GOVERNMENT OF INDIA
MINISTRY OF WATER RESOURCES

FIVE YEAR PLAN (1990-95)

CENTRAL SECTOR SCHEMES RELATING TO IRRIGATION, FLOOD CONTROL AND FARAKKA BARRAGE PROJECT

Volume I

NEW DELHI
SEPTEMBER
1990

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(VOL. I)

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ERRATA

VIII FIVE YEAR PLAN (1990-95) - (CENTRAL SECTOR)
MINISTRY OF WATER RESOURCES

Particulars				(Figures in Rs. Crores) For	To
Financial Outlays - Eighth Plan					
Year	Annexure No.	Col.	Page No.		
1991-92 (Proposed)	II	2 & 4	11	1305.37	1297.87
1991-92 (Proposed)	II	2 & 4	11	1603.87	1596.37
1991-92 Demand No.78	III	-	12	(i) Major & Medium 1191.63	1177.99
				(ii)(e) Flood Control 89.66	66.80

27-8-91

C O N T E N T S

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Graphs

MINISTRY OF WATER RESOURCES-PROPOSALS
FOR VIII PLAN (1990-95) FOR IRRIGATION
AND FLOOD MANAGEMENT PROGRAMME-(CENTRAL SECTOR)

DECENTRALISATION OF PLANNING

1. Document on Approach to Eighth Five Year Plan, 1990-95, prepared by the Planning Commission in May,1990 and approved by the Cabinet, recommended for adopting a new approach envisaging decentralisation of the planning process involving not only reorientation on the focus and priority of planning but also the processing mechanism,to ensure that the needs of ordinary people and the quality of their lives become the Central focus of planning, allocation and use of resources reflect the overall social concern and priority in a long-term perspective.

2. Normally, only those activities are best handled at the block level where the following criteria are fulfilled:

(i) there is an objective of evenly spreading out the activity through all the blocks, for example primary education and health.

(ii) there is a repetitiveness in the management of the activities so that adequate proficiency and a sufficiently large team of properly trained and oriented persons is available at the block level,for example development of ground water, and

(iii) the resources to be mobilised are local and larger system of management beyond the block level is not necessary, for example agricultural operations and marketting.

3.For those activites that do no fulfil the above criteria and have a socio-economic impact over an area much larger than the actual physical area occupied by the activity, the status of that activity needs to be upgraded to the net impact area. The large irrigation projects which generate substantial production surpluses contributing to the national kitty in measureable manner as from Punjab's or Western Uttar Pradesh's irrigation systems are ought to be considered as national efforts rather than purely as local activities.

....2/-

4. The infrastructural network activities are by and large to be distinct from the localised activites,for example, transport and communication. The networks of large irrigation projects are of similar nature and cannot, therefore, be looked up as localised block or district level activities.

5. The large irrigation projects also envisage mobilisation of the resources from a very large catchment area and also its conveyance and distribution over large distances. Hence they transcend the limitation of a district and many times even the State. All such irrigation projects, their development and management should, therefore, be looked upon as national endeavours. These will include mega projects for inter-basin transfer also.

6. The infrastructural network development including that of irrigation is a capital intensive effort and beyond the capacity of the local financial system. Hence they are necessarily to be upgraded to an appropriately high level where the financial package and organisational support to such developments become via_ble.

7. Planning of the water sector envisages consideration of all these pecularities and spreading the action plan over the five year period so as to properly arrange the activities at the different levels starting from the block upward in an appropriate manner. There are identifiable different clusters of activities to be exclusively carried out at the block level, best carried out at the district level,best carried out at the regional level/State level,and necessarily to be carried out at the national/Central level. The Ministry of Water Resources, do not, therefore, propose to include major and medium projects for development at block levels, as it is not possible for local bodies to handle such large projects whose boundaries are geographic rather than administrative.

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However, the state Governments should decentralise planning of minor irrigation structures where farmers are making efforts to utilise ground water resources.

II.VIII PLAN PROPO-SALS.

1. The Ministry of Water Resources is responsible for overall planning, coordination and guidance to the States for development and management of their water resources. Through its specialised technical organisations such as the Central Water Commission(CWC), the Central Water & Power Research Station(CWPRS), the Central Soil & Materials Researh Station(CSMRS), National Institute of Hydrology(NIH),the National Water Develoment erDeve Agency(NWDA),Brahmaputra Board,& GFCC etc. technical guidance and examination of the projects is conducted, and also arrangements are made for additional resources through external financing.The Government of India, through enactments, have also shouldered the responsibility for planning of the water resources for the Brahmaputra/Barak river systems,through the development of master plans for all the tributaries.

2. Based on the guidelines given by the National Development Council and the Planning Commission for formulation of the VIII Five year plan,four working groups were constituted by the Planning Commission on Major/Medium,Minor Irrigation,Command Area Development and the Flood Management for formulation of the proposals during the VIII Plan period. Taking a clue from the performance of the VII Plan period, it is proposed to speed up the completion of ongoing projects as also accelerate scientific development of minor irrigation and the ground water resources for attaining an irrigation potential of approximately 20 million hectares during the VIII Plan

...4/-

period. Correspondingly, the VIII Five year plan based on the recommendations of the Working Groups, has suggested an outlay of Rs.41,635 crores for not only completing the ongoing programmes but also providing impetus to ground water, minor irrigation development and Command Area Programmes. These are seen as important components for filling up gap between the creation and utilisation of irrigation potential. As activities in the field of water resources development are likely to continue at an accelerated rate, it has been found necessary to expand the infrastructural facilities at the Centre, taking into consider-ation the technological requirements and problems to be faced in the near future. Special thrusts need to be given to the science and technological components of this sector through many of its organisations like the Central Water Commission, Central Water & Power Research Station, Central Soil & Materials Research Station, National Institute of Hydrology, National Water Development Agency etc.

3. The four Working Groups set up by the Planning Commission for formulating proposals on Major/Medium, Minor Irrigation, Command Area Development and Flood Management in the Eighth Five year plan, have recommended that, in the Central Sector, financial outlay should be of the order of Rs.5745 crores. But the Ministry has, in turn keeping the financial constraints in mind, prepared detailed programmes for its various organisations amounting to Rs.4163.08 crores. An important additive during the VIII Plan is the creation of an Irrigation Finance Corporation for financing nationally important projects, whose timely completion is considered imperative in the national interest. It is proposed to set up this Corporation with an equity base of Rs.1,000 crores through which Central

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resources will be channeled to the projects that need to be completed quickly.

4. A brief description on some of the important organisations/activities within the Ministry is given in the succeeding paragraphs,along with their funding requirements.

i). **CENTRAL WATER COMMISSION**

The Central Water Commission(CWC) is the apex technical organisation in the country in the field of water resources development . It has the general responsibility of initiating,coordinating and furthering in consultation with States schemes relating to flood control, irrigation, navigation and water power generation. The CWC has prepared a programme requiring Rs. 618.44 crores, out of which Rs.531.56 crores is for the Planning & developmental of major and medium irrigation projects, Rs.55.63 Crores for flood control programmes and Rs.31.25 Crores for construction of buildings at hydrological stations located in remote areas. The programme envisages establishment of additional key hydrological stations, flood forecasting stations, strengthening of dam safety organsiation, Irrigation Research Management Institute Cell (IRMIC), setting up of river basin authorities and basin-wise environmental management units, carrying out socio-economic and environmental impact studies, re-appraisal of irrigation potentional of major and medium irrigation projects etc. A provision of Rs.120 Crores has been made for Centrally Sponsored Schemes and Rs.21.94 Crores have been separately provided for flood plain zoning surveys being undertaken by the Department of Science & Technology.

Contd.p.6/-

ii). **CENTRAL WATER & POWER RESEARCH STATION**

The Central Water & Power Research Station(CWPRS),is involved in applied and basic research relating to problems of hydraulics in sector of water and energy resources and water borne transport.

The CWPRS has formulated a programme requiring Rs.134.40 crores out of which Rs. 79.42 crores is for continuing and committed schemes and Rs.54.98 crores for new schemes. Some of the important schemes for basic research are sedimentation disposal research, mathematical modelling for fluvial and ocean hydro mechanics, automatic operation of irrigation canal system,national ship hydro dynamic,hydrometeric research,earthquake research analysis,dredging studies and advanced research in rock mechanics.

iii) **CENTRAL SOIL & MATERIALS RESEARCH STATION, N.DELHI.**

The Central Soil & Materials Research Station (CSMRS) is a premier organisation dealing with field explorating laboratory, investigation and research in geo-mechanics and construction of river valley projects. The demand of this Institution for the plan period is Rs.42.43 Crores, both for continuing and new schemes. The programme envisages expansion of facilities available for testing of soils and rocks and for carrying out basic research in the use of various materials alongwith advancing the knowledge in rock structures. Advancement in the state of art for the design of underground structures has been gaining importance as the future power houses and water conductor systems in the head reaches may have to be located underground.

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iv) **NATIONAL INSTITUTE OF HYDROLOGY, ROORKEE.**

The National Institute of Hydrology (NIH) is a prime institution of the Water Resouces Ministry dealing with basic and applied research problems in hydrology. The Institute has the responsibility of dissesinating information on hydrological studies both to the Central and State Governments. The organisation has proposed a Plan outlay of Rs.55.92 Crores for its new and ongoing programme.

v) **NATIONAL WATER DEVELOPMENT AGENCY.**

The National Water Development Agency (NWDA) is charged with the responsibility of preparing feasibility reports for water linkages in the Peninsular and Himalayan regions. Compared to the expenditure in the VII Plan, the NWDA has prepared a programme requiring Rs.105.65 crores to attend to the works alloted to the Agency. The Programme envisages completion of preliminary feasibility reports for all the 17 water transfer links of Penisular Rivers Development component and the studies for Himalayan Rivers Development component. In addition, the Agency will also undertake detailed field investigations for some of the water transfer links of Peninsular river development component and prepare detailed project reports so that some of the project proposals are available for implementation during subsequent plan period.

vi) **MINOR IRRIGATION**

The Minor Irrigation Organisation assists the States in its individual and cooperative effort to develo-p schemes for acceleration both surface and ground water

...8/-

programme within the minor irrigation sector. The organisation has prepared a programme requiring Rs.477 Crores. Major component of the programme relates to the continuance of earlier schemes, commencement of new schemes, as also a sizable transfer for SC/ST block development.

vii) **CENTRAL GROUND WATER BOARD**

The Central Ground Water Board (CGWB) is the apex national organisation vested with the responsibility of carrying out nation-wide surveys and assessment of ground water resources through hydrogeological surveys, ground water exploration, water quality monitoring etc. The total demand worked out by the Board is about Rs.314.46 Crores, out of which Rs.131.01 Crores is for critical ongoing schemes, Rs.133.45 Crores for new schemes and Rs.50 Crores for the Centrally Sponsored Schemes.

The programme envisages expansion in investigation and development of the ground water resources, evaluation and assessment of the ground water resources in saline and brackish waters and possibility of storage of fresh water in such areas, augmentation of ground water, ground water protection in coastal areas, use of satellite imagries in ground water management, artificial recharge of ground water, strengthening and restructuring of the Board and the Central Sponsored Schemes and strengthening of State Government organisations.

viii) **COMMAND AREA DEVELOPMENT (CAD)**

This programme broadly covers on farm development (OFD) works like construction of drains, channels, land levelling and warabandi for ensuring equitable and assured supply of water to every farm holding. The objective of bridging the gap between potential creation and utilisation still continues as a major issue and therefore, a plan

contd. p.9/-

outlay of Rs.800 Crores has been proposed for the VIII Plan period which is in keeping with recommendations of the Working Group.

ix) **FLOOD MANAGEMENT/FORECASTING.**

Floods cause immense damage to human lives and property almost every year. Accurate and timely flood forecasting and advance warning are, therefore, primary for mitigating losses. Requirement of funds for Joint River Commission (JRC) and for setting up of Flood Forecasting Stations and detailed survey for flood plain zoning have been included in the requirement of funds for Central Water Commission amounting to Rs.77.57 Crores. In addition, funds requirement for various schemes of anti-sea erosion works, flood proofing measures in North Bihar, Ganga Flood Control Commission etc. are Rs.200 Crores. Requirement for Brahamaputra Board is separately assessed as Rs.56 Crores for investigation of multi-purpose projects like Pagladia, Tipaimukh, Subansiri, Dihang and Lohit. Survey and investigations for preparation of master plans are proposed to be completed. Provision has also been made for construction of NEHARI. It is clarified that funds required for the construction of Harrang drainage scheme, Pagladia and Tipaimukh are proposed to be made through North Eastern Council (NEC).

x) **NATIONAL PROJECTS CONSTRUCTION CORPORATION (NPCC).**

There is a need to increase the equity base of the Corporation so that it is in a position to undertake bigger amount of works and start earning profit instead of running in perpetual loss. It is anticipated that with a plan support of Rs 60 crores, the Corporation would do better in the VIII Plan and could be in a position to handle civil works amounting to Rs.200 crores annually.

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Annexure - I

Central Public Enterprises/ Undertakings

Financing of Plan Projects

Eighth Five Year Plan

(Rs. crores)

S. No.	Name of the Undertaking	Outlay anticipated / proposed		Estimate of Internal Resources							Extra-Budgetary Resources				Budgetary Support
		Total	Of which component covered by External Aid	Gross Internal Resources (Retained Profit + Depreciation)	Of which amount raised by way of ARM (charges in user price, etc.)		Provision for repayment of loan	Accretion to working Capital	Non -Plan Capital Works	Net Internal Resources available for Plan outlay (Col.5-[8+9+10])	Bonds/ Debenture	ECB/SC	Inter- Corporate Transfers	Others	
					Gross Yield	Net Yield *									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1989-90 (actual)															
1.	NPCC														
2.	-														
3.	-														
Total for all undertakings															7.90
Seventh Plan (1985-90) - Actual															
1.	NPCC														
2.															
3.															
Total for all undertakings															24.90
1990-91 (Anticipated)															
1.	NPCC														
2.	-														
3.	-														
Total for all undertakings															6.00
Eighth Plan (Proposed)															
1.	NPCC														
2.	-														
3.	-														
Total for all undertakings															60.00
1991-92 (Proposed)															
1.															
2.															
3.															
Total for all undertakings															

Annexure - II

Financial Outlays: Eighth Plan

Major Head---------- Ministry---------- WATER RESOURCES

Sub-Head---------- Department--------

(Rs. crores)

	Central	Centrally Sponsored *	Total
1	2	3	4
Seventh Plan 1985-90			
1988-89 (Actuals)			244.07
1989-90(Actuals)			239.51
1985-90(Actuals) anticipated			1078.63
1990-91 (Outlays as Budgetted)			267.02
1990-91 (Anticipated)			
Eighth Plan (Proposed)	2736.08	1427.00	4163.08
1991-92 (Proposed)	1305.37	298.50	1603.87

Memo Items: All major heads and sub-heads should be grouped under the relevant Plan Heads of Development as per Budget Documents.

(Statement I, listing the Heads of Development and Statement II, listing the Ministries/ Departments governing them are enclosed for ready reference.)

* - Special attention is invited to paragraph (d) on "Zero-based Analysis" of the D.O. letter No. 11016/3/90-FC from Secretary, (EC) dated 4.6.1990.

(Rs. Crores)

Demand No.	Ministries/Deptts.	Head of Dev.	EIGHTH PLAN Budget Support	EIGHTH PLAN IEBR	EIGHTH PLAN Outlay	1991-92 Budget Support	1991-92 IEBR	1991-92 Outlay
	MINISTRY OF URBAN DEVELOPMENT							
75	Urban Development and Housing							
	a) Water Supply & Sanitation	22215						
	b) Housing	22216						
	c) Urban Development	22217						
	d) Secretariat-General Services	32052						
	e) Other General Economic Services	13475						
76	Public Works							
	a) Public Works	32059						
77	Stationery & Printing							
	a) Stationery & Printing	32058						
	MINISTRY OF WATER RESOURCES							
78	Ministry of Water Resources							
	a) Secretariat Economic Services	13451	2.00		0.40			
	b) Major & Medium Irrigation	12701	229.81		1121.53			
	c) Minor Irrigation	12702	791.46		159. 7			
	d) Command Area Development	12705	800.00		180.00			
	e) Flood Control	12711	339.81		59.66			
	f) Other Transport Services	13075	100.00		12.21			
	MINISTRY OF WELFARE							
79	Ministry of Welfare							
	a) Secretariat-Social Services	22251						
	b) Welfare of SC, ST and Other Backward Classes	22225						
	c) Social Security & Welfare	22235						
	d) Other Industries	12875						
	DEPT. OF ATOMIC ENERGY							
80	Atomic Energy							
	a) Telecommunication & Electronic Industries	12859						
	b) Atomic Energy Industries	12861						
	c) Atomic Energy Research	13401						
81	Nuclear Power Schemes							
	a) Power	12801						

MINISTRY OF WATER RESOURCES
(WATER MANAGEMENT CELL)

8TH PLAN PROPOSALS AND ANNUAL PLAN PROSALS FOR THE YEAR 1991-92.

Water Management Cell in the Ministry of Water Resources is mainly implementing the World Bank aided National Water Management Project for which an agreement was signed between Government of India and IDA (World Bank) for an assistance of US $ 114 million valued at about Rs.148.20 crores at 86-87 rate of exchange. The project aims at providing predictable, reliable and equitable water supply in the commands of existing irrigation schemes. This is proposed to be achieved by preparing an operational plan with delivery schedules of water on volumetric basis and then monitoring actual supplies. Deficiencies notices are to be rectified by taking remedial measures. The cost of infrastructural improvement and rehabilitation works is limited to Rs.2,500 per ha excluding the establishment cost at 86-87 price level. The project covers an area of about 5.5 lakh hectares in the participating states of Andhra Pradesh, Karnataka and Tamilnadu and further 35,000 hectares in some of the other states like Bihar, M.P., Kerala, Uttar Pradesh and Orissa.

The Water Management Cell also deals wifth the EEC assisted Minor Irrigation Projects in Maharashtra (Saline Land Reclamation Project and Development of Water Control System for Diversification of crops). Under Saline Land Reclamation Project about 16,000 hectares of land under 160 schemes is being taken up for improvement. The project is likely to be completed by June, 1990-91. Under development of water system for diversification for crops, 57 schemes covering an area of 9,172 hectares are proposed to be taken up for which an agreement was signed in October, 1988 with the EEC and the work is to be completed in 5 years.

