lucknow	30
12.	Review of Design flood of Existing Projects	4	Bhubaneswar	19
13.	Monitoring of Quality Control in Irrigation Projects	3	Bangalore	35
14.	Refresher Course on Discharge Measurement & Site Maintenance of FCS&ADCP	4	Hyderabad	15
15.	Hindi Workshop	3	New Delhi	30
16.	Handling of CAT cases	3	Bangalore	24
17.	Hindi Workshop	5	Vadodara	33

Sl. No.	Name of the Course	No. of days	Venue of the Course	No. of Officers/ officials Nominated
18.	Hydrological Observation and Compilation (2nd Course)	5	Silchar	25
19.	Refresher Course on Water Quality, Measurement and Processing of Data	3	Kalindi Bhawan	35
20.	Water Quality (Conducted Under HP)	4	Site Under Coimbatore	15
21.	Programme on HYMOS (Conducted Under HP)	11	Coimbatore	10
22.	Dam Safety Studies, Analysis and Review of Hydrology of Projects	6	Coimbatore	20
23.	Workshop on Emergency Action Planning	3	New Delhi	21
24.	Use of Mike 11 for Flood Forecasting	5	New Delhi	9
25.	Hindi Workshop	5	Patna	35
26.	Hydrological Observation and Flood Forecasting Methodology (1St Course)	5	Guwahati	20
27.	Geological Investigation & Foundation Treatment of River Valley Projects	5	New Delhi	22
28.	Introduction to Hydrometeorological Observation and Water Quality	5	Varanasi	30
29.	Course on Application of Computer Package	5	Silchar	25
30.	Installation, Operation and Maintenance of W/L Sets	4	Guwahati	30
31.	Use of Mike 11 for Flood Forecasting	5	Bhubaneswar	10

Annexure XV-1(b)

Participation in various Training/Seminars/Symposia/ Conferences abroad

Topic of Programme/Venue/Period	Participant
14th Session of World Meteorological Congress, Geneva, Switzerland, 16th to 22nd May, 2003.	S Mahto, Dir
South Asia Regional Workshop on Global Programme of Action for the Protection of the marine Environment from Land-based Activities (GPA), Colombo (Sri Lanka), 28th to 30th April, 2003.	Rajendra Kumar Khanna, Dir
SIDA Advanced International Training Course on Operational Hydrology: Technology and Management, Norrkoping, Sweden, 25th August to 26th September, 2003.	Sakti Sarraf, DD Nitya Nand Rai, DD
Regional Workshop on Ensuring Flood Security for Sustainable Urbanization in the Asia Pacific Region, Bangkok (Thailand), 27th to 30th July, 2003.	R Jeyaseelan, Chairman
Training on Water and Wastewater Management, Singapore, 11th to 22nd August, 2003 under the Singapore Cooperation Programme Training Awards (SCPTA).	SK Arora, DD
Dushanbe International Fresh Water Forum, Dushanbe (Tajikistan), 29th August to 1st September, 2003.	SK Das, Member
Study Tour for Appropriate Use of Geomembrane for Canal Lining in India, M/s Mott MacDonald, Egypt & USA, 30th August to 8th September, 2003.	Vinay Kumar, Dir
13th Stockholm Water Symposium and 8th Annual Meeting of Consulting Partnership of the GWP, Stockholm (Sweden), 11th to 15th August, 2003.	MK Sharma, Member
International Conference on Global Developments in Water Industry Performance Bench Marking organized by The Office of Water Regulation, held at Perth (Australia) during 29th September to 2nd October, 2003.	BD Pateria, CE
International Conference on Accelerated Construction of Hydropower Projects, CBIP, Gedu (Bhutan), 15th to 17th October, 2003.	IK Chugh, Dir Praveen Kumar, DD Dr KKM Menon, Dir PR Chopra, Dir
54th International Executive Council Meeting of International Commission on Irrigation and Drainage (ICID) and 20th European Regional Conference, Montpellier (France), 14th to 19th September, 2003.	R Jeyaseelan, Chairman
International Workshop on Aquatic Resources are more than Fish: The Ecosystem Approach in Inland Fisheries and Role of Intra- Country Linkages, World Fish Centre, Penang, Malaysia, 12th to 16th January, 2004.	VY Ramamurthy, Dir

Second Asian Regional Conference of International Commission on Irrigation and Drainage (ICID), ICID, Echuca, Australia, 14th to 18th March, 2004.	R Jeyaseelan, Chairman
24th USSD Annual Meeting and Conference (Theme: Working Rivers- Balanced Resource Management), United States Society of Dams, St. Louis, Missouri, USA, 28th to 31st March, 2004.	SKG Pandit, Dir

Annexure XV-2

Training programmes conducted by NWA during 2003-2004

Sl. No.	Name of the Course	Duration (Weeks)	No. of Participants
1.	Training-cum-Workshop on Mediation of Water Disputes	3 days	12
2.	Application of FEM/FEA in Designing Water Resources Structures	2	15
3.	Training of Trainers in Hydrometry	1 ½	17
4.	Workshop on Conservation of Water in Agricultural and Industrial Sector	1 day	100
5.	Investigation for Planning and Formulation of Hydropower Projects	2	13
6.	IWRM Course with RIBASIM Software	2	16
7.	Environmental Management for River Valley Projects	1	25
8.	Refresher Course in HYMOS	1	11
9.	Workshop on River Basin Organisations	2 days	54
10.	Second Training Programme on Economic Analysis of Irrigation Projects	2	23
11.	Training Programme on water harvesting and ground water recharging	1	47
12.	Training of Trainers in Participatory Irrigation Management	1	34
13.	Eighteenth Induction Training Course for newly appointed Assistant Directors of CWC	14	13
14.	Workshop on Review of Design flood of Existing Projects	1	20
15.	Training Course on Watershed Development and Management	1	24
16.	Refresher Course in HYMOS Course	1	7
17.	Training Course for media personnel under MOWR Media Fellowship Programme	2	19
18.	Basic HYMOS Course	2	23
19.	Workshop on Participatory Resources Mapping	1	25