Financial Achievement:

An estimate for Rs.118 lakhs towards strengthening of the Water Management Cell was approved by the Standing Finance Committee on 24th July, 1987. The entire expenditure of the Cell including staff salary, TA/DA, office expenses, technical asistance

and expenses towards equipment including associated recurrent cost is reimbursible from the World Bank. By the end of 7th Plan i.e. March, 1990 an amount of Rs.17.36 lakhs has been spent by the Water Management Cell for which reimbursement claim from the World Bank has already been submitted. An amo-unt of Rs.20 lakhs has been provided for the Cell for the current year i.e. 1990-91. It is proposed to sepnd another 81 lakhs rupees during the remaining 4 years of the 8th Plan i.e. from 91-92 to 94-95. Out of which it is proposed to spend Rs.25 lakhs during the year 91-92. In addition there is a proposal for strengthening of the Water Management Cell to cope up with the additional work of providing assured irrigation in 8 million hectares of land in the existing canal projects likely to be taken up in the 8th Plan. This is likely to involve an additional expenditure of about Rs.40 lakhs. A token provision of Rs.1.00 lakh is proposed for this scheme in the current financial year 90-91 and and an amount of Rs.9 lakhs for the next year, 91-92.

Physical Achievement:

The main activities relating to NWMP are towards assisting the states in identifying, preparation of project reports, and scrutiny of the same as well as approval from the Govt. of India. So far 27 detailed schemes pertaining to the states of Andhra Pradesh, Karnataka and Tamilnadu costing about Rs.107 crores and covering an area of abo-ut 4.54 lakhs ha have been cleared by Govt. of India for implementation. Besides, 13 summary schemes pertaining to the states of A.P., Karnataka, Madhya Pradesh,Bihar and Kerala estimated to cost Rs.72 crores and covering an area of about 3.43 lakh ha have been cleared for preparation of detailed project reports. Work on execution of 7 schemes has started in the States of Andhra Pradesh, Karnataka and Tamilnadu after September, 1987 and an amo-unt of Rs.20.25 crores has already been spent on these schemes by March, 1990. A total provision of Rs.22.0crores has been made in their budget for NWMP by the States of A.P., Karnataka and Tamilnadu for the current financial year 1990-91. The likely total budget for the year 91-92 of these states has been indicated as Rs.39.5crores.

8th Plan Proposals:

In addition to the continuing NWMP projects and EEC assisted schemes, there is a proposal to provide water supply to an additional 80 lakh ha of land in the existing canal projects on assured basis. Under the scheme, 16 major states have been asked to formulate Preliminary Identification Reports for taking up Phase-I of the work which may cost around Rs.500 per ha on surveys investigations and taking up preliminary works for improving the system. So far Preliminary Identification Reports in respect of 69 projects covering a total C.C.A. of 26.5 lakh ha have been received from the States of Andhra Pradesh, Gujarat, Bihar and Madhya Pradesh. The cost of these schemes is likely to be Rs.660 crores. The additional activities relating to the above schemes will comprise of assisting the states in preparation and implementatilon of schemes including their monitoring and evaluation.

Under the guidelines issued by the Secretary, Planning Commission vide his D.O. No. N-11016/3/90-PC dated 4th June, 1990, it is presumed that no new centrally sponsored schemes would generally be taken up during the 8th Plan. As such, under the proposed " Assured Irrigation Programme" to be launched during 8th Five Year Plan, only strengthening of Water Management Cell has been provided for.

STATEMENT-I

DRAFT EIGHTH PLAN AND ANNUAL PLAN 1991-92
CENTRAL SECTOR - OUTLAYS & EXPENDITURE

MINISTRY OF WATER RESOURCES

DEPARTMENT: WATER MANAGEMENT CELL

(Rs.crores)

Sl. No.	Name of Scheme	Cost approved	Cost latest	Expenditure to end of sixth plan	Seventh Plan outlay	Seventh Plan Expdr.	1990-91 Outlay	1990-91 Antcd. Expdr.	1991-92 Outlay proposed	8th plan Outlay proposed
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.	National Water Management Project (Strengthening of Water Management Cell)	1.18	1.18	Nil	0.174	0.174	0.2	0.2	0.25	1.006
2.	Assured Irrigation Programme (Strengthening of Water Management Cell)	-	0.40	Nil	-	-	-	0.010	0.090	0.40

STATEMENT-II

DRAFT EIGHTH FIVE YEAR PLAN AND ANNUAL PLAN 19991-92
CENTRAL SECTOR-PHYSICAL TARGETS AND ACHIEVEMENTS.

MINISTRY OF WATER RESOURCES

DEPARTMENT: WATER MANAGEMENT CELL

Sl. No.	Name and Scheme	Seventh Plan target	Seventh Plan achievements	Annual Plan 1990-91 target	Annual Plan 1990-91 achievement (anticipated)	Annual Plan 1991-92 proposed target	8th Plan proposed target
1.	2.	3.	4.	5.	6.	7.	8.
1.	National Water Management Project (strengthening of Water Management Cell) A-Project Clearance.						
i)	Scheme summary reports	23	34	6	6	-	6
ii)	Detailed project report	17	23	17	17	-	17
	B. M&E of projects	-	-	3	3	10	40
* 2.	Assured Irrigation Programme (Strengthening of W.M. Cell)						
	A- Project clearance.						
i)	Preliminary Identification Reports	-	-	-	-	30	100
ii)	Detailed reports	-	-	-	-	10	100
	B. M&E of projects	-	-	-	-	-	50

* This is a new scheme proposed to be taken up under the 8th Plan. The targets have been proposed on the assumption that necessary provision for this programme would be made under the State Sector during the 8th Plan.

S.No. I

: MAJOR AND MEDIUM IRRIGATION

: CONTINUING SCHEMES

: ESTABLISHMENT AND MAINTENANCE OF KEY HYDROLOGICAL STATIONS IN RIVER BASINS OTHER THAN GANGA AND INDUS

This scheme was originally sanctioned in June, 1982, for Rs.10.30 crores. Due to ban on recruitment of staff in the VI Plan period and limitation of plan funds, much progress could not be achieved during the VI Plan period. An expenditure of Rs.5.09 crores is likely to be incurred till March, 1990, thus making a spill over of Rs.5.21 crores into VIII Plan. The estimated cost of this scheme would be revised due to escalation in cost.

Ministry of Finance have recently conveyed approval for creation of one circle, 4 sub divisions and 35 site offices in addition to the offices sanctioned earlier under this scheme.

The outlay of Rs.10.00 crores is proposed for this scheme for VIII Five Year Plan for balance work.

Out-lay proposed for 1991-92 is Rs.2.00 crores.

S.No. 2

Major & Medium Irrigation - Continuing Schemes

1. Project Preparation Organisation

PP Cell now called PPO was set up in CWC in May 1980 to take up the work of preparation of project reports for irrigation project in pipeline for external assistance. The functions of PPO are :

to provide guidance/assistance to States in preparation of project reports according to the standards required by the World Bank/other funding agencies. The data received from the State is scrutinised and supplemented after discussions with the State Government and Project reports are finalised in accordance with the norms of funding agencies.

The expenditure of PPO has been reimbursable from the World Bank right from the date of inception. In the beginning it was reimbursed under Gujrat Irrigation II Project upto 1983 and later under UP Tubewell-II Project 1984-86. Currently the reimbursement is covered under ISTM Credit No.1770-IN.

Continuance of the PPO was further sanctioned for 5 years from April '83 to March'88 by Ministry of Water Resources for Rs.198 lakhs. Proposal for further continuance of PPO w.e.f. April '88 to March '93 was sent to the Ministry of Water Resources during February'88 for Rs.155 lakhs, sanction to which is awaited.

Performance of PPO during 7th Plan Period.

Financial

7th Plan provision for PPO was Rs.130 lakhs out of which expenditure likely to be incurred during the plan period will be Rs.127 lakhs. Details of yearwise expenditure incurred are as under

Year	Expenditure
1985-87	46 lakhs
1987-88	28 lakhs
1988-89	28 lakhs
1989-90	25 lakhs (budget estimate)
Total:	127 lakhs

Physical

Upto March '85, 4 major projects were finalised in PPO which were also appraised by the World Bank. During 1985 the work of Narmada PP Cell was also transferred to PPO, CWC. During '87 additional work of evaluation studies of Mulla Irrigation Project and Lower Bawani Project was also assigned to PPO, CWC. During April'85 to March'87 the number of the major projects finalised in PPO rose to 8 out of which credit agreements were executed with the World Bank for 7. During 1987-88, 6 major and 4 medium schemes were finalised in PPO which have also been accepted by the Technical Advisory Committee.

Major Projects :

i. Hathnikund Barrage Project - Haryana.
ii. SYL Part-I Punjab Portion.
iii. Upper Krishna Stage-I Revised.
iv. Punjab Irrigation Phase-II.

3 components viz.

a. Lining of channels
b. Lining of water courses
c. Integrated Development of water logged areas of South West district of Punjab.

Medium Projects :

AP Medium - 4 Sub Project.

i. Vattivagu
ii. Madduvalasa
iii. Andhra Reservoir
iv. Vengalarai Sagaram.

During 88-89 the number of projects detailed hereunder were finalised in PPO. These projects have also been considered acceptable by the TAC during their meetings.

New Major Irrigation Projects	8 nos.
Revised Major Irrigation Projects	6 nos.
New Medium Irrigation Projects	2 nos.
Revised Medium Irrigation Projects	4 nos.

Besides above feasibility report of Sone Canal modernisation project was scrutinised and cleared for submission to the World Bank.

Credit agreement

In all, there are 13 major and medium projects under external assistance. Credit agreements in respect of Upper Krishna Phase-II of Stage-I and Narmada Sagar Project have also been recently negotiated with the World Bank. The details regarding execution of the agreement are awaited.

Pipelines of Projects

The pipeline 88 for irrigation projects for external assistance was also finalised after scrutiny of the identification reports and submitted to Ministry of Water Resources and Department of Economic Affairs.

Programme for 1989-90

During 1989-90, 6 major & 6 medium projects are targetted to be finalised for appraisal of Technical Advisory Committee/ World Bank.

Programme for the 8th Plan

At present there are 25 major and 15 medium schemes in hand which are at various stages of preparation in PPO. Most of the projects included in pipeline 1988 are yet to be received besides there are many more projects under preparation which are in line for inclusion in the future pipelines of projects for external assistance. Thus PPO will have enough work for the VIII plan period.

Financial

Financial requirement of PPO during the 8th Plan period will be as under:

	1990-91	1991-92	1992-93	1993-94	1994-95
Salaries	22 lakhs	25 lakhs	28 lakhs	31 lakhs	34 lakhs
TA & Office Expenses	1 lakh	1 lakh	1 lakh	1 lakh	1 lakh
T&P	4 lakhs	4 lakhs	3 lakhs	3 lakhs	2 lakhs
Training & Study Tour	1 lakh	1 lakh	1 lakh	1 lakh	1 lakh
	28 lakhs	31 lakhs	33 lakhs	36 lakhs	38 lakhs

= 166 lakhs

out-lay proposed for 1991-92 is Rs.0.30 crores.

Annexure-I

Statement of Sanctioned posts, Staff in position & posts required for P.P. Cell, C.W.C.(1988-93).

Sl. No.	Name of posts	Sanctioned posts for 1987-88 vide Min. of W.R. No.1/18/84-Estt-I,dt. 16.6.87	Staff in position	No. of posts required in present proposal for 5 yrs. (1988-93)	Monthly Emoluments (in Rs.)
1.	Chief Engineer	1	1	1	7531.00
2.	Director(Engeneering)	3	3	3	14242.00
3.	Director(Agronomy)	1	-	1	4500.00
4.	Director(Economics)	1	-	1	5380.00
5.	Dy.Director(Engineering) including Hydrologist, Geohydrologist	9	5	9	51240.00
6.	Dy.Director(Economics)	2	1	2	
7.	Dy.Director(Agronomy)	1	-	1	
8.	Asstt. Director(Engg.)	12	8	12	39076.00
9.	Asstt. Director(Eco.)	1	1	1	3007.00
10.	Sr. P.A.	1	-	1	2904.00
11.	Head Draftsman	2	2	2	5573.00
12.	Assistant	2	1	2	4229.00
13.	P.A.	5	4	5	10720.00
14.	Proffesional Asstt.	4	3	3	8070.00
15.	Junior Draftsman	3	3	3	5009.00
16.	Tracer	2	2	2	2518.00
17.	Jr. Computer	3	2	3	4200.00
18.	Stenographer Gr.D	6	4	6	9696.00
19.	U.D.C.	4	1	4	6486.00
20.	L.D.C.	4	4	4	5734.00
21.	Driver	1	1	1	1151.00
22.	Peon	1	1	1	1109.00
23.	Messenger	7	5	7	7800.00
		76	52	75	200175.00

Say Rs. 2 Lakhs/month

Annual Salary = 2x12=Rs.24 lakhs.

S.No. 3

IRRIGATION RESEARCH AND MANAGEMENT IMPROVEMENT ORGANISATION(IRMIO)

During the period of planned development greater emphasis was given to execution of irrigation projects. However, efficient water management practices for achieving high irrigation efficiency and crop yields were not receiving adequate attention. In recognition of the need to train professionals, technicians and farmers in respect of improved water management and to equip them with necessary expertise to deal with day to day problems in the field, a project on 'Irrigation Management and Training' involving training, action research and transfer of technology in the field of irrigation water management was formulated by the Govt. of India with the assistance of USAID. The scope of the project was later enlarged to cover water resources development and management as a whole and the Project was renamed as 'Water Resources Management and Training Project'.

VIII Plan provision is Rs.4.28 crore.

Outlay proposed for 1991-92 is Rs.1.00 crore.

The Irrigation Research and Management Improvement Organisation(IRMIO) was set up in Central Water Commission in December, 1984 to coordinate the different activities of the USAID assisted WRM&T Project, for which the Govt. of India has signed an agreement with the USAID on 30.7.1983 involving an assistance to the tune of US 51 mill. comprising US $ 41 million grant and US $ 10 million loan. The project also involves Government of India rupee (including participating States) contribution equivalent to US $ 28.2 million (Rs.2,820 lakhs) towards salary and O&M expenses of staff, local training for staff, part costs of land and buildings, vehicles and other physical contingencies. The WRM&T Project envisages strengthening of Water and Land Management Institutes(WAIMIS) in the different States of the country, to provide training to a large number of inservice professionals including operational staff and farmers in the field of irrigation management. Involvement of 4 Universities(2 Agricultural and 2 Engineering) to carry out post graduate courses in irrigation management is also envisaged. Besides, two Indian Instt. of Management(IIM) at Ahmedabad and Bangalore are included in the project for imparting training to policy decision making level personnel and carrying out manpower requirement studies in the States.

Upto December, 1998, 382 Officers concerned in the field of Irrigation Management have been trained in USA and other countries through long and short term courses, workshops, seminars and through study tour etc. Besides, more than 16,000 personnels including middle and junior level officers connected with irrigation management and

farmers have been trained through in-country programmes conducted by the WAIMIS/IMTI's upto December, 1988. Besides five Action Research Studies of 5- years duration have been undertaken, each involving long-term on Site arrangement of about 20 professionals. A number of publications/reports have also been brought out by the WAIMIS and other Orgns. With a view to disseminating information in regard to Irrigation ~~Arrangement~~ Management. As a part of Technology Transfer Programme, 16-Study tours have been organised in various States so far in which approximately 150 participants took part.

The expenditure incurred on the scheme till 4th year of VII Plan (i.e. 1988-89) is Rs.162.3 lakhs. A provision of Rs.188 lakhs has been made in the budget estimate for 1989-90 for continuing the activities. The likely expenditure on the scheme during, VII Plan period is estimated at Rs.274.3 lakhs.

Due to delay in implementation of the scheme, some of the activities are compelled to be spilled over to the VIII Plan. The IRMIO will continue to arrange for trainers' training course for faculty members and coordinate training activities of State Trg. Institutes/Universities, organise workshop at national level and continued monitoring and evaluation work for WRM&T project. Keeping the goal set further in the project, it will also continue coordinating the activities of action research, adaption research, publication of news letter, monitoring and evaluation of technology transfer programme and organisational and procedural changes activities. A provision of Rs.4.28 crores has been made in the VIII Plan for this purpose.

Out-lay proposed for 1991-92 is Rs.1.00 crores.

S.No. 4

CENTRAL TRAINING UNIT

Water is becoming scarce to meet the full requirements in some of the river basins and will become more scarce in other basins also where additional demands have to be met through new water resources development projects. Therefore, it is very essential to plan future water resources projects and to have proper management of the future as well as the existing projects in such a way that the available water resources are utilised optimally and efficiently. The magnitude of the problems of planning and management of entire river basin in an

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integrated manner, keeping in view the various competing and sometimes conflicting demands become enormous. Systems Engineering is the latest and a very useful techniques which can be used for integrated and optimal planning and management of water resources, considering multiplicity of the objectives, with the help of mathematical models and digital computers.

With the above in view, Central Training Unit(CTU) has been set up as an integral part of the CWC and temporarily located in CWPRS Campas, Khadakwasla, Pune. The activities of CTU which commenced in May, 1988 are supported by the United States Agency for International Development(USAID) as a part of their Water Resources Management and Training Project(WRM&T). The CTU is envisaged to serve as a national institutes for training in Water Resources Planning and Management at the river basin scale for Central and State Engineers. It would provide training to in-service Government personnel in the Planning and Management of River Basin System for optimal development of available water resources.

The institute has started conducting training courses on River Basin Planning and Management from November, 1988 and will continue to organise training courses during 1989-90 and thereafter. The anticipated expenditure on the scheme till the end of VII Five Year Plan is estimated at Rs.34.3 lakhs. The organisation of training courses and related activities of the Institute shall continue over the span of the VIII Plan period for which a provision of Rs.109 lakhs has been made.

Outlay proposed for 1991-92 is Rs.0.25 crores.

S.No. 5(a)

STUDIES ON RESERVOIR SEDIMENTATION:

It has been observed that the rate of sedimentation in reservoirs in a number of cases has been higher than that envisaged at the planning stage which is likely to result in full benefits not being achieved. The trap efficiency estimates based on experience in foreign countries needed review taking into account the nature of sediment carried by different river systems of the country so that a suitable methodology for estimating sediment distribution in different types of reservoirs in India could be evolved.

The project 'Studies on Sedimentation of Reservoirs in India' was taken up in December, 1985 with the assistance of UNDP for intensive sedimentation studies in five selected reservoirs namely Ukai, Bhakra, Hirakud, Sriramsagar and Tungabhadra. A revised Government of India input for Rs.46.155 lakhs(approx) including the amount towards "Studies on effect of soil conservation measures on Sedimentation yield and river hydrology and Ramganga Catchment" has been sought for as outlay for VII Plan, against an original input of Rs.29.64 lakhs.

The latest UNDP budget provision towards this scheme is 666,714 for Consultancy, Training and supply of equipments. The project envisages exchange of experties from foreign countries and training of Indian personnel abroad. Upto the end of 88, Consultants in Hydrographic survey have visited the country, and 18 fellowships and four study tours have been completed. Almost all the

equipments including HYDAC System, Sediment Sampler, Distomet, Thermister etc. have been received. The software development for Hydrographic data acquisition (HYDAC) is in advanced stage.

The expenditure incurred till the 4th Year of 7th Plan (i.e. 1988-89) is Rs.33.93 lakhs. A provision of Rs.12.225 lakhs has been made for the year 1989-90. The likely expenditure till the end of the 7th Plan would thus be of the order of Rs.46.15 lakhs.

The scheme is to be extended to the first two years of the VIII Five Year Plan for completing the studies. A provision of Rs.11 lakhs is proposed in the VIII Plan for this purpose.

Outlay proposed for 1991-92 is Rs.0.5 crores
(Total outlay proposed for S.No.5(a) & 5 (b) is Rs.0.13 crores)

S.No. 5(b)

AGRO-SOCIO-ECONOMIC IMPACT STUDIES OF IRRIGATION PROJECTS

Irrigation projects play a key role in the economic development of the country. The projects have direct or indirect impact on the socio-environmenal scenario. It is necessary to monitor the impact of the irrigation projects on various socio-agro-economic and environmental parameters from time to time, so that the realistic estimate of the total benefits/cost due to them can be made. The feed-back from such categories will also provide suitable inputs forplanning new projects.

To begin with it has been proposed to conduct Agro-Socio-Economic Impact studies of a few selected irrigation projects in the country covering various agro-climatic zones. The main objectives of the study are:

(a) To identify and analyse the problems of under-utilisation of the irrigation potential created.

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Waterlogging and salinity etc.

(b) To evolve and recommend remedial measures for improving the performance of the existing irrigation projects.

(c) To make recommendations for necessary changes in the criteria for planning, execution and operation of new irrigation projects.

(d) To conduct special studies in the fields related to Water Resources Development such as Irrigation Management Organisation.

During the VII Plan period, a few such studies, have been taken up and it is proposed to take up new projects during the VIII Plan period also which includes continuation of on-going studies. The States in which new schemes are likely to be taken up in the VIII Plan are in Bihar, UP, West Bengal, Karnataka, Orissa, Rajasthan, Maharashtra, MP and Andhra Pradesh.

For undertaking further evaluation studies in respect of new projects and also for completing the on-going studies it is proposed to provide a budget of Rs.40 lakhs for the VIII Plan period.

Outlay proposed for 1991-92 is Rs. 0.08 crores. (Total outlay for S.No. 5(a) & S.No. 5(b) is Rs.0.13 crores)

Flood Control SNo 7

BRIEF NOTE ON THE PROGRESS AND PROGRAMME OF WORKS TO BE CARRIED OUT UNDER JRC PLAN SCHEME ANNUAL PLAN 1990 - 1995 OF CENTRAL SECTOR

1. Joint River Commission:

1.1 The activities under Indo-Bangladesh Joint Rivers Commission which was set up in pursuance of the Indo-Bangladesh treaty of friendship and co-operation and peace cover the following distinct groups of works of Investigation and Hydrological Observations:-

i) RD(JRC) Investigation Circle, CWC, New Delhi (now renamed as Meghna Circle).

ii) Joint Observations with Bangladesh.

iii) Investigation for storages in Brahmaputra and Ganga Basin.

1.2 Provision of Rs. 690 lakhs have been made in the 8th Five Year Plan for the above JRC Plan Schemes.

This is a continuing programme which was started in 1973 to assist the Indo-Bangladesh Joint Rivers Commission. Brief programme of each of the above listed works is detailed below. An outlay of 690 lakhs have been made in the 8th Plan on this account.

2. Continuing Schemes:

2.1. RD(JRC) Investigation Circle, CWC

In pursuance of a decision taken by the Indo-Bangladesh Joint Rivers Commission, the Circle was established in 1973 to assist the Joint Rivers Commission for comprehensive planning for food control in Sylhet, Cachar and adjoining areas. Initially, collection of daily hydrological data in respect of 14 hydrological sites (10 gauge and discharge and 4 gauge sites) sediment data at 2 silt sites in Barak catchment and compilation of meteorological data of 40 rain guage stations in that region was undertaken.

At present, gauge and discharge observations at 30 sites, silt observations at 14 sites and compilation of meteorological data from 40 rain gauge stations in the region is being collected and compiled for the preparation of Water Resources Development Plans. Since the works is of continuing nature, the hydrological and meteorological data collection at all the sites will have to be continued during the period 1989-90. Budget demand for 1989-90 has been made for Rs.92.99 lakhs.

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Functions of this Circle have been recently enlarged (i) to prepare preliminary outline reports on flood control and Water Resources Development Schemes in the Sub-Basins of Meghalaya, Tripura and Assam States after necessary field works and reconnaissance surveys. (ii) to identify the requirements with a view to develop flood forecasting systems in the region, (iii) to liaison between the various Organisation of States and Centre and complie sub-basinwise reports on:

(a) Ground Water and Ground Water Potential.

(b) Water availability and utilisation in minor and medium irrigation schemes.

(c) Master Plans for flood control with data on flood prone areas, flooded areas during specific flood events nature of inundation ect.

(d) Flood Plain maps with linkage between flood levels and areas of innudation.

(e) Data on flood damage during the specific flood events with details of flood events and damage centres.

(f) Water Quality and Water Polution status.

(g) Data on cropping pattern and crop calender.

2.2. Join't Observations with Bangladesh.

The Joint Observations at Hardinge Bridge(Bangladesh) and at Farakka(India) were initially taken up in pursuance of the Ganga Waters Agreement of November, 1977 for five day seasons of 1978 to 1983 and extended to next two dry seasons viz., 1983 and 1984 as per the MOU of 1982. It was extended again in pursuance of MOU of 1985 for three dry seasons viz., 1986, 1987 and 1988, on the same terms as the 1982 MOU which expired in May, 1988.

The Joint Observations comprise of recording of daily flows below Farakka Barrage and Feeder Canal (India) and at Hardinge Bridge (Bangladesh) during the period January to May. The measurement of flows would have to continue to be monitored during the season of 1989-90 and for this purpose a provision of Rs.4.33 lakhs has been made in 1989-90. A provision of Rs.25 lakhs has been made in the 8th five year plan and the full amount will be spent only if the MOU is signed between India and Bangladesh.

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2.3 Investigation for storage and Diversion schemes in Brahmaputra and Barak Sub-Systems.

Field Investigations for providing irrigation facilities to Assam and Tripura from the proposed Tipaimukh Dam on the Barak River of the Ganga - Brahmaputra - Meghna System have also been completed during 1984-85. However, a provision of Rs. 0.90 lakhs and Rs.1.37 lakhs has been made during 1988-89 and 1989-90 respectively for completing residual works of investigations of Phulerthal Barrage downstream of Tipaimukh Dam.

2.4 New Schemes:

1. In the context of river water talks, India and Bangladesh recongnised that during dry season, the flows of the Ganga available at Farakka are not sufficient to meet the needs of the two countries and it will be necessary to find means to augment its flows. The water availability in the Brahmaputra for the cultivable area and population depending on it is very large compared to that of Ganga. India had therefore proposed a gravity link canal from Jogighppa in Assam to Farakka in West Bengal passing through Bangladesh for harnessing the surplus waters of Brahmaputra into the Ganga. The above proposal was not accepted by Bangladesh.

Therefore, another proposal lying entirely in India, to harness Brahmaputra Waters and also to provide irrigation waters in the intervening available lands has been felt necessary. Office studies conducted by CWC indicated that it will be feasible to have a barrage on Jogighopa on Brahamputra with a canal linking Tista barrage on river Tista and then to Ganga at Farakka. Preliminary field investigations were necessary to firm up the proposal. Therefore an estimate amounting to Rs.15.55 lakhs was sanctioned in July, 1987 to take up the to popgraphical, geological and other investigation to examine technical feasibility of the projects.

2.2 Alternative Studies for Link Canal from Brahmaputra to Ganga

The proposal for augmentation of lean season flows in the Ganga from the Brahmaputra are under continuous discussion between Govt. of India & Bangladesh. It is possible that some alternative schemes are identified and decided to be taken up for investigation and preparation of feasibility report. A token provision of [illegible] lakhs has therefore, been kept in the VIII Five Year Plan for these works.

The investigations were started in the year 1987-88 and an expenditure of Rs. 5.29 lakhs incurred. In order to complete the work as per revised schedule a provision of Rs. 10.93 lakhs have been kept during 1988-89 in the revised budget.

The work is hoped to be completed during the VIIIth Plan.

Outlay proposed for 1991-92 is Rs.1.19 crores.

Statement showing estimated cost and provision for J&C Plan Schemes for the 8th Plan Period 1990-95

Rupees in Lakhs

Sl. No.	Name of Scheme	Sanctioned/ estimated cost.	Total Expn. incurred Upto (87-88)	During (88-89)	Revised Probable estimated expenditure 1989-90	Total estimated outlay (90-91) to 3/90 during 1985-89	for 8th Plan	Breakup (yearwise) (91-92)	(92-93)	(93-94)	(94-95)
1.	Continuance of Meghna (J&C) Inv. Circle										
	1985-90	334.50	199.55	-	92.00	320.96					
	1990-95	690.00					690.00	143.78	119.30	131.07	141.28	154.57
2.	Joint Observations with Bangladesh										
	1985-90	20.00	2.68	3.87	4.33	-	25.00	5.00	5.00	5.00	5.00	5.00
	1990-95	25.00									
3.	(a) Link Canal										
	1985-90 Orgnl	15.55	5.29	10.93	1.00	-	1.00	1.00	-	-	-	-
	1990-95 Revd.	07.22									
	(b) Tipaimukh Irr. Project (Fulertal Barrage)	1.00	-	-	-	-	-	-	-	-	-	-
			(-)1.13	0.90	1.37	-	-	-	-	-	-	-
	(c) Alternative Studies for Link Canal from Brahmeputra to Ganga										
	1985-90	NIL									
	1990-95	50.00	-	-	-	-	50.00	10.00	10.00	10.00	10.00	10.00
	Total:		206.39	33.63	98.70	320.96	766.00	159.78	134.30	146.07	156.28	169.57

2711- FLOOD CONTROL

1. IMPROVEMENT OF RIVER AND FLOOD FORECASTING SYSTEM FOR YAMUNA IN INDIA PILOT SCHEME FOR YAMUNA BASIN (UNDP) PHASE-II (ESTIMATED COST Rs.1.56 CRORES) GOVT. OF INDIA COMPONENT.

A scheme for modernisation and improvement of flood forecasting system in Upper Yamuna Catchment for improving the forecast techniques at Delhi Rallway Bridge was taken up. Under Phase-I of this scheme, 14 telemetry stations have been installed for automatic collection and tranmmission of hydro-meteorological data to the Central Control Room at New Delhi.

Under Phase-II of this scheme data would be transmitted through INSAT-1B satellite. The scheme for an estimated amount of Rs.1.5522 crores (Govt. of India component) was approved in December, 1986. The scheme provides for procurement and installation of Data Collection storage and Transmission sub-system (DCSTS) for connecting the existing telemetry stations with INSAT-1B satellite. The UNDP input is $260.609.

An expenditure of Rs.1.2654 crores is likely to be incurred upto March, 1990 for procurement and installation of DCSTS and its allied equipment. An outlay of Rs.0.50 crore for balance work has been proposed for VIII plan.

Outlay proposed for 1991-92 is Rs.0.08 crors.

S.No.9

2. MODERNISATION OF EXISTING HYDROLOGICAL OBSERVATION AND FLOOD FORECASTING ACTIVITIES IN RESPECT OF HYDROLOGICAL OBSERCATION AND FLOOD FORECASTING ORGANISATION (NORTH)

A scheme for modernisation of 30 existing hydrological observation sites to improve the flood forecasting activities in respect of rivers of the Ganga, Brahmaputra system at cost of Rs.4.0677 crores was sanctioned by the Ministry of Water Resources in January, 1987. It provides for procurement and installation of sophisticated hydrological equimpment computers and wireless sets for improvement of existing wireless network so as to upgrade the sites according to ISI and ISO standards as far as possible.

The anticipated expenditure to end of March, 1990 is Rs.3.8305 crores. Since the scheme provides for procurement of sophisticated hydrological equipment some of which is to be imported and the indegenous manufacture of others take time, the procurement has been slow during the VII Plan. It has now gathered momentum and the firms have been identified and orders for part of the equipments placed, manufacture of some of which has been undertaken for the first time in the country. An outlay of Rs.2.40 crores for balance work has been proposed for VIII Plan.

Outlay proposed for 1991-92 in Rs.1.00 Crors.

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S.No.10

4. FLOOD FORECASTING SCHEME FOR KRISHNA BASIN (ESTIMATED COST Rs. 0.9184 CRORES.

An estimate amounting to Rs.0.6983 crores for flood forecasting in the Krishna basin to cater for the needs of Karnataka and Maharashtra was sanctioned in March, 1984. For various reasons including late sanction, the scheme could not be fully implemented in the VI Plan.

A new estimate amounting to Rs.0.9184 crores covering the balance works of the scheme has been sanctioned in December, 1986. The scheme provides for procurement and installation of hydro-meterological equipments, computer and allied items and life time spares.

The expenditure upto March, 1990 is likely to be Rs.0.4163 crores. An outlay of Rs.0.85 crores for balance work and maintenance of sites in the basin has been proposed for VIII Five Year Plan.

Outlay proposed for 1991-92 is Rs.0.15 crores.

S.No.11

FLOOD FORECASTING SCHEME FOR MAHANADI BASIN

(ESTIMATED COST Rs.0.9426)

A scheme for flood forecasting in Mahanadi basin with an estimated cost of Rs.1.4976 crores was sanctioned in 1982 but due to delay in creation of posts the provisions of the scheme could not be fully implomented during VI Plan. A fresh schamc for Rs.0.9426 crores was formulated to cover the balance works spilled over from VI Plan. This scheme was sanctioned in December, 1986 but the staff component has still to be sanctioned. The scheme provides for procurement of hymeteorological equipment, wireless sets, computer and allied itams and other special T&P items and construction of wircless sheds.

The expenditure upto March, 1990 is likely to be Rs.0.4978 crores. Outlay of Rs.0.80 crores and Rs.0.12 crores for balance work and maintenance of sites in the basin have been proposed for VIII Five Year Plan and 1990-91 respectively.

Outlay proposed for 1991-92 is Rs.0.14 crores.

S.No.12

12. FLOOD FORECASTING SCHEME FOR HO&FFO(SOUTH) BALANCE WORKS OF VI PLAN (FIVERS OTHER THAN.KRISHNA AND MAHANADI (ESTIMATED COSTRs.1.3598 CRORES)

Six schemes for flood forcasting in Godavari basin, Narmada and Tapi basin, Mahi-basom Sabarmati and Banas basin Daman Ganga Basin and Coastal rivers of Orissa and north Coastal rivers of Andhra Pradesh were sanctioned in March, 1984. Only apart of this work could be implemented during the 6th Plan for various reasons including late sanction. A fresh estimate amounting to Rs.1.3593 crores covering the balance works of the above six schemes has been framed. This scheme was sanctioned in 1986 but the staff compoment has still to be sanctioned. The scheme envisaged land acquisition, construction of wireless sheds, procurement and installation of hydro-meterological equipments, wireless sets etc.

The expenditure upto March 1990 is likely to be Rs.1.5784 crores. Outlay of Rs.0.50 crore and Rs.0.07 crore for balance work and maintenance of sites under this scheme have been proposed for 8th Five Year Plan and 1990-91 respectively.

Outlay proposed for 1991-92 is Rs.0.08 crores.

S.No.13

10. HYDROLOGICAL OBSERVATIONS AND FLOOD FORECASTING IN JHELUM BASIN

Hydrological observations and Flood Forecasting in Jhelum basin in Kashmir Valley, there is no defined monsoon season like in thr rest of the country. Floods ceeur at any time of the year excepting peak winter months. The precipitation in kashmir Valley generally cocurs due to western disturbances which normally occur during April to September or October. As a result, large sudden floods and consequent damages occur practicelly every year in the valley. On the basis of state Government reports from 1953-87 or an average, the flood loss for the State of J&K works out to about 6.66 crores per year. There is no flood forecasting network in the valleg. The J&K Government has expressed their keen interest in CWC establishing a flood forecasting set up there and the Ministry of Water Resources has since agreed in principle to take up these works in the valley and an estimate amounting to Rs.0.95 crores is under consideration of the Ministry. An amount of Rs.25 crore has been allotted for the work during 7th Plan. An outlay of Rs. 2.70 crores has been proposed for 8th Five Year Plan.

Outlay proposed for 1991-92 is Rs. 50 crores.

S.No.14

14. SCHEME ARISING OUT OF THE RECOMMENDATIONS OF RASHTRIYA BARH AYOG.

Subsequent to the submission of the report of R.B.A., it was programmed that as an incentive some items involving further studies be financed by the Centre. Under this head, items like-proper assessment of direct and indirect damages due to floods, and assessment of the effectiveness of the flood protection measures etc. were proposed to be studied through the help of specialised institutions. It is proposed to take a few schemes for evaluation studies in some states.