Sl. No.	Name of the Course	Duration (Weeks)	No. of Participants
20.	Second Training Course on Flood Management and Flood Forecasting	1	19
21.	Training Course on Hydrology and Hydrometeology for Cabinet Secretariat	1	1
22.	Training Course on Coastal Erosion, Protection and coastal management	1	20
23.	Construction Aspects of Hydropower Projects for NTPC officers	10	16
24.	Training Course on Command Area Development with special emphasis on equitable distribution of water including Warabandi, Shejpli System & Participatory Irrigation Management	1	32
25.	Training-cum-Workshop on Freshwater for school Teachers	1 day	57
26.	Induction Training Course for NTPC Engineers	19	37
27.	Sixth Training Course on Application of RSGIS Techniques for WRD projects	2	30
28.	Workshop on Inter-basin water transfer issues and options	2 days	66
29.	Third Training Course on Economic Analysis of Irrigation Projects	2	22
30.	Management Development Programme for Senior Level Officers	4 days	21
31.	Training Programme on Geo-Media Software for NWA Faculty	2 days	7
32.	Field visit to Water Resources Projects for college students from Pune	1 day	26

CHAPTER–XVI

VIGILANCE

16.1 DISCIPLINARY CASES

The Vigilance/ Disciplinary cases and complaints received against officers & staff of CWC received proper and prompt attention. During the year 2003-04, 39 complaints were received and taken up for investigation. Investigation was completed in 36 cases (including old cases) and final decision was taken in respect of 32 cases out of which in 16 cases, the officials found guilty were awarded major/minor penalties. The break-up of vigilance/disciplinary cases in respect of different category of officers and staff is as follows:-

Category of Officers/Staff

	Particulars	**Gr.A**	**Gr.B**	**Gr.C**	**Gr.D**
a)	No. of cases pending at the beginning of the year	34	10	35	12
b)	No. of cases added during the year	10	6	17	6
c)	No. of cases in which investigation was completed	15	10	9	2
d)	No. of cases disposed of during the year	14	6	7	5
e)	No. of cases pending at the end of the year (a+b-d)	30	10	45	13

One short term training course on vigilance/disciplinary matters for the benefit of officers and staff of field offices of CWC was conducted at Bhubaneswar from 28.04.2003 to 02.05.2003. Vigilance Awareness Week was observed in CWC HQ and its 4 regional offices during the period 03.11.2003 to 07.11.2003.

16.2 REDRESSAL OF GRIEVANCES

Effective measures have been taken to strengthen the machinery for the redressal of grievances in respect of the serving persons and the retired persons of CWC. Secretary, CWC has been designated as Staff Grievances Officer to deal with the cases of serving/retired personnel, which are not redressed in the normal channels. Both public grievances and that of Staff are redressed suitably.

The progress made in the disposal of pending grievance cases during the year 2003-04 is as under :-

Pending grievance cases as on 31.3.2003	Cases received during the year 2003-04	No. of cases disposed off during 2003-04	No. of cases pending on 31.3.2004
31	56	29	58

A Complaint Committee was constituted under the chairmanship of a Under Secretary to look into the complaints of women employees working in Central Water Commission at the Headquarter and also in its field formations.

CHAPTER–XVII

REPRESENTATION OF CENTRAL WATER COMMISSION IN VARIOUS COMMITTEES

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

17.1 COMMITTEES REPRESENTED BY CHAIRMAN CWC

Sl. No.	Name of Committees/Boards/Panel of Experts/Technical Groups etc.	Position of Chairman, CWC
	WATER PLANNING AND PROJECTS WING	
1.	The National Water Development Agency (NWDA) Society under MOWR	Member of Governing Body
2.	Technical Advisory Committee of National Water Development Agency	Chairman
3.	National Water Board (NWB) of the National Water Resources Council	Member
4.	Group to speed up the process of arriving at consensus amongst the States on the proposals of inter-basin water transfer of NWDA	Chairman
5.	High Powered Committee (HPC) on Maintenance of Minimum Flow of River Yamuna	Member
6.	Working Group of National Water Board	Chairman
7.	Joint Panel of ICAR-CWC with the Problems relating to optimizing the return from the investment in Irrigation	Chairman/ Associate Chairman Alternate Years
8.	Indian National Committee on Irrigation and Drainage (INCID)	Chairman
9.	Selection Committee for i) JAIN-INCID Sookshma Sinchai Puraskar ii) JAIN-INCID Krishi Sinchai Vikas Puraskar	Chairman
10.	Cauvery Monitoring Committee (CMC)	Member
11.	International Commission on Irrigation & Drainage (ICID)	Vice-President
12.	Standing Committee on Water Resources (SC-W) of Planning committee of National Natural Resources Management System (PC-NNRMS) of Planning Commission	Member
13.	Betwa River Board	Invitee
14.	Executive Committee of Betwa River Board	Chairman
15.	Bansagar Control Board	Invitee
16.	Executive Committee of Bansagar Control Board	Chairman
17.	Board of Governors(BOG) of National Institute of Construction Management and Research (NICMAR)	Member
18.	Advisory Committee for consideration of Techno Economic viability of Major Medium Irrigation, Flood Control and Multipurpose project proposals	Member
19.	Committee for expediting Environment/Forest clearance of	Chairman