The approved outlay for VII plan was Rs.0.43 crores but upto March, 1988 no expanditure was incurred. The likely expenditure during VIIth Plan is Rs.0.05 crores. The Outlays proposed for VIII Five Year Plan and 1990-91 is Rs.0.40 crores and Rs.0.05 crores respectively.

Outlay proposed for 1991-92 is Rs.0.06 erores.

S.No. 15

6. FLOOD FORECASTING ON RIVERS COMMON TO INDIA AND NEPAL.

A scheme for flood forecasting activities in Kosi basin common to India and Nepal at an estimated cost of Rs.0.3638 crores was submitted in 1985 for the benefit of areas in India adjacent to Nepal which sufiers from floods. The scheme envisages installation of some new hydrometeorological stations and also provides for the recurring expenditure for taking over and maintenance of the existing site which is presently being operated by Kosi Project authority of Bihar. It has agreed in principle to the sanction of the scheme.

Very severe floods of 1987 in North Bihar in the rivers common to India and Nepal have sharply focussed attention on the necessity for implementation of this scheme urgently. A revised scheme for all the rivers common to India and Nepal has been prepared and concurred by the Cabinet Committee in principle. Due to the understanding reached between the Secretaries of the two countries the execution of the scheme has picked up momentum. An expenditure of Rs.1.60 cores is likely to be incurred up to end of March 1990. It is planned to get hydrological data of 45 sites in Nepal during 8th Plan. The equipment including wireless sets whih have to be supplied by India are to be procured on an urgent basis. Two reconnaissance teams has since visited Nepal to have on the spot inspection of a total of 15 sites for flood forecasting. An outlay of Rs.2.23 crores for this scheme has been proposed for the 8th Five Year Plan.

Out lay proposed for 1991-92 is Rs.0.44 crores.

S.No.1(a)

Strengthening of Monitoring Units

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The Monitoring units at present consists of 2 Chief Engineers and 7 monitoring Dtes. The Unit was monitoring 66 selected major projects upto 87-88. As per the present decision of the Commission the list of selected monitored projects was revised. The revised list included 90 projects once a year however, it is expected that 160 major projects shall spillover into VIII plan as ongoing schemes. As per the present criteria of selection of major projects for monitoring by CWC it is expected that number of major projects to be monitored by CWC shall come out to be 100 project twice a year. To cope-up with the increase in work for increasing the effeciency and better quality of work based on experience gaind by monitoring units. It has become utmost necessary to strengthen the monitoring organisation with 4 addl. C.E's and 12 addl. Dtes., as detailed in the estimate. Earlier these units were taking only one visit per year to monitoring projects, but for the World Bank Aided projects World Bank insists on minimum 2 to 3 visits each year the spread over for longer period for most detailed monitoring. To achieve this effeciency and better quality of work it has been proposed to visit each monitoring project twice a year.

To organise monitoring 100 major projects with the strength of 6 CE and 19 Dtes., an addl. expenditure during the year 90-91 has been proposed as Rs.322.45 lakhs. Total expenditure during subsequent year i.e., from 1991 onwards shall be Rs.227.25 lakhs per annum. An estimate in this regard has already been prepared and sent to the Ministry for approval in January'90.

Outlay given for 90-91 is Rs.60 lakhs. Even if this scheme is approved by the end of Sept'90 we shall be able to spent an amount of Rs.60 lakhs.

Total outlay proposed for 1991-92 is Rs.10.00 crores for S.No.1(a) and S.No.1(b).

S.No.1(b)

MONITORING OF MAJOR AND MEDIUM PROJECTS UNDER CONSTRUCTION

Presently CWC is monitoring 50 selected major projects under construction. However, recently it has been decided to increase the monitoring activities to 100 selected major projects in the country.

It is felt that ultimately, all the projects including medium projects should be monitored by CWC. As per the present statistics, this would cover 200, major projects and 600 medium projects. To organise monitoring of such a large number of projects, apart from strengthening the existing monitoring set up in CWC, atleast 50% of the work may have to be got done by engaging consultants. These Consultants could be retired engineers whose experience and knowledge would be of immense help in identifying the bottlenecks and in speeding up the activity.

For every major project under construction, it is considered that a team of 3 Consultants would be able to effectively monitor the activity with lumpsum amount of Rs.15,000/- per man month as fees including all expenditure for printing of reports, cost of travel and other contingencies etc. The cost per project for the monitoring work would be Rs.5.4 lakhs per year.

Similarly, for every medium project, a single consultant would be able to do the monitoring work. With a fee of Rs.15,000/- per man month per year, the cost for such consultancy per project would be Rs.1.8 lakhs/year.

For review of these reports and for interaction with the various governments involved, a cell headed by a Chief Engineer assisted by 4 Directors, 8 Deputy Directors and supporting ministerial staff like PA etc. will be created in CWC.

The total cost of carrying out the monitoring functions as proposed above would be as under in the VIII Plan.

CWC set up including Cell		- Rs.13 crores
Consultants(Major)		- Rs.27 crores
(Medium)		- Rs.54 crores
	Total	- Rs.94 crores

Total outlay proposed for 1991-92 is Rs.10.00 crores for S.No.1(a) and S.No.1(b).

BRIEF NOTE ON 'MODERNISATION & UPGRADATION OF CWC' LIBRARY XXXX AND INFORMATION BUREAU.

The proposed 'Modernisation and Upgradation of the Central Water Commission, Library and Information Bureau is an urgent necessity and envisages the management of the various activities upgradation and expansion by strengthing the Library with more and better trained staff to be equipped with the modern equipments for reprography and Computer Based Information Retrieval System. To serve better, manual Selective Dissemination of Information and Current Awareness Service have to be extended as well as Computerised Selective Dissemination of Information initiated.

The literature in the field of Water Resources, Engineering and allied subjects has to be procured to update the library services in all its aprox aspects. The library has to be geared to manage about 12,000 additional publications per year to meet the requirements of various Engineers, Scientists, Managers on the subjects.

The Library and Information Bureau has a HP-3000/37(Micro) Computer System installed and in operation under the scheme 'WAPIS'. This has to be maintained as well as upgraded and additional PC terminals provided to meet the further requirements of the Library services. It also requires additional staff to manage the computerised activities on a sound footing. The Library and Information Bureau has also received certain Micro-filming/reprography facilities under 'WAPIS'. These have to be maintained. The relevant provisions have been made.

The existing space for Library and Information Bureau is too inadequate, too constrained and too congested for its satisfactory development. An independent library building designed to specific requirements of library services is necessary. Provision for this is also made. Provision of hiring of additional space has also been made to manage the various activities till such time an independent library building is made available.

The cost of the total scheme has been estimated Rs. 316.40 lacs in the 8th Five Year Plan, period. A tentative yearwise requirement is as under:-

1. Ist Year (90-91) Rs. 5623 Lakh.
2. 2nd Year (91-92) Rs. 61.28 lac.
3. 3rd Year(92-93) Rs. 66.28 Lac
4. 4th Year (93-94) Rs.66.28 lac
5. 5th Year (94-95) Rs.66.28 Lakhs.

In view of the development, the Library & Information Science, the scheme is very useful to ensure upto date information services to the water resources users, engineers, scientists and readers. Out lay proposed for 1991-92 is Rs. 0.61 crores.

MODERNISATION & UPGRADATION OF LIBRARY & INFORMATION BUREAU, CWC

REQUIREMENT OF FUNDS

YEAR WISE BREAK UP (lakhs)

The period of implementation of the scheme is Five years i.e. 1990-95. The requirement of dunds for carrying out various activities will be as under:

		1st year 90-91	2nd year 91-92	3rd year 92-93	4th year 93-94	5th year 94-95	Total
1.	Construction of an independent Library building for CWC Rs.110.00 lac	15.00	20.00	25.00	25.00	25.00	110
2.	Hiring of additional accomodation for library pending construction of Library building(5 years) Rs. 90.00 Lac	18.00	18.00	18.00	18.00	18.00	90
3.	Procurement of Books/periodicals for the main library and 45 mini libriries at an average of Rs. 3.00 lac/year Rs. 40.00 lac	8.00	8.00	8.00	8.00	8.00	40
4.	R&M of Micro HP-3000 Computer System including additional terminals, upgradation of the system, annual service contract and stationery etc. at an average of Rs. 4.00 lac/year Rs. 20.00 Lac	4.00	4.00	4.00	4.00	4.00	20
5.	Procurement of additional T&P requirement in the library & Inf. Bureau, CWC at an average of Rs. 1.50 lac/year Rs. 7.50 Lac	1.50	1.50	1.50	1.50	1.50	7.50
6.	R&M of Binding and Mending Unit of L&IB at an average of Rs.0.18 Lac/year Rs. 0.90 Lac	0.18	0.18	0.18	0.18	0.18	0.90
7.	Special R&M of Library including w/c labour 4 nos per day at an average of Rs. 1.25 lack per/year Rs. 6.25 Lac	1.25	1.25	1.25	1.25	1.25	6.25
8.	R&M Photo-copies, cyclostyling machine including procurement of stationery at an average of Rs. 0.40 lac per/year Rs. 2.00 Lac	0.40	0.40	0.40	0.40	0.40	2.00
9.	Running and maintenance of micro-filming and Stat file Unit Rs. 3.25 lac at an average of 0.65 lakh per/year	0.65	0.65	0.65	0.65	0.65	3.25

1	2	3	4	5	6	7	8	9
10.	Translation work of articles from varicus regional and foreign languages at an average of Rs.0.30 Lac/year	Rs. 1.50 Lac	0.30	0.30	0.30	0.30	0.30	1.50
11.	Salary of library staff in non-plan/plan at an average of Rs. 7.00 Lac/year	Rs. 35.00 Lac	7.00	7.00	7.00	7.00	7.00	35.00
	Total	Rs.316.40 lacs.	56.28	61.28	6628	66.28	66.28	316.40

Say Rs. 316.00 Lacs.

S No. 3 STRENGTHENING OF HYDROLOGICAL UNIT, NEW DELHI

In order to meet the increasing demands and the complex nature of hydrological studies for project hydrology, Dam safety, Flood hydrology etc., and to provide transfer of modern technology to States and other user organisations, there is urgent need to strengthen and re-organise the present hydrological set up in C.W.C. The scheme with an estimated cost of Rs. 1.81 crores envisages to provide adequate additional staff and equipment for the purpose. An outlay of Rs. 1.81 crores has been proposed for this scheme under VIIIth Five Year Plan. An outlay of Rs. 0.34 crores has been proposed for the year 1990-91. Approved for 1990-91 0.10 crore.

Outlay proposed for 1991-92 is Rs. 0.44 crores.

Sl.No.4

MODERNISATION OF CWC HEADQUARTERS OFFICES

Department of Administration Reforms and Grievances under their letter No.30011/10/88-O&M dated 29.8.88 have desired preparation of a comprehensive scheme aimed at re-designing of existing offices. This visualises improvements to be effected in re-designing the layout with a view to improve physical environment within which the staff works including other aspects like provision of latest communication side, modern furniture and management system.

Keeping the above in view a scheme amounting to Rs.172.00 lakhs has been prepared which includes modern office equipment as well as other items required for modernisation of offices. This involves annual recurring expenditure of Rs.4.40 lakhs and non-recurring expenditure of Rs.150.00 lakhs on capital equipment etc.

The scheme does not include any item which may be required by other wings for their specific work requirement for which the information may have to be collected from the respective wing. Total proposed Eighth Plan outlay is Rs.150 lakh out of which provision of Rs.20 lakhs has been made for 1990-91. Requirement for 1991-92 would be Rs.20 lakhs.

Outlay proposed for 1991-92 is Rs.0.20 crores.

Sl. No. 5

57

Subject: Central Water Engineering Academy Project.

I. NEED:

Training is an integral part of Human Resources Development more so in the case of Water Resources sector which is multidisciplinary in nature as it includes various disciplines such as Irrigation, Hydropower generation, Water supply, Environmental and Socio-economic aspects etc. Training programmes in this sector have to cover all these disciplines in its ultimate development. In addition, development of the Managerial talent is also a prime need in Training. Experience has shown that Manpower development and training have not kept pace with the massive investments in this sector.

It is now proposed to set up a Central Water Engineering Academy in the Central Water commission to satisfy Training needs of all officers of Central & State Govts /UTs engaged in Water Resources sector.

II. PROGRAMME

(i) One Induction Training Course for 25 newly recruited officers annually.

(ii) Two Orientation Courses for promotees to Group 'A' Services of Central Water Commission with an intake of 35 officers per course.

(iii) General and Specific type of Courses for Senior level/S.E. level group 'A' officers of CWC and senior level officers from State Govt., Union Territories and Public Sector Undertakings etc; including Policy Workshops with an intake of 25 officers per course.

Contd/ -

III. COST ESTIMATES

The total estimated cost for the Central Water Engineering Academy is Rs.10 crores(under non recurring) in the first phase of works.

The acquisition of the land is expected to be taken up during 1989-90 and completed by 1991-92. The construction of buildings would be taken up as the acquisition proceeds and would be completed by 1992-93. Most of the procurement of T&P and other equipment would also be completed by this period. The Academy will start functioning from 1993-94 in the final phase. Outlay for VIII Five Year Plan is 12.82 crore

The Year-wise requirement of Funds for the phase I is as under:-

(Rs. in lakhs)

	Non Rec.	Recurring	Total
1990-91	260	5	265
1991-92	380	15	395
1992-93	270	61	331
1993-94	70	110	180
1994-95	1	110	111

Outlay proposed for 1991-92 is Rs,3.95 crores.

Sl.No.6

AUGMENTATION OF COMPUTER AIDED DESIGN FACILITY
(Modernisation of D&R Wing)

The applications of Computer Aided Design and Analysis Techniques have greatly increased the role of related techniques such as, Computer Aided Drafting and Finite Element Analysis in the routine design of dams and hydraulic structures. D&R Wing has already achieved considerable facilities in the field of software like Dynamic Analysis of Dam, Static Finite Element Analysis of Dam Stability of Dams, Analysis of Power House Structures, Hydraulic Transients etc. The Wing has also recently been able to set up nucleus computer hardware which can support such analysis and design activities. These facilities are being used to the maximum extent. However, the demands are for outstripping the facilities available on these systems for their use like, terminals etc.

The activity is especially facing a bottleneck as it generally requires a substantial amount of interactive work on computers for data preparation and setting up and testing the software in small modules. These activities can vary easily be handled by available PC-ATS and XTs which can take up the job of interactive processing which does not require a very substantial amount of computing power.

To achieve optimum utilisation of available high capacity computer resources, it has been proposed to acquire about 30 Nos. of PC-ATs along with suitable networking hard and software to act as intelligent terminals on centralised computer systems. These machines are proposed to be acquired during 1990-91 for which a provision of Rs.20,00,000/- (Rupees twenty lakhs) have been made in the Annual budget Approved for 90-91 is 0.10 crores.

These systems will serve as a first step in setting up of an all encompassing computer network as proposed in the tentative proposal for the scheme and will also help towards familiarisation of the assisting perscnnel to the usage of computer systems and remove the constraints on the availability of terminals for their use. The scheme does not involve creation of any additional posts as the existing manpower will be utilised for operation and maintenance of the additional computer systems which are being acquired under this scheme.

Outlay for VIII Five Year Plan is Rs.1.50 crores.
Outlay proposed for 1991-92 is Rs.0.07 crores.

Sl.No.7 PUBLICATION DIVISION

EXPANSION OF CENTRAL WATER COMMISSION OFFSET PRESS

The Government of India has given emphasis to the Water Resources and Flood Control Programme in the Five Year Plans so as to augment the agriculturel production, to meet the ever increasing water demands of the increasing population.

The Ministry of Water Resources has been entrusted with the task and CWC has been given the responsibility to study and formulate the different plans for the overall improvement of the economy of the country in the field of water Resources Various technical reports, study papers , scientific literatures material to educate the masses to use the latest technology in the water resources are required to be printed and distributed throughout the country.

The Publication Division in its present form came into existence in 1953 with a skeleton editoral staff under the charge of Extra Assistant Director, whose main duty was to get the project Reports received from various Directorates of erstwhile Central Water & Power Commission printed through Govt. of India presses throughout the country. In 1956 a small Printing press was gifted to Central Water & Power Commission under the Columbo Plan. In 1960 a few IBM machines were procured to meet the growing demand of printing. All these years, the printing work was carried out in a small scale with the capacity to print less number of copies with the help of Paper Masters.

Realising the useful work done by the Publication Branch, it was felt by the Ministry and the then Chairman, CWC,to arm the Publication Division with the modern and latest Offest Printing equipment and accordingly a scheme of 'Renovation of CWC Offset Press was drawn up, approved and implemented(1980-85) Under this Scheme among other equipments, two double colour Printing Machines (Heidelberg) costing Rs.32 lakhs(approx) were procured and for the first time, the Publication Division switched over to colour printing from Black and White.

After Renovation of CWC Offset Press Publication Division has been producing reports and publicity literature in multi colour matching with inter-national standard, printing quality of which have been acclaimed by the Secretary and Union Minister of Water Resources* Some of the publications broughtout at Publication Division, CWC were presented to the Hon'ble Prime Minister who has also acclaimed the work done bythe Commission.

* - Ministry of Water Resources.

Deficiencies in the Present set-up

However it has been consistently felt that the Publication Division has been passing through a critical phase. The present setup is inadequate to cope up with the present work-load and the ever increasing printing work in the near future quantitatively and qualitatively. Some modern sophisticated and latest machinery is required to be added for sophisticated printing and to keep pace with the fast developing printing world besides standby equipment. Proportionately additional staff is also required to manage and operate the latest machinery.

The Composing Section is considered to be tha backbone of printing. The electric typewriters procured many years back have become old, outdated and have been declared obsolete and unserviceable by the manufacturer. In fact the use of electric typewriters for the work of composing . has become out of date these days. A photocopying machine is very urgently required for that. This will also enable to have display type setting of Hindi and English for covers and other publicity materials to give better look which is being done at present through outside private agencies. This Division is not having the facility of modern Binding machines like Spiral Building Machines, automatic cutting machines etc. to match with the sophisticated developments in Binding.

Many a times this Division is called upon to print a smaller jobs requiring smaller copies. As this Division is not having smaller printing machines, the smaller jobs are being printed on big printing machines which is not good from the economy point of view. Accordingly a small offset printing machine is required. Desk Top Printing Machine has also been proposed in this regard which will also add to the composing capacity of the Press.

There are no arrangements for different type faces for Hindi Printing. With the passage of time there has now been a greater demand for printing of CWC Reports, Manuals, Brochures, Pamphlets etc. bilingually, The Advisory Committee for Hindi has also recommended for the printing of Publications bilingually-

Proposed set-up

In view of the foregoing deficiencies in the present setup and to make the CWC Offset Press a full-fledged independent Directorate, a scheme costing Rs.138 lakhs has been drawn up for the expansion of CWC Offset Press which is submitted for perusal/approval and inclusion in the eighth Five Year Plan in a phased manner. Modern machinery and equipments have been proposed for quality printing alongwith respective operational and supervisory staff in the proposal.

The proposed machinery numbering 21 machines alongwith the matching operational staff numbering 53 to run the machinery is given on page no .8,12-12. The proposed schemewill have the following facilities.

1. With the installation of one perfecta Offset Printing Machine and one Small Offset Printing Machine the text material of various Reports, Manuals, Covers will be printed expeditiously and economically.

2)With the installation of three side trimmers, Computerised Cutting Machine and Spiral Binding Machine the Binding Section will have a better look so far as the binding of Reports, Manuals are concerned.

In order to keep the machines in perfect working conditons and free from moisture and other dust elements, a scheme of Air Conditioning has also been included to keep the machines in perfect working order.

An Accounts Section has been added in the proposed setup to take care of the pricing, sales, distribution, exhibition of the printed materials. This will not only bring revenue to the Government but at the same time will keep the printed material in proper order in accounting. The scheme has been proposed in phases spreading to five years. It is hoped that the scheme in its final stage will cost Rs 138lakhs to accomodate the extra-machinery and the additional staff of the proposed setup. It is recommended that 600 sq.metre area will be needed for the proposed scheme. It is suggested that both the machinery and the staff may be accomodated in one coherent space.

i)With the expansion of CW C Offset Press in terms of latest machinery, it is felt that the Publication Division may be strengthened with a Director as the head of the Publications Directorate, having the complete powers of a Superintending Engineer, in the field, vested with the power of procurement, maintenance, accounts etc.

ii)After the implementation of the scheme, it is suggested that the Ferro-Printing and Micro-Filming units and other related units should form a part of the Publication Directorate and function under the overall control of Director- Publications Thiss will centralise all the Reproduction Units under one Roof. This will facilitate systematic and efficient functioning of the proposed Publications Directorate. Apart from the Reproduction Units, the distribution work of printed publications and collection of the material in perfect printable condition from different agencies indentors and Directorates will also be carried out by the proposed Directorate.

iii)To Supervise and to have a better quality control, supervisory staff have also been proposed to utilise the latest advanced technology in printing and to have a better and quantitative production with a lesser input. After the completion of Expansion Scheme there would be a fleet of 38 machines in position. To keep them in perfect working condition it is felt necessary to have mechanical as well as electrical staff under the charge of Foreman(Workshop).

Following jobs which are at present being printed from outside will be taken up in CWC Offset Press after the implementation of this scheme. This will result in a saving of Rs.18 lakh annually.

i)At present Bhagirath(English & Hindi) are being printed at the Government of India Photolitho press, Faridabad. An expenditure of Rs.5 lakhs annually is being incurred on this.

ii)On account of non-availability of facility like photo-composing, Lamination etc. worth Rs.2lakhs of jobs are being carried out from outside agency annually

iii)There are about 42 field officers of CWC. On a rough estimate it is understood that Rs.11 lakh worth of printing work is bei g done from outside agency.

It is therefore requested that the proposal for Expansion of CWC Offset press to have a compact reprographic establishment in Central Water Commission be approved.

Sl.No.8

CENTRAL WATER COMMISSION
(TRAINING DIRECTORATE)

TECHNOLOGY TRANSFER TO DESIGN WING UNDER NATHAPA, JHAKRI PROJECT AND OTHER PROJECTS.

A proposal has been framed for technology transfer and training for CWC Officers under World Bank Assistance for upgrading skills with regard to Nathapa Jhakri and other Internationally funded large hydro electric projects particularly with regard to underground structures. The civil module of the proposal would include investigations of hydro electric project, civil Designs of H.E. Projects, Constructions technique, Management and Monitoring of HE Projects.

This would be a Central Plan Scheme under the 8th Five Year Plan of CWC Ministry of Water Resources. The total outlay of scheme is estimated at Rs.306 lakhs. The total outlay includes the expenditure towards, cost of Expatriate Consultants, Project Implementation cell and equipment and study tours and training. The foreign exchange component of the scheme would be US $ 1.268 million (Rs.216 lakhs) mainly for payments expatriate Consultants. Foreign training for CWC Officers and import of Tech. Literature.

Outlay proposed for 1991-92 is Rs.1.02 crores.

Sl. No. 9 (a)

Performance Evaluation and Environmental Impact Studies of Irrigation Projects (Socio-economic Evaluation of Irrigation Projects).

Considerable financial resources are being invested in the irrigation sector with objectives of meeting the demands of food and fibre for the country. The irrigation projects are planned and implemented to provide efficient water supply for agricultural production keeping in view the socio-economic environmental and other relevant factors. In order to determine whether envisaged benefits are fully achieved, and the reasons for short fall,if any, as well as to take stock of the socio-economic changes, environmental impacts, it is necessary to carry out exhaustive impact evaluation studies of completed irrigation projects. Such studies would become all the more necessary in the face of criticism from certain quarters that benefits realised from different water resources projects are far less those envisaged at the planning stage.

In addition to evaluating the benefits from the projects, the studies would also cover detailed analysis of problems and suggestions for suitable remedial measures with a view to provide necessary inputs for efficient operation of existing projects and for planning and operation of future projects.

A beginning has been made in this direction under the central sector by taking up studies of a few projects on a pilot basis. However, in order to reflect the performance of the irrigation sector in the country on a realistic basis, it is necessary to carry out such impact evaluation studies in respect of a number major and medium projects falling under different command area sizes, and located in different agroclimatic regions.

With the above objectives in view, it is proposed to carry out impact evaluation studies in respect of about 75 completed irrigation projects (about 25 major and 50 medium) during the VIII Five Year Plan under central sector-CWC through specialised agencies at the estimated cost of 5 crores.

Outlay proposed for S.No. 9(a)& S.No.9(b) for 1991-92 is Rs. 7.00 crores.

S. No. 9(b)

C. Studies on Evaluation of Projects:

Presently, after the completion of a project, no evaluation of the project with reference to the basic planning parameters is being done. Apart from affecting the optimum utilisation of water as evnisaged in the original plan, such a lack of information also affects future planning processees.

Studies are therefore required to be taken up to find out the actual position on the following basic parameters after the implementation of projects. These studies would also enable an understanding of the total benefits from the project.

a) Socio economic aspects:
   i) Crop Pattern developed.
   ii) Crop productivity after irrigation.
   iii) Increase in per capita income
   iv) Development of agrobased industries
   v) Development of other activities in the project area.
   vi) Employment.

b) Environmental aspects:
   i) Rehabilitation & Resettlement of Oustees.
   ii) Afforestation.
   iii) Health.

Such a studies could be carried out with a frequency of once in 5 years.

The studies are proposed to be carried out through consultants, having institutional support. It is estimated that costs for such studies would be about Rs. 40 lakhs per major projects and Rs. 5 lakhs for medium projects.

For review of the reports and for interaction with various projects and organisations, a cell headed by a Chief Engineer assisted by 4 Directors, 8 Dy. Directors and supporting ministerial staff will have to be created in CWC.

-/-

In view of the very large no. of projects implemented during the previous plans, this sort of study may not be completed in the VIII Plan period and would need to be continued in the subsequent plans also.

Initially we may take up about 100 major projects and 500 medium projects to carry out these studies. The financial requirements for such studies during VIII Plan would be about Rs. 35 crores including the expenditure on the Cell to be set up in CWC.

Outlay proposed for 1991-92 for Sl.No. 9(a) & S.No.9(b) is Rs. 7.00 crores.

S. No. 10

MODERNISATION OF INVESTIGATION TECHNOLOGY FOR WATER RESOURCES DEVELOPMENT-INDP ASSISTANCE-INDIAN COMPONENT

The CWC is the premior technical organisation in the country in the field of water Resources Development and has played an important role in the fields of planning, Investigations Designs and Research of Multi-purpose River Valley Projects.

Since independence, large number of dams have been constructed and CWC has been continuously associated with the investigations of a number of projects for the past 40 years. CWC has developed an expertise required for necessary surface and sub-surface investigations on various Multi-purpose River Valley Projects.

Upto the end of VI Five Year Plan, CWC investigated and Formulated Project Reports in respect of as many as 164 irrigation Hydro-Power, Water Supply and Multi-purpose Projects in various parts of the country. In the VII Plan, as many as 40 projects are under investigation and equal number of projects shall be under investigation during VIII Five Year Plan.

Although the cost of investigations, constitutes, very small percentage of the capital cost of the project, i.e. about 1% inadequate surveys and investigations often result in time and cost over runs on account of changes in designs, quantities etc. It is therefore, necessary that adequate investigations are carried out at the investigation stage with the modern equipment.

The Modernisation of Investigation Technology for Water Resources Development involves, procurement of latest equipment/instruments and training of personnel in operating the equipment/instruments. The total cost of the Indian Component of input is of the order of Rs. 0.49 crores for which the required provision is made in the VIII Five Year Plan spreading over a period of 4 years.

The equipment/instrument are proposed to be procurred under World Bank aid. The original estimate of US $ 0.87 million has been revised to US $ 0.25 million by (a) retaining only equipment & (b) only such equipment as is not available on Rupee payment. Rs. 2.00 crores is proposed for VIIIth Five Year Plan and Rs. 0.10 crores for Annual Plan - 1990-91.

Outlay proposed for 1991-92 is Rs. 0.50 crores.

S.No. 11

CREATION OF CENTRE OF EXCELLENCE FOR CONSTRUCTION METHODS PLANNING AND MANAGEMENT

During the 8th Five Year Plan, there is an ambitious programme to create more than 8.7 ha. of additional irrigation potential under major and medium irrigation and add more than 8000 MW additional hydro-power. Projects have been suffering from extensive time and cost over runs for various reasons e.g. inadequate finance, surprises during construction, use of age old conventional methods of construction , lack of proper planning and management etc.

In order to achieve the ambitious target set for 8th Plan, it is essential that the available scarce financial resources are used judiciously for construction of water resources projects by using modern construction technology and methods of planning and management to avoid time and cost over runs. With the proper selection of construction methods and technology, it is possible to reduce the construction period of major HE and irrigation projects to about 10-12 years.

Accordinly, a proposal for creation of Centre of Excellence for construction technology, methodology, planning and management under the CWC has been prepared and submitted to the Government for sanction during the 8th Five Year Plan. The Centre of Excellence will be headed by a Chief Engineer, assisted by 6 Directors and other supporting staff as per details given in Annexure-I. The Centre will function as a consultancy/Advisory agency for all the major HE/Irrigation projects costing more than Rs. 200 crores as well as projects where modern technologies are adopted for construction such as for tunnelling etc. and for vetting the initial construction plan planning at project report preparation stage. The Centre will also monitor the actual construction methods, planning and management and equipment, deployed during construction of these major projects. The expertise of this Centre will also be available to all other projects and State Irrigation/Power Projects for consultancy in their specific construction problems. Total proposal for VIII Plan outlay is Rs. 400 lakhs. The outlay provided for 1990-91 is Rs. 5 lakhs. As the scheme has not yet been sanctioned, the amount may not be spent. Outlay proposed for 1991-92 is Rs. 80 lakhs.

Outlay proposed for 1991-92 is Rs. 0.80 crores.

S. No. 12

SETTING UP OF BASINWISE ENVIRONMENTAL MANAGEMENT UNIT:

The scheme with an estimated cost of Rs. 14.00 crores envisages to strengthen the infrastructure in CWC for meeting the increased demand on problems concerned with environmental management related to water resources development at the level of river basin. An outlay of Rs. 13.85 crores has been made for this scheme in the VIIIth Five Year Plan. The Annual outlay proposed for the year 1990-91 is Rs. 0.10 crore . Approved for 1990-91 is Rs. 0.05 crore.

Outlay proposed for 1991-92 is Rs. 2.77 crores.

S. No. 13 (a)

RE- APPRAISAL OF IRRIGATION POTENTIAL OF MAJOR AND MEDIUM SCHEMES IN OPERATION:

There is a wide gap between the irrigation potential reported to have been created by major and medium irrigation projects and its annual utilisation. The gap was about 4.7 million hectares at the end of Sixth Plan. This gap is mainly the result of over reporting of the figures of irrigation potential which takes place due to the following reasons:-

i) The designed potential of the project is reported as created on the completion of the project while the water available at the outlets is sometime less due to designed yield not being realised or transmission losses being more than the assumed rates.

ii) Post construction command surveys not being done.

iii) The cropping pattern developed in the command being different from the projected ones.

iv) Sedimentation of reservoirs and deterioration of the physical condition of the systems causing reduction in the potential of old irrigation system.

During the Seventh Plan period some States reviewed the potential figures of certain projects and reduced them and as a result the gap has come down by about 1.3 million hectares. But a comprehensive review of all projects under operation is yet to be carried out. The Working Group on Major & Medium Irrigation Programme for VIII Plan has recommended a systematic review so that the realistic figures of potential is reported instead of the design figures indicated in the project reports.

A centrally sponsored scheme has been framed by the C.W.C. for the purpose. The scheme envisages re-assessment of the irrigation potential created up to the end of 1989-90 by the major and medium schemes. It will be done starting from the preparation of outletwise maps of the command and building the data upwards. The work will be organised into a number of sub-schemes and will be executed by the existing machinery of the State Governments through the project Co-ordinators to be appointed for each sub-schemes. The co-ordinators who are to be seleected from retired experienced senior engineers will report the results to the State Governments and the State Governments will furnish the re-appraised figures of potential to the Central Water Commission. Total provision in VIIIth Plan outlay is Rs.130 lakhs. An amount of Rs. 5 lakhs was provided in tne budget of 1990-91. But the expenditure is not likely to be incurred due to the delay in sanctioning the scheme. The full amount of Rs. 130 lakhs has been proposed for 1991-92.

Outlay proposed for S.No. 13(a) & S.No. 13(b) for 1991-92 is Rs. 6.00 crores.

S. NO. 13 (b)

Monitoring Water Use and related studies of completed major and medium projects:

Presently, there is no reliable data on water use from completed irrigation projects both major and medium. Though at the design and approval stage the projects were based on certain crop pattern data, after implementation of the projects, the actual crop pattern developed is entirely different in most of the projects. Such a situation upsets the very planning of these projects.

To study the water use, and other associated issues for completed projects, it is proposed to monitor these through Consultants.

To start with 100 completed major projects and 500 completed medium projects would be taken up for these studies. Roughly the consultancy charges per project would be Rs. 10 lakhs for major projects and Rs. 5 lakhs for medium projects.

For review of the reports and interaction with State Govts., etc. a Cell headed by a Chief Engineer assisted by 4 Directors, 8 Dy. Directors and supporting staff will be created in CWC.

The outlay for the above works in the VIII Plan would be about Rs. 35 crores including the expenditure on the cell to be set up in CWC.

Outlay for S.No. 13(a) & S.No. 13(b) for 1991-92 is Rs. 6.00 crores.

S. No. 14

Regionalisation of CWC Offices.

The regionalisation of CWC offices is proposed to be implemented in two phases in the year 1991-92 and 1992-93. The proposal envisages opening of a Chief Engineer's office at Shillong/Guwahati and opening of a Chief Engineer's office at Bangalore by shifting the Chief Engineer Mon.(South), CWC from New Delhi. The required posts for the Chief Engineer North-Eastern Region at Shillong/Guwahati may have to be created whereas the ministerial post required for Chief Engineer Mon.(South), Bangalore only need to be created. It is also proposed to shift some of the posts under the Chief Engineer Mon.(North) to Chief Engineer (Northern Region) to take up the additional workload proposed under regionalisation. However, this does not involve any additional expenditure. The proposal is estimated to cost Rs. 68 lakhs in phase I during 1991-92 and Rs. 82 lakhs in phase II during 1992-95. (Total plan outlay -Rs.150 lakhs).

Outlay proposed for 1991-92 is Rs. 1.00 crores.

S. No. 15

Hydro Power Design Organisation in CWC-continuation of 26 posts

A Design Cell was created in CWC in Sept. 1989 for consultancy work pertaining to three hydroelectric projects under execution by NHPC limited exclusively. The sanction of posts in the cell was reviewed annually and the last sanction expired on 30.9.1987. The proposal for continuance of these posts upto 28.2.90 has been agreed to in principle by the NHPC. Though the Cell was originally created exclusively for NHPC projects, after the reorganisation of D&R Wing some projects belonging to Eastern and North-Eastern Region were transferred to this Cell in addition to the design of NHPC projects. Further this organisation started accepting more and more projects from various states in the region and from PI Organisation of CWC. The NHPC is not interested in continuance of 26 posts of this cell exclusively for NHPC beyond 28.2.90. Thus sanction to continue the 26 posts under the Design Cell has become necessary. With this in view the proposal amounting to Rs. 83.55 lakhs was submitted for the years 1990-91 to 1994-95.

Outlay proposed for 1991-92 is Rs. 0.20 crores.

Creation of an Indus Cell in CWC.

One of the important obligations placed on India by the Indus Waters Treaty relates to supply of exhaustive technical data/drawings of various run-off the river schemes across the western rivers of the Indus basin. As the data is required to be furnished to Pakistan in time bound manner before taking up construction work, proper scrutiny ofthe data has to be made before supply of the data. In order t. stregthen the Indus Wing of the Ministry of Water Resources by adequate technical support by Central Water Commission, the proposal has been framed. The Cell is proposed to be headed by a Chief Engineer and assisted by two Directors comprising a total staff strength of 36 in various cadres. The expenditure on the proposed Cell for a period of five years is estimated at Rs.113.38 lakhs. Outlay proposed for 1991-92 is Rs.0.30 crores..