	TAC cleared projects	
DESIGNS & RESEARCH WING		
Sl. No.	**Name of Committees/Boards/Panel of Experts/Technical Groups etc. and reference to its Notification**	**Position of Chairman, CWC**
20.	Farakka Barrage Control Board	Member
21.	Governing Council for the Central Water & Power Research Station, Pune	Member
22.	Technical Advisory Committee to the Governing Council for Central Water and Power Research Station, Pune	Chairman
23.	Governing Council for Central Soil & Materials Research Station	Member
24.	National Committee on Dam Safety (NCDS)	Chairman
25.	Committee of Technical Experts for advising on the problems to O&M of Bhakhra Nangal & Beas Project (Irrigation Wing)	Chairman
26.	National Institute of Hydrology Society	Member
27.	Governing Body of National Institute of Hydrology	Member
28.	Technical Advisory Committee of National Institute of Hydrology	Chairman
29.	Indian National Committee on Hydrology (INCOH)	Chairman
30.	Sardar Sarovar Construction Advisory Committee	Member
31.	Narmada Control Authority	Invitee
32.	Review Committee of Narmada Control Authority	Invitee
33.	Science and Technology Advisory Committee (STAC-MOWR)	Member
34.	General body of NWDA, New Delhi	Member
35.	Governing body of NWDA, New Delhi	Member
RIVER MANAGEMENT WING		
36.	Steering Committee for the preparation of Status Report on Water Resources Requirements and its availability for urban areas.	Co-Chairman
37.	Monitoring Committee for the National River Conservation Plan (NRCP)	Member
38.	Water Quality Assessment Authority (WQAA)	Member
39.	Steering Committee of National River Conservation Plan (NRCP)	Member
40.	Water Resources Division Council (WRDC) of BIS	Chairman
41.	High Powered Review Board of Brahmaputra Board	Member
42.	Ganga Flood Control Board	Invitee
43.	ICID Working Group on comprehensive approaches to Flood Management (WG-CAFM)	Member
44.	Joint Group of Experts on Pancheshwar Multi purpose Project	Team Leader
45.	Indo-Nepal Joint Committee on Water Resources	Member
46.	International Committee on Irrigation & Drainage (ICID)	Vice President
HUMAN RESOURCES MANAGEMENT WING		
47.	Standing Committee on Education & Training	Chairman

17.2 COMMITTEES REPRESENTED BY MEMBER (WP&P)

Sl. No.	Name of the Committee / Board / Panel of Experts	Position of Member (WP&P)
1.	Upper Yamuna River Board	Chairman
2.	National Environmental Monitoring Committee	Chairman
3.	Joint Operation Committee for Rihand Dam	Chairman
4.	Contracts Works Sub Committee of Betwa River Board	Chairman
5.	Sub-Committee for processing tenders and proposals for purchase of stores & equipments of Bansagar Control Board	Chairman
6.	Sub Committee of officers to consider the claims of M/s HSCL in Earth Dam- Lot of Rajghat Dam Project	Chairman
7.	Committee for settlement of claims of M/s N.P.C.C. Ltd of Betwa River Board	Chairman
8.	Sub-Committee to examine and process claim cases of contractors of Bansagar Control Board	Chairman
9.	Monitoring committee for non-structural aspects of the proposed Tipaimukh Multipurpose Project	Chairman
10.	Technical Advisory Committee on Socio-Economic, Agro-economic and Environmental Impact studies	Chairman
11.	Screening Committee for selection of arbitrators on Arbitration Boards.	Chairman
12.	Informal interdisciplinary group of officers of WP&P Wing	Chairman
13.	Joint regulation committee of Chandil Dam and Galudih Barrage	Chairman
14.	Sub-Committee on Irrigation, Performance Assessment History, Education, Training, Research & Development	Chairman
15.	Standing Project Appraisal committee of Central Water Commission	Chairman
16.	Joint Regulation Committee of Kharkai Dam	Chairman
17.	Water Resources Planning Management and evaluation Sectional Committee-WRD-06 (BIS)	Chairman
18.	Recommendation of National Commission for Integrated Water Resources Development (NCIWRDP) Task Force for reporting guidelines for reporting figures of Irrigation of Irrigation Potential created and utilized in a uniform manner	Chairman
19.	Task Force for Flood Management in the country (North Western Region	Chairman
20.	To evaluate the Job Norms for the Engineering Technical Activities being done in CWC and it s field offices	Chairman
21.	Committee for Cost Sharing of Hathnikund Barrage	Chairman
22.	Sub-Group-1 for Research topics under invited reserved Category	Chairman
23.	Sub-Group-II Rain Water Harvesting connection in Ground Area for use in Supplementary Canal Water	Chairman
24.	Committee for the Re-organised UP/ Uttaranchal States	Chairman
25.	Committee for Re-organised Bihar/ Jharkhand States	Chairman
26.	Regulation Committee of Bansagar Reservoir	Vice-Chairman
27.	Working Group of National Water Board	Vice Chairman

28.	National Water Board (NWB) of the National Water Resources Council	Member-Secretary
29.	Upper Yamuna Review committee	Member-Secretary
30.	The National Water Development Agency (NWDA) Society under MOWR	Member of Governing Body
31.	Technical Advisory Committee of NWDA	Member
32.	Group of Inter Basin Water Transfer Proposal of NWDA	Member
33.	Indian National Committee on Irrigation & Drainage (INCID)	Member
34.	Working Group of (INCID) on capacity building	Member
35.	Working Team on Socio-Economic Impacts & Policy Issues (ICID)	Member
36.	Standing Committee for overall National Perspective Water Planning and Coordination in relation to diverse use of water	Member
37.	Committee constituted by Hon'ble Supreme Court of India in the matter of WP No.914 / 96 (Sector, 14 Resident Welfare Association Noida versus Union of India & Others)	Member
38.	Joint Panel of Indian Council of Agriculture & Research (ICAR) - Central Water Commission	Member
39.	Executive committee of Betwa river Board	Member
40.	Executive committee of Bansagar Control Board	Member
41.	Committee Constituted by Hon'ble Supreme Court of India in matters of WP (Civil) No.725/94. News item in Hindustan Times on "And quiet flow the Mainly Yamuna versus Central Pollution Control Board and others".	Member
42.	Advisory Board of National Water Academy (NWA), Pune	Member
43.	Standing Committee on Rural Development (SC-R) of Planning Committee of National Natural Resources Management System (PC-NNRMS) of Planning Commission	Member
44.	Committee for Eastern River Water of Indus System of River	Member
45.	National Watershed Committee	Member
46.	Central Loan Assistance under Accelerated Irrigation Benefits Programme	Member
47.	Advisory Committee on Irrigation, Flood Control and Multipurpose Projects of Ministry of Water Resources	Special Invitee
48.	Steering Committee of Indian National Committee on Hydrology (INCOH)	Permanent Invitee
49.	Sardar Sarovar Construction Advisory Committee	Invitee
50.	High Powered Committee-Yamuna Action Plan of Ministry of Environment and forest	Invitee

17.3 COMMITTEES REPRESENTED BY MEMBER (RM)

Sl. No.	Name of the Committee / Board / Panel of Experts / Technical Groups etc.	Position of Member (RM)
1	Technical Advisory Committee for Flood Control, Drainage and Anti-Sea Erosion Schemes (GOA)	Chairman
2	State Technical Advisory Committee (Floods) (KARNATAKA)	Member
3	Subernarekha Embankment Committee (ORISSA , WEST BENGAL & BIHAR)	Chairman
4	Advisory Committee on Irrigation, Flood Control and Multipurpose Projects	Special Invitee

5	Working Group to advise WQAA on the minimum flow in the rivers	Chairman
6	National Co-ordination Committee for Hydrology Project	Chairman
7	R&D Evaluation Committee under Hydrology Project	Chairman
8	High Level Technical Group (HLTG) on Surface Water for Hydrology Project	Chairman
9	National Level Steering Committee for Hydrology Project	Member
10.	Steering Committee for the Preparation of Status Report on Water Resources requirements and its availability for Urban Areas	Member
11	Coastal Protection and Development Advisory Committee (CPDAC)	Chairman
12	National Coastal Zone Management Authority (NCZMA)	Member
13	Ghaggar Standing Committee	Chairman
14	Yamuna Standing Committee	Chairman
15	Sahibi Standing Committee	Chairman
16	Apex Committee constituted under the Chairmanship of Hon'ble Chief Minister of Delhi to recommend, supervise and co-ordinate flood control measures in the NCT of Delhi	Member
17.	Flood Control Board set up by the Irrigation and Flood Control Department of Govt. of NCT of Delhi	Member
18.	Brahmaputra High Powered Review Board	Permanent invitee
19	Committee for Flood Control Works in Brahmaputra Valley	Member
20.	Standing Committee to Brahmaputra Board	Member
21.	Brahmaputra Board, Govt. of India by Act of Parliament	Member
22.	West Bengal State Committee of Engineers	Member
23.	Ganga Flood Control Commission	Member
24.	Kosi High Level Committee	Member
25.	DVRR Committee	Chairman
26.	WRD 01 Sectional Committee of BIS for Fluid Flow Measurements	Charman
27	Sub-Committee-III (Flood Management, Drainage and Environment Impacts) of INCID	Chairman
28.	INCID Working Group on Drainage (WG-DRG)	Member
29.	MHA cyclone monitoring & mitigation group	Member
30	Joint Group of Experts on Pancheshwar Multi-purpose project	Special Invitee
31.	Joint Team of Experts (JTE) on Sapta Kosi Project	Team Leader
32.	Committee for examination of technical issues regarding Baglihar Hydro-Electric projects on the Chenab Main in J&K	Member
33.	TAC to Assam State Brahmaputra Valley Flood Control Board	Member
34.	TAC to Cachar Flood Control Board (Assam)	Member

17.4 COMMITTEES REPRESENTED BY MEMBER (D&R)

Sl. No.	Name of the Committee / Board / Panel of Experts	Position of Member (D&R)
1	Governing Council for Central Soil & Materials Research Station, New Delhi.	Member
2	Standing Technical Advisory Committee (STAC) to the Governing	Chairman