S.No. 17. KARNALI (CHISAPANI) MULTIPURPOSE PROJECT SETTING UP OF B&N UNIT IN CWC - JUSTIFICATION FOR

* * *

Karnali (Chisapani) Multipurpose Project in Nepal envisages construction of 270 m high dam across river Karnali to create a reservoir of 16.2 Km^3 capacity. The underground power house located near the dam on the left bank would have the installed capacity of 10,800 MW and it is anticipated to generate hydropower of 20842 Gwh annually. The project benefits also include to provide Irrigation facilities in about 1,90,000 ha area in Nepal and stabilisation of about 3,20,00,000 ha. of existing irrigated area under Saryu and Sarda Sahayak Commands in India. Flood Control benefits are also contemplated.

The feasibility studies for the project have been carried out by the Himalayan Power Consultants, appointed by HMG Nepal, The consultants have submitted the final report on the Karnali Project in 22 Volumes, recently. Earlier, draft reports of the Consultants were received from time to time and CWC hasfurnished commentson the various parameters of projects mainly Hydrology, Sedimentation, Dam Design, Spilway Design, Energy Dissipation Arrangements etc.

The final report of the project proposals received now does not appear to have taken into account any of our major comments regarding the parameters of the project proposals. We are now required to firm up our views on these aspects and come foward with our views in absolute terms on the project parameters. For this purpose, special studies are required to be carried out by CWC urgently on priority basis. The list of aspects on which these studies are required are mainly as indicated below:

I. HYDROLOGY & SEDIMENTATION ASPECTS

1. Hydrology Studies, and finalisation of PMF.
2. Studies on rate of sedimentation of the Reservoir and assessment of likely rate of sedimentation and dead storage to be provided alongwith minimum draw down level (MDDL).

II. DESIGN ASPECTS

1. Sizing of the project - optimisation studies.
2. Power House Studies - Unit size etc.
3. General layout, dam design, spillway design, energy dissipation studies etc.

Contd.....2/-

III. SYSTEM STUDIES

1. Water Planning Studies - Studies on Irrigation aspects including requirements for Irrigation in India.
2. Enviormental studies.
3. Studies for techno-economic evaluation.

JUSTIFICATION FOR THE STAFF PROPOSED:

Karnali is one of the highest dams proposed in the continent and the critical review studies to be undertaken, leading to modifications of the project parameters and the resulting project report, call for a lot of additional works, proper documentation and preparation of a final report. The team entrusted with this task should have the capacity to defend its submission in an able manner when called upon. This involves inter action with the foreign Consultants and Officers in foreign countries concerned with the project. The proposed B&N Unit therefore, should be headed by an officer at sufficiently high level and as such it is proposed that a Chief Engineer level Officer should head this Unit.

The other staff required to carry out the studies hasbeen assessed based on the work load involved and details are furnished herewith.

The expertise exists in CWC to carry out the above mentioned studies but the specialised units dealing with these various disciplines are spread over in various Wing of CWC. For better Coordination and for completion of the task in minimum time period, it is necessary that one unit with representatives of staff specialised in various disciplines works under One Umbrella. Accordingly, Cell called Bhutan & Nepal Unit has been proposed. After completion of works on special studies for Karnali Project after one year, the unit could be extended further to undertake similar studies for Indo Nepal Joint Projects such as, Pancheshwar Project, Kosi High Dam Project, Rapti Project etc. which are to be jointly planned with Nepal.

The requirement of staff is worked out on the basis of that the Dy.Director is the working level withthe assistance of Two Assistant Directors and under the guidance of half a Director (i.e. One Director will have two D.Ds. under him).

Contd.....3/-

Detailed workload involved in carrying out the studies and requirements of man-power for the same are furnished below:-

I. Hydrological & Sedimentation Aspects .

1. Hydrological Studies

a) Those studies involve the following steps:-compilation of Hydrological & Meteorological Data in Consultation with the IMD, State Govts.etc. - 2 D.D.Months.

b) Analysis of Data - development of rainfall-run off-relationship, unit Hydrograph Development etc. - 6 D.D.Months.

c) Calculations of PMF and Design Flood, and Water Availability - 4 D.D.Months.

Say 1 D.D for One Year.

2. Sedimentation Studies

The works involved are:-

a) Compilation of Sediment Data in Consultation with the State Govt. - 2 D.D.Months.

b) Analysis of Data for fine, medium and course size, sediment distribution in the reservoir. - 4 D.D.Months.

c) Comparision of the results with the data at other sites in the basin and also in the other neighbouring basins. - 3 D.D.Months.

d) Arriving at the life of the reservoir after working out area - capacity curves after 10 years, 15 years, 25 years, 50 years and 100 years sedimentation FRLS, Viz. at EL-375,EL-395, EL-415. - 4 D.D.Months.

Total 13 D.D.Months

Say 1 DD for one Year.

The above studies are to be carried out with three alternative FRLS, i.e. at 375 m, 395 m and 415 m.

Staff:- One D.D. for 12 months with one A.D. with other supporting staff for 24 months.

or

Two A.Ds. for 12 months with other supporting staff.

Contd.....4/-

II. DESIGN ASPECTS

The works involved are:-

a) Compilation of input data like yield studies, reservoir operation, Project Flood and PMF Studies, sedimented area-capacity curves etc. - 4 D.D.Months.

b) Design and layout of spillway and energy dissapter at 3 alternatives FRLs namely 375, 395 and 415. - 9 D.D.Months.

c) Design of main Dam. - 9 D.D.Months.

d) Design of Power House - After finalising unit size. - 9 D.D,Months.

e) Cavern Design and Power House layout. - 9 D.D.Months.

Total 40 D.D.Months.

Say 4 D.Ds. for One Year.(2 DDs for Dam Spillway Design +2 DD for Power House Design)

III. SYSTEM STUDIES

a) The works involved are:- Compilation of data in consultation with State Agriculture Department & Other Agencies. - 1 D.D.Month.

b) Calculations for Crop Water requirements, using modified Peneman's method. - 6 D.D.Months.

c) Environmental Studies comprising on Flora and Fauna, affected Forest Area Submerged, Submergence of Villages, Population and Houses affected etc. - 6 D.D.Months.

d) Evaluation of the Project from techno-economic angle.,Calculations of B.C.Ratio and Internal Rate of Return, Preparation of Detailed Project Report. - 12 D.D.Months.

Total 25 D.D., Months.

Say 2 D.Ds. for One Year

Contd.....5/-

Thus the staff requirements, keeping the target of completing the work in one year is as under:-

Hydrology.	12 D.D.Months or 1 D.D. for One Year
Sedimentation.	13 D.D.Months or 1 D.D. for one Year
Design of Dam/Spill-way.	22 D.D.Months or Say 2 D.Ds. for One Year.
Design of Power House.	18 D.D.Months or Say 2 D.Ds. for One Year.
System Studies	25 D.D.Months or Say 2 D.Ds. for One Year

With the norm mentioned above about the requirement of Chief Engineer, Director, Dy.Director, Assistant Director & other Supporting staff (on the basis of existing staff strength in Chief Engineer (PIO's) Office) the proposal works to as given in the statement attached with.

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STATEMENT INDICATING THE REQUIREMENT OF STAFF FOR THE PROPOSED BHUTAN & NEPAL UNIT (B & N UNIT) IN CENTRAL WATER COMMISSION

Name of Post	Chief Engineer (B & N)	Director Design (Dam/Spillway)	Director (Power House)	Director (Systems Design)	Director (Hydrology & Sedimentation)	Secretariat staff	Total
2	3	4	5	6	7	8	9
Chief Engineer	1	-	-	-	-	-	1
Director	-	1	1	1	1	-	4
Deputy Director	-	2	2	2	2	-	8
Assistant Director	-	4	4	2	4	-	14
Draftsman Grade.I	-	1	1	1	1	-	4
Draftsman Grade II	-	2	2	2	2	-	8
Assistant	-	-	-	-	-	1	1
Upper Division Clerk	-	-	-	-	-	3	3
Lower Division Clerk	-	-	-	-	-	5	5
Senior P.A.	-	-	-	-	-	1	1
Stenographer Grade.II	-	1	1	1	1	-	4
Stenographer Grade.III	-	1	1	1	1	-	4
Jamadar	-	-	-	-	-	1	1
Messenger	-	-	-	-	-	8	8
Driver	-	-	-	-	-	1	1

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S.No.18

See Setting up National Irrigation Management Institute(NIMI)

National Irrigation Management Institute (NIMI) is envisaged as an apex body at the national level to guide the WALMIS and agricultural universities in developing proper approaches and methods for irrigation management. NIMI will function as a specialised high level body to assist WALMIS in developing appropriate methodology in training of irrigation engineers in improving the performance of irrigation systems. The main thrust of the training activity undertaken by NIMI directly will be policy orientation of the senior staff of irrigation agencies and command area administrators and staff of irrigation training institutes and senior researchers of the agricultureal universities. Emphasis will also be on developing proper training programmes for training of farmers. NIMI will provide a national back-up to the chain of WALMIS being established in the State. At present WALMIS are dependent on foreign agencies and foreign universities for such guidance. NIMI will take over that responsibilities. It is proposed to train 40 professionals every year through highly specialised courses.

The main objective of the Institute will be to promote efficient water management of the existing irrigation systms, diagnosis of deficiencies and giving suggestions for solutions and action research for the above functions. The training activities of the Insitute will be concentrate mainly for training trainers.

The scheme is likely to start during 1989-90 and the activities be continued over the VIII Five Year Plan. A provision of Rs. 1355 lakhs has been made for this scheme for VIIIth Five Year Plan.

Out lay proposed for 1991-92 is Rs. 2.70 crores.

S.No.19

DIRECTIONAL BLASTING TECHNIQUE/LONG TERM PROGRAMME WITH U.S.S.R.

A Long Term Protocol for cooperation between USSR & India was signed in March, 1987 in the field of Water Resources. As a part of this a team of USSR expetts visited Bargi Canal for preliminary assessment of feasibility of use of Directional Blasting Technique in the rocky reach of 19 km which was however not considered feasible by Project Authorities due to thickly populated areas and other constraints.

Further, proposal of its use on Bangit dam is still under consideration. Also possibility of its use in Bansagar dam project is also being considered. A team of Indian Experts also visited USSR for a period of 10 days to have first hand knowledge of this technique.

In view of Long Term Nature of the programme of Cooperation, a continuous review of activities is likely on the subject. Provision of Rs. 55 lakhs has been suggested for away possible liabilities expenditures as a result of further discussions/discisions.

Outlay proposed for 1991-92 is Rs.0.15 crores.

S.No.20

SETTING UP RIVER BASIN AUTHORITIES

The National Water Policy lays down that resources Planning in the case of water has to be done for a hydrological unit such as drainage basin and appropriate organisations should be estab lished for comprehensive planned development of a river basin as a whole (vide para 3.2 and 3.3 of the National Water Policy).

The Parliamentary Consultative Committee for the Ministry of Water Resources in it meeting held on 5th May, 1988 considered and approved a report on the setting up of river basin organisation prepared by a sub-committee fof the Consultative Committee regarding the form and role of the organisation to undertake planning and development of river basin. The report recommends the setting up of river basin organisations in seven basins, viz. Narmada, Brahmaputra, Ganga, Mahanadi, Godavari, Cauvery and Krishaa. While three basins, viz. Narmada, Brahmaputra and Ganga have already some existing organisations which can be reconstituted to form the proposed river basin organisations, the remaining four do not at present have any such organisations.

The organisational pattern for the River Basin Organisations may not be uniformed for all the river basins in view of the different levels of development that has taken place. Actual setting up of river basin organisations will have to be made in consultation with the concerned basin states. To begin with, it is proposed to set up river basin authorities in three basins namely Narmada, Brahmaputra and Krishna under the Ministry of Water Resources.

The project is expected to be operational by the beginning of VIII Five Year Plan and the activities will be continued over the plan period. A provision of Rs. 1500 lakhs has been made in VIII plan for covering the cost of the scheme.

Out lay proposed for 1991-92 . . is Rs.3.00 crores.

5. INVESTIGATIONS FOR DRAINAGE SCHEMES IN WATER LOGGED AREAS EXISTING IRRIGATION PROJECTS IN VARIOUS STATES.

Proper field drainage in Irrigation Schemes is an important requirement . In absence of correct surfaceand sub-surface drainage, the irrigated areas progressively becomes water logged due to rise of watertable. When the water table rises above the root zone of the crops, the crop yield decreases. Evaporating water from this zone leaves behind soluble salts which increases the salt content of the field and renders the land infertile.

Due to various reasons the irrigation schemes constructed earlier and ongoing schemes did not have drainage facilities. The importance of drainage is becoming more relevant now as the pressure on the cropped area for giving highest possible produce is increasing. 8 Projects in Six States have been identified to have developed water logging conditions. The total culturable command area of these projects is assessed as 80 lakhs ha. Assuming 50% of total CCA is needing remedial measures, it is proposed to plan for 40 lakh ha. of water logged area. This scheme is for investigations of water logged areas and preparation of project reports. The estimated present cost of providing drainage arrangement is about Rs 2500/-ha. The Project costs may therefore, work out Rs 1000 crores. The normal investigation costs are taken at 2% of capital cost works out to about Rs 20 crores.

In order to investigate and formulate proposals for providing the field drainage in these projects, it is proposed to have a new field organisation headed by one Chief Engineer in the CWC. Total cost establishment, T&P, office equipment including recurring expenditure like R&M of vehicles and also expenditure on works, is estimated to be Rs 15 crores. The investigations and preparation of Project Reports is proposed to be completed in Five Years of VIII Five Year Plan. The annual break up of total expenditure of Rs 15 crores is indicated in the table. This cost is less than 2% of capital cost and therefore considered reasonable. Outlay proposed for 1991-92 is Rs 3.00 crores.

SL.NO. 22

NATIONAL HYDROLOGY PROJECT

For a rational and integrated development of water resources of a large country like India, a planned approach is needed covering various aspects such as irrigation, flood control, hydro-electric power generation drainage, water quality, industrial and water supply demands etc. Keeping this in view, the High Level Technical Committee on Hydrology (HLTCH) reviewed the problems in different areas of Hydrology in detail and identified the areas needing immediate attention for improvement:

1. Augmentation of data collection work.
2. Hydrological instrumentation.
3. Basin-wise data bank.
4. Training cells and development of software.

The project proposal under the National Hydrology Project envisages:

i) Improvement of hydrological practices and infrastructural facilities at the state, regional and natonal level.

ii) Strengthening and creation of facilities for development of hydrological instrumentation.

iii) Establishment of natural water data system.

iv) Training and Manpower development.

v) Development of tecniques and software for hydrological studies and modelling.

The various agencies involved in the project would be CWC, Ministry of WR, CWPRS IMD, Academic institutions like University of Roorkee (Department of Hydrology), State Irrigation Department Concerned.

The scheme is expected to be sanctioned and become operational by the beginning of the VIII Plan and will be spread over the entire plan period. A provision of Rs 89.01 lakhs representing CWC's share out of total provision of Rs.2592.24 lakhs in the project has been made in the 8th Plan.

In addition to this, there would be overhead charges, as applicable from time to time, amounting to approximately Rs 40.00 lakhs for seven years. NJPC has signed a Memorandum of Understanding' agreeing for the creation of such a cell as well as for meeting the above expenditure 'in full'. As already stated, the entire Project is funded by the World Bank and has fixed targets for completion. The components for this total expenditure for the 8th Five Year Plan period on CWC would amount to around Rs 115.00 lakhs. Action for creating the Cell has already beentaken up.

CENTRAL WATER COMMISSION
DAM SAFETY ORGANISATION (D &R WING)

.....

NOTE ON DAM SAFETY ASSURANCE AND REHABILITATION PROJECT

(AUGUST 1990)

Title of the Project:

The title of the project is "Dam Safety Assurance and Rehabilitation Project". This is proposed as a plan scheme in the Centre/State Sector.

Description of the Project:

The proposal involves institutional strengthening of Central Water Commission and also the institutional strengthening including provision of basic facilities for identified dams and undertaking rehabilitation of some identified dams in distress in the states of Madhya Pradesh, Orissa, Rajasthan and Tamil Nadu.

Justification of the Proposal/Scheme:

As per the National Register of Large dams there are 2938 completed large dams in the country, of which the four participating states in this project consisting of Madhya Pradesh, Orissa, Rajasthan and Tamil Nadu account for 963 dams making up 33% of the completed dam population of the country. Moreover, the Dam Safety Cells of these four states need strengthening, to carry out the dam safety activities in their respective states. The expenditure envisaged for the four states amounts to Rs.28,956 lakhs. If a similar programme has to be carried out for the entire country involving all the states, the expenditure would be of the order of 90,000 lakhs. (Rupees ninety thousand lakhs only).

Presently, the project focusses on institutional strengthening and providing infra structure needs for dam safety and rehabilitation measures for identified dams in distress in the four states, through a period of 5years. The size and scope of rehabilitation cost will

be finalised be expert panels as one of the activities of the project. A successful implementation of this project would provide a framework for extending and undertaking similar programme in all the states of the country.

Financial Implications;

The total outlay under this project during the VIIIth plan is estimated to be Rs.33,726.62 lakhs (Annexure 1). This consists of an amount of Rs.4,770.5 lakhs for the Central Sector and Rs.28,956.04 lakhs for the four states participating in the project.

Component of grant, loan and subsidy if any:

The expenditure is to be met with initially from the Central/State Budget. Subsequently, reimbursement in an agreed proportion is to be claimed from the World Bank, the terms of which are yet to be discussed.

Provision in the VIIIthe Five Year Plan:

The VIIIth Five Year Plan is yet to be formulated. However, in the report ofthe Working Group on Major and Medium Irrigation Projects (1989) for Eighth Plan 1990-95, the following outlays have been recommended under Dam Safety. The outlays mentioned in page IV-22, para 4.3.1p State Plan of the above report indicate the following.