	Council for CSMRS, New Delhi.	
3	Technical Advisory Committee of the Farakka Barrage Project.	Chairman
4	Committee for Monitoring the progress of Farakka Barrage Project.	Chairman
5	Committee for monitoring structural aspects of proposed Tipaimukh Multipurpose Project.	Chairman
6	Technical Co-ordination Committee (TCC) for Tala HE Project, Bhutan.	Co-Chairman
7	Committee of CEA to accord Techno-Economic appraisal of Power Schemes.	Pmt. spl. Invitee
8	NHPC Performance Review Committee	Member
9	Technical Advisory and Review Committee (TARC) for preparation of PMP Atlas	Chairman
10	World Meteorological Organisation	Advisor
11	Civil Engineering Division Council, Bureau of Indian Standards.	Principal Member
12	Board of Directors Tehri Hydro Development Corpn. Ltd.	Director
13	NIH Society	Member
14	Research Advisory Committee (RAC) of National Council of Cement and Building Materials	Member
15	Board meeting of Tala H.E. Project Authority (THPA), Bhutan	Invitee being Co-Chairman of TCC for Tala HE Project
16	Technical Advisory Committee to National Water Development Agency (NWDA)	Member
17	Governing Body of National Water Development Agency (NWDA)	Member
18	General Body of National Water Development Agency (NWDA)	Member
19	Water Resources Division Council (WRDC) of BIS	Member
20	Civil Engineering Division Council (CEDC) of BIS	Member
21	Governing Body of National Institute of Rock Mechanics (NIRM)	Member
22	General Body of National Institute of Rock Mechanics (NIRM)	Member
23	Science and Technology Advisory Committee	Member
24	Board of Management of Geological Survey of India	Member
25	Board of Consultants for Koyna Dam	Member
26	National Committee on Dam Safety (NCDS)	Vice Chairman
27	Indian National Committee on Hydraulic Research (INCH)	Chairman
28	R&D Implementation and Monitoring Committee(RIMC)	Chairman
29	National Committee on Seismic Design Parameters of River Valley Projects (NCSDP)	Chairman
30	WRD9, Dams & Reservoir Sectional Committee of BIS	Chairman
31	WRD15, Hydro-electric Power House Structures Sectional Committee	Chairman
32	Board of Directors National Hydro Power Corporation (NHPC)	Part time Director
33	Board of Directors of Satluj Jal Vidyut Nigam Ltd. (SJVNL)	Director
34	TAC of Kolkatta Port Trust	Chairman

17.5 ACTIVITIES OF SOME IMPORTANT COMMITTEES

17.5.1 National Committee On Dam Safety (NCDS)

The National Committee on Dam Safety (NCDS) was constituted by the Government of India in October 1987 by broad basing the then existing Standing Committee to include all the States having significant number of large dams. The National Committee was reconstituted three times i.e. first in December 1989, again in July 1993 and in November 1997 to include States/agencies having significant number of dams. This Committee oversees dam safety activities in various States/Organisations and suggests improvements to bring these in line with the latest procedures consistent with the Indian conditions. It acts as a forum for exchange of views on techniques adopted for rehabilitation of old dams in distress. The Committee also monitors follow-up action on recommendations of the report on Dam Safety Procedures circulated in July 1986.

The 25th meeting of this Committee was held on 16.12.2003 at Sewa Bhawan, CWC, New Delhi, under the Chairmanship of Chairman, CWC. The meeting was attended by the representatives from 12 States besides 5 other organizations namely, DVC, NHPC, BBMB, GSI and IMD. Major dam safety issues were discussed and deliberated during the meeting. Chairman, NCDS emphasised the necessity of Dam Safety Act and requested the members to bring in legislation in their respective states. Several follow-up issues on dam safety were also discussed.

17.5.2 National Committee on Seismic Design Parameters (NCSDP)

NCSDP, earlier known as "Standing Committee to suggest Design Seismic Coefficient of Hydraulic Structures in River Valley Projects" was reconstituted in Oct., 1991. Member (D&R), CWC is the Chairman of this Committee. The meetings of this Committee are convened normally once in a year to finalise the seismic design parameters for the various river valley projects referred to the NCSDP. The 13th meeting was held on 18th December, 2003 in which the design seismic parameters for 19 river valley projects were discussed and seismic design parameters for 10 projects were finalized. Modification in the parameters was suggested in case of two projects and site-specific seismic studies were recommended for the remaining 7 projects. With a view to standardise the procedure, guidelines for site specific seismic study for river valley projects have been formulated by NCSDP and circulated to all States and Central Agencies.

17.5.3 Indian National Committee on Hydraulic Research (INCH)

INCH is one of the five Indian National Committees (INCs) constituted by the Ministry of Water Resources to promote research work in the field of hydraulic structure and river hydraulics, environmental hydraulics, drainage

and reclamation, coastal and estuarine hydraulics and hydraulics machinery. INCH is entrusted with the promotion and funding of research work in the above fields. During the year, the meetings of INCH Sub Committees on *Coastal Estuarine Hydraulics and Hydraulic Machinery* were held on 30.4.2003, 18.8.2003 and 8.1.2004 respectively. During the financial year, funds were released for one research scheme "Design of stilling Basin and Flexible Aprons for Barrages under Variable Hydraulic Conditions" at IIT Kharagpur. Further, two research schemes, one at IIT Madras and other at KREC, Surathkal have been recommended to MOWR for funding.

17.5.4 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. Chairman, Central Water Commission is the Chairman of the committee with the members drawn from Central and State Governments as well as experts from academic and research organizations besides a few members drawn from non-Governmental professional associates. The committee gets a feed back from states and coordinates activities at State level through state co-ordinators.

INCOH plays an active role for implementation of UNESCO sponsored International Hydrological Programme (IHP) and relevant activities were continued during the year.

17.5.5 COMMITTEE FOR EXPEDITING ENVIRONMENT/FOREST CLEARANCE OF TAC CLEARED PROJECTS

In pursuance of the decision taken in the meeting of Standing Committee of Secretaries (SCOS) on 15th November 2002, during the year the Chairman CWC took region wise review meeting with the Irrigation Secretaries, Forest Secretaries and Principal Chief Conservator of Forests of State Governments of Madhya Pradesh and Orissa and Regional Chief Conservator of Forests of Ministry of Environment to discuss pending issues of environmental and forest clearance of the projects of these states. Three more regional meetings were held to discuss forest clearance as well as rehabilitation and resettlement plans in respect of projects of AP, Karnataka, HP, Rajasthan, UP, Assam, Goa, Maharashtra, and Manipur. 57 projects from 11 states were thus discussed in the four region wise meetings during 2003-04.

17.5.6 Consensus Group

In pursuance of the decision taken in the 42nd meeting of the Governing Body of NWDA, a group has been constituted under the Chairman, CWC to discuss and expedite the process of arriving at consensus amongst the States regarding the sharing of surplus water as well as issues of

preparation of detailed project report of schemes regarding interlinking of rivers. The second meeting of the Group on the inter-basin water transfer proposals of NWDA for Ken Betwa link was held on 12th November, 2003 at New Delhi under the Chairmanship of Chairman, Central Water Commission. In the meeting both U.P. & M.P. agreed to revise their indicative master plan based on the virgin yield of 6188 Mm3 at 75% dependability at proposed Daudhan dam site. Although State of M.P. accepted the Ken Betwa link project in principle but the State of U.P. had certain apprehensions on this project.

17.5.7 World Water Council

The World Water Council (WWC) is an International Organisation, which makes and approves the Policy on water. The Central Water Commission (CWC) is a Member of this organisation. A centre of WWC has been set up in New Delhi to promote the activities of WWC in India. Global Water Partnership (GWP) is an International Organisation, which is semi-official in nature and discusses the policy papers on water at global level and then puts it to WWC for further consideration. Indian National Committee on Irrigation and Drainage (INCID) is a Member of GWP from India. There is one regional water partnership for South Asia Region with a Technical Advisory Committee for South Asia Region (SASTAC). At country level, a Non-Governmental Organisation has been formed which is named as India Water Partnership (IWP). CWC is represented in the Steering Committee of IWP. The Chairman, CWC is one of the Members of this Steering Committee. Irrigation Planning (South) Directorate functions as a nodal Directorate for all the works related to World Water Council.

17.5.8 International Commission on Irrigation And Drainage (ICID)

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

17.5.8.1 Committees/Working Groups Under ICID

Various committees/Working Groups have been constituted by ICID on which the CWC officers are represented to promote the above activities

S.N.	Name of the Committee	Member
1	Permanent Finance Committee	Shri A.D. Mohile, Ex. Chairman, INCID and CWC
2	Working Group on Capacity Building Training and Education	Shri Suresh Chandra, Ex. Member (WP&P), CWC
3	Working Group on Drainage	Shri S.K. Das, Ex. Member (RM), CWC
4	Working Group on comprehensive Approaches to Flood Management	Shri R. Jeyaseelan, Chairman, CWC
5	Working Group on History of Irrigation, Drainage and Flood Control.	Shri B.D. Pateria, CE, CWC

17.5.8.2 Executive Council of ICID

The 54th International Executive Council (IEC) meeting of ICID and 20th European Regional Conference were held from 14th to 19th September 2003 at Montpellier, France. During the meeting Shri R. Jeyaseelan, Chairman, CWC & INCID was elected as one of the Vice-Presidents of ICID. He has been allocated the region/National Committees of South Asian countries covering Australia, Bangladesh, Pakistan, Sri Lanka, Myanmar and India.

17.5.8.3 Watsave Award 2003

Search & Selection Committee comprising of Member (WP&P), CWC, CE (IMO), CWC and CMD (WAPCOS) was constituted to review the nominations for ICID WATSAVE Annual Awards, 2003 in three categories. 15 nominations as received were processed and the committee recommended for the nomination of awards to ICID for consideration.

17.5.9 Indian National Committee On Irrigation And Drainage (INCID)

Indian National Committee on Irrigation and Drainage (INCID) was constituted in 1990 by Ministry of Water Resources. The Chairman, CWC is the chairman of INCID and Member (WP&P) is one of its members. The secretariat of INCID is located at New Delhi

The INCID pursues the mission and activities of ICID in India. It also looks into the R&D activities in Irrigation and Drainage sectors. To promote research schemes and for their expeditious processing and monitoring, four Sub-Committees of INCID have been constituted. These are

(i) Irrigation Performance Assessment, History, Education, Training, Research and Development;
(ii) Crops, Water Use and drought management, Micro and Mechanized Irrigation
(iii) Flood Management, Drainage and Environmental Impacts, and
(iv) Construction, Rehabilitation and Modernisation Operation, Maintenance and Management.

Two Sub-Groups and one Working Group were also constituted under invited research category. The 23rd meeting of INCID was held on 28th October 2003. The 7th meeting of INCID Sub-Committee-I was held on 3.6.2003 under the Chairmanship of Member (WP&P), CWC. The fourth R&D Review Session of INCID was held on 27-28th November 2003 at Water Technology Centre, TNAU, Coimbatore. The session was organized to take a review of the ongoing research scheme, identification of areas needing attention along with suggestions for improving the implementation and for taking up of new schemes. During these meetings, 11 schemes estimated to cost Rs. 3.16 crores were approved for funding and reports of 6 schemes accepted.INCID is also actively associated with the publication of technical literature. The important publications brought out by INCID during 2003-04 are:

1. History of Irrigation Development in Andhra Pradesh.
2. Report on Participatory Irrigation Management(PIM)

17.5.10 TAC OF NWDA

Chairman, CWC is the Chairman of the Technical Advisory Committee (TAC) of NWDA and Member (WP&P) and Member (D&R), CWC are Members of TAC of NWDA. 32nd meeting of TAC of NWDA was held on 8th September, 2003. In the meeting, the technical aspects of feasibility reports of following five feasibility reports were discussed.

ii) Feasibility report of Par-Tapi-Narmada link project.
iii) Feasibility report of Ken-Betwa Link Project.
iv) Feasibility report of Godavari (Polavaram)- Krishna (Vijayawada) Link project.
v) Feasibility report of Krishna (Srisailam)- Pennar link Project.
vi) Feasibility report of Krishna (Nagarjunasagar)- Pennar (Somasila) Link Project.