Outlays (v) Dam Safety Measures Rs.169 crores. The ad-hoc break up of this figure for the four candidate states is an under:

1. Madhya Pradesh	Rs.10 crores
2. Orissa	Rs. -nil-
3. Rajasthan	Rs.30 crores.
4. Tamil Nadu	Rs.1 crore.

There is no provision in the Central Sector for Dam Safety.

DAM SAFETY ASSURANCE AND REHABILITATION PROJECT

ABSTRACT OF THE COST ESTIMATES.

Sl.No.	Particulars	Total cost for 5 years in Rs.lakhs.	
1.	**CENTRAL COMPONENT:**		
	A.Institutional Stengthening :		
1.	Strengthening of the Dam Safety Orgn. of CWC by addition of four directorates and one Chief Engineer.	333.74	652.48
2.	Strenthening of the Hydrology Orgn. by addition of one C.E. and three directorates	257.05	
3.	Strengthening of the Project Appraisal Organisation by addition of one director-ate.	61.69	
	B.Improvements of National Flood Fore-casting Network:		
1.	Installation of satellite based telemetry system.	299.00	4118.10
2.	Establishment	1172.90	
3.	Tools and Plant	2507.60	
4.	Maintenance.	128.60	
5.	Training	10.00	
	Total (I).	4770.58	
II.	**STATE COMPONENT:**		
A.	Total Cost of the estimates of Madhya Pradesh state.	8418.83	
B.	Total cost of the estimates of Orissa state.	7363.61	
C.	Total Cost of the estimates of Rajasthan State.	7301.65	
D.	Total cost ofthe estimates of Tamilnadu state.	5371.95	
	Total (II).	28956.04	
	Total ofthe project...	33.26.62	

Centrally sponsored research schemes: proposed outlay:Rs.120 crores.

The National Water Policy adopted by the Government of India in September 1987 laid down that for effective and economical management of our water resources, the frontiers of knowledge need to be pushed forward in several directions by intensifying research efforts in various areas relevent to this sector. Keeping in view these directions a comprehensive S&T Chapter "Science and Technology Component for Water Resources Development" has been prepared and included in the report of Working Group of Major and Medium Irrigation Projects for 8th Five Year Plan after detailed deliberation in various National Advisory Committees for Research and Development (NACRSs) and the Sceience and Technology Advisory Committee of Ministry of Water Resources. In these S&T proposals a total outlay of Rs.595 crores was proposed to cover all aspects i.e. the research studies (Basic, Applied and Action Research); Development of Infrastructure of Research Institutes; Education and Training and creation of centres of excellence. This was considered essential because it would form less than 2% of outlays for Water Resources sector. Of this, the outlays for Central Sector is Rs.297 crores while the balance of Rs.298 crores is under state sector.

Under the Central Sector a provision of Rs.120 crores has been made for centrally sponsored research schemes, the details of breakup are as shown under:

	Centrally Sponsored Research Schemes:		Amounts (Rs.in crores)
1.	(a) R&D Basic and Applied Research schemes		40
	(i) For 14 NACRDS Subject areas	25	
	(ii) For topics not covered by (i) above but may be suggested by		
	CWC	5	
	CGWB	5	
	MIG Wing	3	
	CAD Wing	2	
		40	

(b) Infrastructure Development 18

(c) Education and Training 11

2. (a) Establishment of Centres of Excellence 37

(b) Action Research 14

Total 120

It may be noted that out of these provisions, item 1 (a) (ii) is specifically for some of the organisations of Ministry of Water Resources. The Research Institutions of the Ministry, viz. CWPRS, CSMRS and NIH are separately provided for. Rest of the provisions are meant for country wide sponsored research schemes which will cater to state institutions including academic institutions.

SCHEME - DESIGN CONSULTANCY TO NATHPA JHAKRI POWER CORPORATION

Nathpa Jhakri Power Corporation - a joint venture of Government of India and Government of Himachal Pradesh has been set up for implementing hydro-electric projects in Himachal Pradesh. The main project undertaken presently by the Corporation is Nathpa Jhakri H.E. Project on river Sutlej with an installed capacity of 1500 MW at an estimated cost of Rs.2,266.00 crores including transmission. This is a World Bank funded project. CWC has been appointed as "the Principal Consultant" for NJPC for providing consultancy to carry out the detailed design and engineering of the civil engineering works viz. the dam, de-silting works, water conductor system and power house of the Project. The Project is of large dimensions and involves a 27 kms. long tunnel of 10.15 metre dia., the longest in the country, a surge shaft of 20 metre dia and an underground power house structure as well as a 60 metre high diversion dam.

In view of the continuous work involved for this project, under design consultancy, the NJPC have agreed to set up a separate Design Cell in Central Water Commission exclusively for this Project under the administrative control of CWC. The Design Cell will consist of a staff component of one Chief Engineer, two Directors, four Deputy Directors and other relevant allied officers and staff including the ministerial components and other equipments Tools and Plants etc. for carrying out the design consultancy. The consultancy has been initially agreed for a period of seven years, with an initial capital expenditure of Rs. 28.65 lakhs and a recurring expenditure of Rs. 13.81 lakhs for seven years totalling Rs. 140.32 lakhs for the entire period.

Contd.....p/2.

In additon to this, there would be overhead charges, - - - as applicable from time to time, amounting to approximately Rs. 40.00 lakhs for seven years. NWPC has signed a 'Memorandum of Understanding' agreeing for the creation of such a Cell as well as for meeting the above expenditure 'infull'. As already stated, the entire Project is funded by the World Bank and has fixed targets for completion. The components for this total expenditure - - for the 8th Five Year Plan period on C.W.C. would amount to around Rs. 115.00 lakhs. Action for creating the Cell has already been taken up.

SCHEME - DESIGN CONSULTANC TO NATHPA JHAKRI POWER CORPORATION

Year	1990-91	1991-92	1992-93	1993-94	1994-95
Rupees (in lakhs)	25.00	25.00	25.00	20.00	20.00

NEW SCHEMES - FLOOD CONTROL

S.No.1

COMPUTERISATION AND STANDARDISATION OF HYDROLOGICAL OBSERVATION

CWC is conducting Hydrological observations and data is being collected in most river basins. It has been proposed that all data which is presently being collected by different Units of CWC be processed at one place for computerisation and further storage and retrieval. The VIIth Plan approved outlay was Rs.0.13 crores for this scheme but as expenditure has made upto March, 1980.

Since it is proposed to work out a consolidated scheme for the work taking all works under different wings of CWC as a whole. The outlay for this scheme from RM wing is proposed to be Rs.0.20 crores for VIII Plan.

S.NO.2

IMPROVEMENT OF SURFACE WATER HYDROLOGICAL OBSERVATIONS IN INDIA

The scheme has been prepared for effecting improvement of hydrometry in India. The scheme has been framed with the objective of modernisation in hydrological observations by introducing modern equipments and modern method of data collection, compilation, processing, storage and retrieval of data. It is also proposed to evolve and establish standard procedures of data collection, and is envisaged to cover the expansion of the Hydrological observation network, modernisation/updating the the existing stations and improve the techniques in the measurement of silt loads and water quality analysis of river water. The scheme is taken up with assistance of UNDP. It has also been proposed to import training to Indian personnel in the latest technology with expertise from UNDP. The scheme has been approved for which an allocation of $ 1.00 million has been made by the UNDP. The revised estimate has been framed and is under the consideration of the Ministry of Water Resources.

Total estimated Indian component of the scheme is Rs.7.00 crores for the VIII Plan. The approved outlay for this scheme in the VII Plan was Rs.70 lakhs.

S.NO.3

R.M. WING

2701 NEW SCHEMES FOR VIII FIVE YEAR PLAN

1. EXPANSION OF SNOW HYDROLOGICAL SURVEYS

Under the Snow Hydrology, a compo-ent of the UNDP project Improvement of River and Forecasting System for Yamuna in India Pilot Scheme for Yamuna Basin Snow measuring sensars/equipme-t in the Sundli Nalu test basin were installed to account for the Water balanced due to snow melt run off. These snow hydrological surveys are to be expended to cover other snow melt area of Yamuna and other basins in the Country. The estimated cost of this scheme is Rs.1.00 crores and the same amount has been proposed during VIII Five Year Plan.

S.No.4

2. HYDROLOGICAL OBSERVATION ON RIVERS IN ISLAND AREAS OF ANDAMAN ETC.

Collection of hydrological data in most of the river basins on the main land in the country is being carried out. But so far, no hydrological data on any of the rivers of the islands of India viz: Lakshadweep, Andaman & Nicobar etc. is collected. For planning of Water Resources of islands of India number of hydrological stations are proposed to be established during the VIII Five Year Plan. The estimated cost of the Scheme is Rs.1.60 crores and the same amount has been proposed during Eighth Plan.

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2. MONITORING OF WATER QUALITY IN THE RIVERS OF INDIA

Due to increase in the economic activities population growth and expansion of industries the quantitative as well as qualitative need of water has increased many folds. Simultaneous due to disposal of effluent emanating from industrial and agricultural wastages in the river, the pollution of river water has become maximum. Hence it has become very essential to study the extent of pollution and take remedial measures to safeguard the supply for human consumption, for industries and for irrigation purposes.

The National conference of Irrigation & Water Resources Minister's held on 21.7.1986 has recommended "that the Central and State Governments should improve and strengthen the water quality observation both for surface and ground water". Stress at various forums has also been laid on the water quality measurements in India. It has been decided that a net work of Water Quality stations should be set up. The stations where Hydrological observations are being done now can be strengthened to take pollution studies also in addition to the work in hand. The National Water Policy also stresses on the importance of regular monitoring of quality of both surface and ground water.

An estimate for Rs.3.00 crores is under consideration. The approved outlay in the VII Plan for this scheme was Rs.0.30 crores, and the likely expenditure to the end of VII Plan is also same. The outlay of Rs.3.00 crores is proposed for this scheme for VIII Plan.

S.No.6

ESTABLISHMENT OF CURRENT METER RATING FACILITY(ESTIMATED COST OF Rs.210.00LAKHS

One of the most important inputs for flood forecasting is the discharge observations at various upstream sites. The accuracy of these measurements depend upon well rated current meters. Even though Central Water Commission is the owner of the large number of current meters in India, presently the CWC has no facility for rating of current meters. Experience has shown that sending current meters to various organisations like IIT's, CWP&RS, State Research stations etc. is not only highly time taking but also lead to failure of system as well as is uneconomical. Moreover the existing facilities in the country are capable of rating current meters only upto velocities of about 4 m/sec. The velocities in some of the North Indian rivers are as high as S m/sec. during floods. Precise measurement of the flows during high floods as well is also required for proper assessment of the available water resources and in flood forecasting and flood control operation. It would help in design of hydraulic structures for water utilisation and other purposes. It is necessary for CWC to establish its current meter rating facilities.

An estimate for Rs.210 lakhs has been prepared and is under the consideration of Ministry of Water Resources. An approved outlay of Rs.158.24 lakhs was made for this scheme in the VII Plan but no expenditure has been incurred during the VIIth Plan. An outlay of Rs.1.00 crore has proposed for VIII Plan.

S.NO.7

11. MODERNISATION AND IMPROVEMENT OF FLOOD FORECASTING WORKS IN BRAHMAPUTRA BASIN

River Brahmaputra is one of the largest rivers in the world draining an area of 5,800 sq.kms. Out of a total length of 2,900 sq.kms., it flows in the plains of Assam for a length of about 750 kms. As assessed by the Rashtriya Barh Ayog, out of a total geographical area of about 78,500 sq. kms. in Assam, an area of 31,500 sq. kms. is liable to floods. Central Water Commission has a network of flood forecasting stations on the main Brahmaputra and its tributaries in which the hydrological hydrometeorological data is transmitted through wireless sets and flood forecasts are formulated manually. To modernise and improve the data communication and formulation of flood forecasts by the use of satellites and computers, respectively, a scheme has been prepared at a cost of Rs.17.392 crores. In this scheme hydrological and hydrometeorological data would be communicated automatically from the unmanned stations with the help of slave tele-processors to the Master Teleprocessor in Central Control Room and be fed into the Computers automatically. On a command the flood forecasts would be formulated. The scheme would be made operational during VIII Plan period.

Sl.No.8

Strengthening the functions of the R.M. Wing in the field of Flood Plain Management, Disaster Preparedness and Flood Mitigation, Anti Sea Erosion studies, Hydrometeorology for Flood Forecasting and Advance Communication Technology studies and River Flow modelling for flood forcasting by way of setting of specialised Units/Cells.

For strengthening the functions of the RM Wing in the various fields and for effectiveness in carrying out the studies, following specialised units/Cells have been proposed.

1. Creation of units for implementation of advance technology in communication and river flow modelling for flood forecasting in River Management.
2. Creation of Hydrometeorology flood forecasting Dte.
3. Flood Plain Management Practice and Policy Dte.
4. Anti Sea erosion studies (Coastal Engineering Dte.).
5. Scheme for setting up the Disaster Mitigation Dte.

The outlay proposed for VIII Plan for the above units/cells is Rs.4.22 crores. The approved outlay and anticipated expenditure during 1990-91 are Rs.0.07 crore and 0.17 crore respectively. The outlay proposed for 1991-92 is Rs.0.95 crores.

S.No.9

C. NEW SCHEMES OF VIII PLAN

1. FLOOD FORECASTING ON GHAGHAR BEAS AND SUTLEJ

A scheme for flood-forecasting on Ghaghar, Beas and Sutlej was formulated sometimes back but the same could not be implemented due to various reasons including paucity of funds. During the recent floods in Punjab, it was felt that the Bhakhra Beas Management Board do not have an effective flood warning system. It is, therefore, proposed to take up flood forecasting on these rivers and a provision of Rs.2.5 crores has accordingly, been kept in the VIII Plan.

S.No.10

The comprehensive scheme of Hydrological Observations and Flood Forecasting on rivers common to India & Bhutan.

The scheme envisages collection of hydrological data of rivers flowing within Bhutan territory and communication of real time data to CWC control rooms at Guwahati, Nalbari, Barpota Road, Coach Behar & Jalpaiguri for formulation of flood forecasts and communicating the same to the concerned authorities. In addition to maintaining the same to the concerned authorities. In addition to maintaining the existing stations the scheme envisages the installation of additional wireless network at 9 stations including hydrometeorological sites and 7 silt sites, setting up 15 Nos. meteorological stations with wireless at 4, construction of buildings at 13 sites, imparting training to the staff of the Royal Govt. of Bhutan and transmission of real time data during flood season for flood forecasting services.

The estimated cost of the scheme for the 8th Plan including spill over from the previous years is Rs.183.00 lakhs and the provision for the annual plan 1990-1991 is Rs.39.20 lakhs. The provision for 1991-1992 is Rs.42.30 lakhs.

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S.1.9.11

Government of India
Central Water Commission
Meghna Circle
Wing-4, Ground Floor, West Block-I
R.K. Puram: New Delhi-66

SCHEME:

GAUGE DISCHARGE AND SILT OBSERVATION IN BARAK BASIN AND SMALL RIVERS FLOWING DIRECTLY TO BANGLADESH

The total catchment area within India of river Barak and other small rivers flowing directly to Bangladesh has been worked out to be 78,150 Sq.Km. A net work of 29 Gauge Discharge sites of which some are sediment observation sites also, has to continue for a period of five years during 1990-95. Forty Rain-gauge Stations are also to be established for collection of Rainfall data. The aim of this observation is to collect realiable hydrological and silt data for estimating the Water Resources of the region and Planning of Irrigation., Flood control and Power Projects. Sharing of waters between India and Bangladesh has also to be done on the basis of data being observed in these 29 sites covering 4 states in the North Eastern Region namely Tripura, Assam, Meghalaya and Mizoram.

SAlo/2

SURVEY AND INVESTIGATIONS OF FLOOD CONTROL PROJECTS COMMON TO NEPAL AND BHUTAN.

An outlay of Rs.50 lakhs has been proposed during the Eighth Plan for taking up Surveys and investigations of flood management projects on rivers flowing from Nepal and Bhutan, which create extensive flood problems in the Gangetic plains. The negotiations for undertaking project investigations in the territories of Nepal and Bhutan are in progress. An outlay of Rs.10 lakhs were approved for 1990-91 and the same amount is expected to be utilised during 1990-91. The outlay of Rs.30 lakhs is proposed for 1991-92.

PROPOSED PROVISION FOR VII th PLAN

The French Govt. has expressed their intension to give a total of FF 49 million including FF 20.00 million as soft loan, vide letter No. 19(3)/90-FA(I) dated 23.3.90 received from Min. of Water Resources. As regards the local contribution for the purpose of budget provision, it would not be possible to assess exactly since the indentification reports are still under preparation. However, based on information available and discussion held, it can be assumed that the local ontribution and French contribution would be around 50 : 50. The soft loan will be utilised for equipments whereas technology transfer will be under grant

Name of Project	French inputs (FF million)	Local inputs (Rs. Lakhs)
Indo French Collaboration Projects.		
a) Training, studies etc.	29	-
b) Equipment	20	-
	49	1500
Assuming 1/3rd of this amount will be shared from other Ministries/State Govts.		500
		Total 1000 Lakhs

(It is assumed that the repayment of loan will start for IXth Plan Period).

Break up of 1000 lakh between CWC Project & State/Other agencies Project.

a) CWC Project (Flood Forecasting)	300 lakh
b) Other Projects to be funded by MOWR	700 lakh
	1000 Lakh

(The amount includes Rs.600 lakh for payment of taxes custom dury etc. on account of export of 600 lakh worth equipment).

Required Budget provision for VIIIth Plan Rs.1000 lakhs

Indo-French Collaboration, details of French and Local inputs for projects as per identification reports received.