In addition, the status of different preliminary water balance studies pertaining to Peninsular rivers development component as well as Himalayan rivers development component were reviewed during the meeting.

17.5.11 Technical Advisory Committee OF NIH

The Research Programmes and other Technical activities of NIH are monitored and guided by Technical Advisory Committee of NIH headed by Chairman, CWC. Member (D&R) and Chief Engineer, Hydrological Studies Organisation are the Members of the TAC. The 49th & 50th meetings of TAC were held on 23.10.2003 & 24.3.2004 respectively. TAC gets feedback from 3 Working Groups on Surface Water, Ground Water and Hydrological Observation and Instrumentation. Chief Engineer, HSO and Chief Engineer, BPMO, CWC are the Members of the Surface Water Group and Chief Engineer

(P&D), CWC is the Member of the Hydrological Observations and Instrumentation Group. The combined meetings of three Working Groups were held on 20-21st February, 2004 and decisions taken on further research programmes.

17.5.12 Technical Advisory Committee OF CWPRS

The TAC was constituted mainly for the purpose of providing an overall perspective and technical guidance in the area of hydraulic research. The TAC is composed of 17 members drawn from various public Institutions, and is headed by the Chairman, CWC. Member (D&R), CWC is one the members of TAC. 25th Meeting of TAC was held on 12th June, 2003 at Pune wherein research programme for CWPRS for 2003-04 was finalized.

17.5.13 Standing Technical Advisory Committee OF CSMRS

The STAC was constituted mainly for providing an overall perspective and guidance in technical scrutiny of research schemes being done at CSMRS. The STAC is composed of 11 members drawn from various public sector institutions, and is headed by Member (D&R), CWC. 20th meeting of STAC was held on 2nd of July, 2003 at New Delhi. The work programme of the research stations was reviewed and finalised for 2003-04.

17.5.14 Technical Advisory Committee OF Farakka Barrage Project

The TAC of Farakka Barrage Project headed by Member (D&R), CWC generally meets once every year and takes decisions about various works to be executed for efficient and safe functioning of the project. Various problems, special studies and related design work were referred to D&R wing from time to time. The 100th meeting of the TAC was held on 11 & 12th December, 2003 at Farakka.

17.5.15 ICAR - CWC Joint Panel

The Joint Panel of ICAR-CWC was initially constituted in March 1979 for a period of three years in order to promote inter-organisational collaboration on matter of research, education and activities related to water resources management and for developing linkages at State level among various Institutions working in the field. The Director General, ICAR and Chairman, CWC hold the post of Chairmanship of Joint Panel for a period of one year on alternate basis. The panel is reconstituted every 3 years and so far it has been reconstituted seven times and the present panel was reconstituted in September 2003.

17.5.16 Coastal Protection and Development Advisory Committee (CPDAC)

Realising the need of overall planning and cost effective solution to the coastal problems, the Govt. of India constituted Beach Erosion Board in the year 1966 under the Chairmanship of Chairman, CWC (erstwhile CW&PC). With this objective of the development in the protected coastal zone and the pressure of population in the densely populated area in the coastal zone, the Beach Erosion Board was reconstituted and renamed as Coastal Protection and Development Advisory Committee (CPDAC) by the Ministry of Water Resources, Govt. of India in April 1995, under the Chairmanship of Member (RM) and with representatives from all the coastal States and related Central Departments. Coastal Erosion Directorate, CWC works as the secretariat of Coastal Protection and Development Advisory Committee (CPDAC).

The Beach Erosion Board has held 24 meetings in all. The CPDAC has so far, held 5 meetings. Last meeting of CPDAC was held at Mangalore in September, 2002 and follow-up action on the decision taken in the meeting were continued during the year.

17.5.17 Bureau of India Standards (BIS)

Central Water Commission being an apex technical body in the water resources sector, has been playing an important role in formulation of standards in field of Water Resources Development and Management and allied areas through its participation in activities of Water Resources Division (WRD) and Civil Engineering Division (CED) of BIS. Chairman, Central Water Commission is presently the Chairman of Water Resources Division Council (WRDC). Member (D&R), CWC and Chief Engineer, Designs (NW&S) are the Principal and Alternate Member in Civil Engineering Divisions Council (CEDC). CWC is involved in all the 21 Sectional Committees under WRDC. Out of 41 Sectional Committees under Civil Engineering Division, CWC is involved in 9 Sectional Committees. During the current financial year, total 4 Indian Standards pertaining to Dams and Reservoir were reviewed and reaffirmed and 3 were recommended for revision, Six Indian Standards have been reviewed and recommended for adoption and printing and another four Standards are under finalisation for recommendation of adoption and printing.

CHAPTER–XVIII

PUBLICITY AND PUBLICATIONS

18.1 PRINTING AND PUBLICATION

The offset press in the Publication Division of Technical Documentation Directorate carried out various printing jobs for CWC & MOWR. About 2650 pages were composed and 3,50,000 copies of various publications / forms were printed during the year. The press also carried out binding/ trimming works for publications and reports etc.

The publications/reports/journals/pamphlets/folders printed and brought out during the year 2003-2004 are given below :

Sl. No.	Report / Publication
1.	Annual Report of National Environmental Monitoring Committee Report for River Valley Project (NEMCRVP)
2.	Rehabilitation and Resettlement in Water Resources Development Projects
3.	Status Report on Flood Forecasting & Warning Network in India
4.	Performance Evaluation of Irrigation Project in India (as on 31.3.2003)
5.	Bhagirath (Hindi) (3No.)
6.	Water and Related Statistics 2002
7.	Pocket Book on Water Data 2003
8.	Guidelines for Performance Evaluation of Irrigation System
9.	Flood Estimation Report for Upper Narmada and Tapi Sub Zone 3(C)
10.	Inspection Questionnaire of Committee of Parliament on official language
11.	Water Around Us
12.	Draft Report on Integrated River Basin Planning of Management
13.	Bhagirath (English) (2No.)
14.	Seminar on Guidelines for Water Audit and Water Conservation
15.	Performance Evaluation of Augasi Pump Canal Project (U.P.) July 2003
16.	Theme Paper for Seminar on Silting of Rivers – Problems & Solutions held on 12th-13th Feb. at New Delhi
17.	Annual Report 2002-2003 of CWC

18.	Hydraulic Design of Gates: Guidelines
19.	Guide Book Papers on River Basin Organisation
20.	Foundation and Treatment of Sone Irrigation Dam (India)

18.2 MICROFILMING

With a view to preserve important drawings and other documents for future references, the micro-filming unit of TD Dte. records documents in microfilms after proper indexing and coding. During the year 2003-2004, nearly 1250 engineering drawings / documents were microfilmed.

18.3 JOURNALS

T.D. Dte. of CWC publishes several technical and semi-technical journals and publications in the field of Water Resources development. 'Bhagirath' a quarterly semi-technical journal, both in English and in Hindi was published separately during the year. In addition, 'Administrative News Bulletin' on monthly basis was also published during the year 2003-2004.

18.4 CWC WEB SITE

The Central Water Commission has an existing website which can be accessed on the address http://www.cwc.nic.in. The website has comprehensive information on the role of CWC in development of Water Resources and its achievements.

18.5 PUBLICITY AND MASS AWARENESS

Publicity & Mass Awareness programmes on water were arranged/ prepared and broadcasted over AIR / TV in the form of talks & interviews etc. as a part of World Water Day and Water Resources Day's Special Programme. Pamphlets on various topics with focus on Water Conservation were prepared and distributed in various exhibitions as a part of Fresh Water Year activities. A comprehensive scheme was also drawn on different aspects of water, which is under publication.

18.5.1 ENGINEERING MUSEUM

Central Water Commission is maintaining an Engineering Museum at B-5, Kalindi Bhawan, Qutub Institutional Area, New Delhi-16, which is fully devoted to water resources development in the country. Various aspects of the development in the field of water resources in India are illustrated through self explanatory working models. The museum is visited by a large

number of visitors, which includes students, professionals and people from all walks of life.

18.5.2 EXHIBITION

The Central Water Commission is regularly participating in various exhibitions. During the year 2003-04 CWC took active part in the following exhibitions by displaying its activities and achievements for the awareness of the general public:

1. Water Asia, New Delhi 10.09.03 to 12.09.03
2. 7th National Kokata Expo 12.09.03 to 21.09.03
3. Exhibition at Jhandala, Distt. Sirsa, Haryana 01.11.03
4. India International trade Fair-2003, New Delhi 14.11.03 to 27.11.03

In addition, the year 2003 was celebrated as Fresh Water Year and as a part of this, training programmes for schools teachers, students, women and farmers were organised throughout the year to sensitise them about this precious resource.

18.6 FRESH WATER YEAR 2003

On eve of "World Water Day" which falls on 22nd March-2003, the number of activities and programmes across the country were organised to create a greater awareness about issues related to water in various sections of the society. In line with the United Nations resolution adopted during the 55th session of General Assembly declaring the year 2003 as "International Year of Fresh Water" the following programmes were organised/activities carried out under "Fresh Water Year 2003"

- To sensitise school teachers towards critical issues related to water and its management, training was given to the school teachers.
- Painting competition was organised for School Children.
- Street play and puppet shows were organised at number of places on conservation and economic use of water.
- Project visits were organised for school/college students to provide them a glimpse of various aspects of water resources development/conservation.
- Training programmes were organised for school students with the aim to sensitise them towards critical issues related to water and its management.
- Training programmes were organised for women with the aim to create a resource pool of women for mass awareness programme on water related issues. Training for testing water samples were also imparted to them and they were handed over water quality test kit for use in villages.
- Programmes on "Jan Jagriti on water related issues" were organised for villagers which registered an impressive attendance and active support of village head and village Panchayat.

- One-day programme "Jal Yatra" for school children were organised in Delhi, Bhubaneswar and Hyderabad.
- Rain Water Harvesting structure and toilets were constructed through N.G.O. (Trilonia) at various places in the country. CWC acted as facilitator and will also be assisting in Social audit of the project.
- New publicity and mass awareness material were published and distributed through regional centres of I.C.A.R. to farmers to resolve water related regional problems in the field of water resources.
- To sensitise the School Children and convey the message of Water conservation CWC actively participated in preparation of 13-episode quiz for School children broadcasted on National Doordarshan.
- Two Radio quiz for School Children were also organised through All India Radio.
- Various training program for Policy and Decision maker, Youth & Children, Women & Villagers and Farmers were also organised.
- Vigyan Prasar of D.S.T. planned a "Vigyan Rail on Wheel" to take scientific achievement to the doorsteps for the benefit of General Mass. MoWR alongwith various Ministries participated in this event. Available space in the coach was decorated with exhibits highlighting the achievements in the field of water resources development and vision 2050 by CWC, which was highly appreciated by Hon'ble Minister of Science & Technology.

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