Name of the Project	French (Million FF)	Local (Rs. lakhs)
1. Improvement of water main operation		
a) Manpower	3.55	2.43
b) Equipment	1.6	3.3
Total	5.15	5.73
	(Rs.15.3 million)	
	Add: Loan (repayments)	48.0
	Add: Taxes & Customs duties	48.0
	Total	101.73
2. Recycling waste water	4.47	66.95
a) Studies, training		
b) Equipment	-	-
Total	4.47	66.95
	(Rs.13.41 million)	
	134.1 lakhs	
3. Flood Forecasting		
a) Works	3.5	212.76
b) Equipment	2.8	-
	6.3	212.76
	(Rs.189)	
	Add: Soft loan	84.00
	Add: Taxes & customs	84-00
		397.76
4. Equipment impact of mining		
a) Manpower	Nil	36.0
b) Equipment	0.33	112.5
c) Miscellaneous	3.67	10.0
	4.00	158.50
	(Rs.120 lakhs)	
	Add: Soft loan	10.00
	Add: Taxes & Customs	10.00
	Total	178.50

ABSTRACT

Name of the Project	French (Equivalent Rs. lakhs)	Local (Rs. lakhs)
1. Improvement of Water Main Operation	153	101.73
2. Recycling of waste Water	134	66.95
3. Flood Forecasting mitigation	189	297.6
4. Environmental Impact on mining	120	178.5
Total	596	644.78

The French and Local contributes are almost equal. Therefore, it is presumed that the contributions would be 50 : 50.

INDO-FRENCH COLLABORATION/ASSISTANCE IN WATER SECTOR

Area of Collaboration/ assistance	Item	Nature of Collaboration/assistance	Identified Pilot Project in India	Coordinating Organisation			
				India side		French side	
				Main	Back-up	Main	Back-up
2	3	4	5	6	7	8	9
Institutional, Financial and Technical Approach to Basin Management.	Basin Planning and Management	S&T (1) & (2)	--	CWC	CEA	One Basin Authority	SOGREAH LYONK GERSAR
Surface Water Management- Irrigation System, Dynamic regulation	Dynamic regulation of Irrigation Canals	E&T (1),(2),(3) (4) & (5)	Mahi Project (Gujarat)	CWC	CEA CW&PRS GOG	GERSAR	
Flood Forecasting and Mitigation	Installation & Operation of flood forecasting system	E&T (1),(3),(4) & (5)	Burhabalang River(Orissa)	CWC	CW&PRS	SOGREAH	GERSAR
Ground Water Management & Quality Protection	Ground Water Management including setting up data base	E&T (2),(3) (4) & (5)	(a) Indira Gandhi Nahar Project (Stage -I) (Rajasthan)	CGWB	--	BRGM	--
			(b) Mining area in Asansol - Dhanbad(Bihar)				

2	3	4	5	6	7	8	9
of water distribution system in Urban areas	computor operation/ and control of water distribution net work system, including leakage detection.	S & T (1), (2) & (3)	Delhi Water supply scheme	CPHEEO	DWS&SD Undertaking	SAFEGE	
6. Water Supply in Rural areas	Rural Water Supply with autonomous units (solar pumps)	E & T (2), (4) & (5)	Block of villages to be identified in Gujarat/ Rajasthan/ Tamilnadu/ Andhra Pradesh	National Drinking Water Technology mission	CGWB Deptt. of Non-conventional Energy	CHRS	Total
7. Recycling of waste water	(a)Use of sewage water for artificial recharge purpose involving treated sewage	E & T (1),(2), (3),(4) & (5)	Sabarmati Scheme, Ahmedabad (Gujarat)	CWC & CGWB	CPOB CPHEEO GOG	SAFEGE	BRGH DEC
	(b)Treatment of Municipal waste and Supply to Industries	S & T (1) & (2)	Madras/ Hyderabad	CPCB	TNPCB, Madras/ Hyd. Metro Water Supply.	SAFEGE	--

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1.	2.	3.	4.	5.	6.	7.	8.	9.
8.	Advanced Technologies in water potabilisation.	(a) Feasibility study and pilot plant for the use of ozone	E & T (1),(2),(3),(4),(5)	A town in MP with a population of 3 to 5 lakhs where municipal water supply scheme is in operation	CPHEEO	--	DEGREMONT	---
		(b) Mobile Defluorisation pilot plant	E & T (4) & (5)	Village in Haryana, A.P. or T.N.	National Drinking water Technology Mission	--	DEGREMONT	---
		(c) Use of membrane as an alternative to conventional methods in water treatment	S & T (1)	--	CPHEEO, CWC	---	LYONNAISE	---
9.	Industrial Pollution control and Treatment	Regeneration of activated carbon, disposal of hazard waste and reduction in pollution.	S & T (1)	--	CPCB CWC	---	ANREO	----

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1.	2.	3.	4.	5.	6.	7.	8.	9.
10.	Rivers and Lakes Quality Protection	Rehabilitation of lake to provide new water resources.	E & T (1),(3),(4) & (5)	Ramgarh lake Jaipur (Rajasthan	CWC	CPHEEO CPCB GOR	SAFEGE	
11.	Power Supply from Mini Schemes	Installation of syphon type small hydrogenerators in canals.	E & T (3),(4) & (5)	(a) D-83 distributary of Kakatiya canal(AP)	CEA	APSEB	EDF	
				(b) Akaltara branch canal (MP)	--	MPSEB	EDF	--

Note:- In addition to the above, Indo-French joint ventures in Third countries are also recommended (Refer Annexure-C)

LEGNED

CWC	-	Central Water Commission, New Delhi.
CEA	-	Central Electricity Authority, New Delhi.
CGWB	-	Central Ground Water Board, New Delhi.
CPCB	-	Central Pollution Control Board, Shahdara, Delhi.
CPHEEO	-	Central Public Health & Environmental Engineering Organisation, New Delhi.
CW & PRS	-	Central Water & Power Research Station, Pune.
GOR	-	Government of Rajasthan
GOG	-	Government of Gujarat
GOMP	-	Government of Madhya Pradesh
TN	-	Tamilnadu
APSEB	-	Andhra Pradesh State Electricity Board
DWS&SD	-	Delhi Water Supply & Sewage Disposal
S & T	-	Scientific & Technical Cooperation
E & T	-	Economic & Technical Cooperation
(1)	-	Training
(2)	-	Planning & Feasibility Studies
(3)	-	Engineering Works
(4)	-	Supply & Installation of Equipment
(5)	-	Operation & Maintenance including Training of Operators.

Capital Section
S.No.1

Government of India
Central Water Commission
River Data Directorate
New Delhi-110066.
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Sub: Estimate for construction of non-residential and residential buildings.
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With reference to our telephonic discussion regarding residential and non-residential buildings information is as below.

An estimate for construction of non-residential and residential buildings for the field units of CWC at different places, amounting to Rs.5957.00 lakhs has been framed and the same has been submitted to Ministry of Water Resources for approval and sanction.

The year-wise phasing of expenditure during VIII plan is proposed as below:-

	Year	Phasing
1.	1990-91	Rs.350.00 Lakhs
2.	1991-92	Rs.600.00 Lakhs
3.	1992-93	Rs.800.00 Lakhs
4.	1993-94	Rs.800.00 Lakhs
5.	1994-95	Rs.450.00 Lakhs
	Total:	Rs.3000.00 Lakhs

The total plan out lay during VIII Plan is Rs. 30.00 Crores.

Construction work of non-residential and residential buildings can be undertaken during VIII plan period at these places as detailed below:

	Name of Place	Total cost (in Lakhs)
1.	New Delhi	Rs.134.00
2.	Patna	Rs.506.00
3.	Itanagar	Rs. 20.00
4.	Gauhati	Rs. 55.00
5.	Hyderabad and Nagpur	Rs.441.00
6.	Calcutta	Rs. 55.00
7.	Surat	Rs. 95.00
		Rs.1306.00

Contd....2

	Name of Place	Total Cost (in Lakhs)
8.	Building for Circle, Division, Sub-Division under Meghna Circle at Silchar and at other Places in North Eastern Region.	B.F. Rs.1306.00 Rs. 346.00
9.	For field Division and sub-Division under B.B. circle excluding Guwahati.	Rs. 613.00
10.	For field Division and Sub-division and Circle under Lower Ganga Circle, Maithon	Rs. 280.00
11.	At Varanasi	Rs. 219.00
12.	At Lucknow	Rs. 202.00
13.	At Dehradun	Rs. 110.00
	Total	Rs.3081.00 Lakhs

BRIEF NOTE ON THE PROPOSAL FOR CONSTRUCTION OF A PERMANENT EXHIBITION FOR PARTICIPATION OF MINISTRY OF WATER RESOURCES IN THE ANNUAL I.I.T.F. AND FOR HOUSING THE ENGINEERING MUSEUM AT PRAGATI MAIDAN, NEW DELHI.

The Trade Fair Authority of India requested Ministry of Water Resources to shift our temporary pavilion in Pragati Maidan to a new site allotted in Pragati Maidan. The existing pavilion of the Ministry of Water Resources is a temporary structure which has many deficiencies. It is also located in a remote corner of the Pragati Maidan, where it fails to attract large number of visitors. The new site earmarked for Ministry of Water Resources is better located near the main stream of visitors flow. Considering that shifting of the pavilion is inevitable, a decision now has to be taken regarding the scale of expenditure on new pavilion.

In 1984, Ministry had sanctioned an expenditure of Rs.37.44 lakhs for construction of a permanent building at Pragati Maidan. However, when CPWD was approached for taking up this construction, they revised many designs parameters and also updated rates, and the final cost came to Rs.84.15 lakhs. Approval for the same was however not received from Ministry of Water Resources. As a result the annual exhibitions continued to the organised in the temporary wooden structure which now is about 10 years old.

It is proposed that a permanent building with a ground and 2 floors be constructed at the new site. Ground Floor will house the exhibition which will be a dynamic display, changing in accordance with the theme of each exhibition. The first floor would house the museum which is corrently located in Sewa Bhawan. The second floor would be utilised for office of the proposed Exhibition Division and its Sub-Divition, workshop for model making, stores for surplus models, exhibits and other miscellaneous hardware used in exhibitions.

Roughly the building is estimated to cost Rs.1.25 crores Detailed plans and exact estimates can be prepared, if in principle it appears feasible to incur expenditure in the range of Rs.1.25 crores for a permanent pavilion.

The above proposal was sent to Ministry of Water Resources vide CWC U.O. No.7/74/Exh./89-PIC/1859-60 dated 7.6.89.

The Trade Fair Authority of India has now earmarked an open space measuring 1114.75 SQ.M. for setting up of Water Resources pavilion at pragati Maidan. They have further indicated that before commencing the construction work of the pavilion, an amount at the rate of Rs.200/- per sq.m. is required to be paid to TFAI. The proposal for approval for payment of Rs.2,22,950/- was sent to Ministry of Water Resources vide CWC U.O. No. 7/74/Exh./90-PIC/1248-49 dated 21.5.90 (copy enclosed). Ministry of Water Resources sought certain clarifications vide their letter No. 1(3)/89-Coord. dated 18.6.90 (copy enclosed), the replies to which were sent vide this office U.O. No. 7/74/Exh./90-PIC/1823 dated 20th July, 1990 (copy enclosed).

Approval from the Ministry is awaited.

ABSTRACT

(Figure in Crores)

HEAD	VIIITH PLAN PROPOSALS	ANNUAL PLAN PROPOSALS 1991-92
MAJOR & MEDIUM IRRIGATION		
i) CONTINUING SCHEMES	17.54	3.68
ii) NEW SCHEMES	514.02	61.77
Total: Major & Medium:	531.56	65.45
FLOOD CONTROL.		
i) CONTINUING SCHEMES	17.28	3.64
ii) NEW SCHEMES	38.35	13.64
Total: Flood Control:	55.63	27.28
CAPITAL SECTION	31.25	6.20
GRAND TOTAL:	618.44	98.93

STATEMENT-I

DRAFT EIGHTH PLAN AND ANNUAL PLAN 1991-92
CENTRAL SECTOR OUTLAYS AND EXPENDITURE

(Rs. in Crores)

MINISTRY WATER RESOURCES
DEPARTMENT CENTRAL WATER COMMISSION.

Sl. No.	Name of Scheme	Cost approved	Cost latest	Expenditure to end of Sixth Plan	Seventh Plan Outlay	Seventh Plan Expenditure	1990-91 Outlay	1990-91 Antcd. Expdr.	1991-92 proposed	Eighth Plan outlay proposed.
1	2	3	4	5	6	7	8	9	10	11
	M.H.2701-MAJOR & MEDIUM IRRIGATION.									
	CONTINUING SCHEMES:									
1.	Establishment of additional Key Hydrological Stations in river basins other than Ganga & Indus.		10.30				1.80	1.80	2.00	10.00
2.	Project Preparation Cell.(Strengthening of Planning Cell).		1.66				0.28	0.28	0.30	1.66
3.	Irrigation Research & Management Improvement Cell (IRIMO).		4.28				0.65	0.65	1.00	4.28
4.	Central Training Unit of Water Resources System of Planning Management.		1.09				0.35	0.30	0.25	1.09
5.	a) Studies on Reservoir Sedimentation.		0.11				0.20	0.20	0.13	0.11
	b) Scheme-Socio-Economic & Agro-Economic.		0.40							0.40
	Total: Major & Medium:						3.28	3.23	3.68	17.54

1	2	3	4	5	6	7	8	9	10	11
	M.H.2711-FLOOD CONTROL.									
	CONTINUING SCHEMES									
7.	Joint River Commission.	6.90					0.72	0.72	1.19	6.90
8.	Improvement of River & Flood Forecasting System for Yamuna Basin (UNDP Phase-II).	1.56					0.15	0.07	0.08	0.50
9.	Modernisation of existing Hydrological Observation & F.F. activities in respect of HO &FFO(North).	4.06					1.20	0.80	1.00	2.40
10.	Flood Forecasting Scheme for Krishna Basin.	0.92					0.25	0.13	0.15	0.85
11.	Flood Forecasting Scheme for Mahanadi Basin.	1.50					0.25	0.13	0.14	0.80
12.	Scheme for FloodForecasting for HO &FFO(South) Balance work for VIth Plan (Rivers other than Mahanadi & Krishna).	1.36					0.15	0.07	0.08	0.50
13.	Hydrological Observation F.F.C. in Dhelum Basin.	2.70					0.40	0.40	0.50	2.70
14.	Schemes arising out of recommendation of Rashtriya Barh Ayog (RBA).	0.40					0.05	0.05	0.06	0.40
15.	Flood Forecasting in rivers Common to India and Nepal.	2.23					0.49	0.49	0.44	2.23
	Total: Flood Control:						3.66	2.85	3.64	17.28

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1	2	3	4	5	6	7	8	9	10	11
M.H.2701-MAJOR & MEDIUM IRRIGATION.										
NEW SCHEMES:										
1.	(a) Strengthening of Monitoring Unit. (b) Monitoring of Major & Medium Projects under construction.	94.00					0.60	0.60	10.00	94.00
2.	Modernisation and Upgradation of Library & Information Bureau in CWC.	3.16					0.35	0.35	0.61	3.16
3.	Strengthening of Hydrological Unit at CWC.	1.81					0.10	0.10	0.44	1.81
4.	Modernisation of Head-quarters Offices of CWC.	1.50					0.20	0.20	0.20	1.50
5.	Central Water Engineering Academy.	12.82					0.10	0.10	3.95	12.82
6.	Modernisation of D&R Wing - Augumentation of Compptur facilities.	1.50					0.10	0.10	0.07	1.50
7.	Expansion of Central Water Commission Offset Press.	1.70					-	-	0.50	1.70
8.	Technology transfer to Design Wing under Nathapa Jhakri Project and other Project.	3.06					1.21	1.21	1.02	3.06
9.	(a) Performance Evaluation and Environmental Impact studies of Irrigation Projects(Socio-Economic Evaluation of Irrigation Projects). (b) Studies on Evaluation of Projects.	5.00 35.00					0.25	0.25	7.00	40.00
10.	Modernisation of Investigation technology for WRD Projects.	2.00					0.10	0.10	0.50	2.00
11.	Creation of Centre of Excellence for Construction Method.	4.00					0.05	0.05	0.80	4.00
12.	Setting up of Basin-wise Environmental Management Unit.	13.85					0.05	0.05	2.77	13.85

Contd/---4.

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1	2	3	4	5	6	7	8	9	10	11
13.	(a) Re-appraisal of Irrigation Potential of Major & Medium schemes under operation. (b) Monitoring Water Use and related studies of completed major & medium projects.	36.30					0.05	0.10	6.00	36.30
14.	Regionalisation of CWC Offices(in two years).	1.50					-	0.30	1.00	1.50
15.	HydroPower Design Organisation in CWC.	0.83					-	0.13	0.20	0.83
16.	Creation of an Indus Cell in CWC.	1.13					-	0.13	0.30	1.13
17.	Proposal for creation of Nepal & Bhutan unit in CWC.	1.56					-	-	0.30	1.56
18.	Setting up National Irrigation Management Institute(NIMI).	13.55					-	1.65	2.70	13.55
19.	Long-term Cooperation between India& USSR.	0.55					-	0.10	0.15	0.55
20.	Setting up of River Basin Authority.	15.00					-	-	3.00	15.00
21.	Investigation of Drainage scheme in Water Logging areas-existing Irrigation Projects.	15.00					-	-	3.00	15.00
22.	National Hydrology Projects.	89.01					-	-	5.00	80.35
23.	Dam Safety Assurance & Rehabilitation Project.	47.70					-	-	7.00	47.70
24.	Centrally sponsored Research Schemes.	120.00					-	-	5.00	120.00
25.	Consultancy work for Nathapa Jhakri Project.	1.15					-	0.25	0.25	1.15
	Total: New Schemes Major & Medium:						3.16	5.77	61.77	514.02

1	2	3	4	5	6	7	8	9	10	11
	3.H.2711-FLOOD CONTROL.									
	NEW SCHEMES:									
1.	Computerisation and Standardisation of Hydrological Data and retrieval.		0.20				0.02	0.02	0.03	0.20
2.	Improvement of Surface Water Observation in India(including replacement of obsolete navigational equipment).		7.00				0.35	0.35	2.00	4.70
3.	Expansion of Snow Hydrological Surveys.		1.00				0.02	0.02	0.22	1.00
4.	Hydrological Observation on rivers in Island Areas of Andaman etc.		1.60				0.02	0.02	0.32	1.60
5.	Monitoring of Water Quality in the rivers in India.		3.00				0.50	0.50	0.25	1.50
6.	Establishment of Current Meter Rating Facility.		2.10				0.02	0.02	0.18	1.00
7.	Modernisation & Improvement of Flood Forecasting in Brahmputra Basin(Extension of Flood Forecasting).		17.39				0.40	1.00	8.00	13.78
8.	Strengthening the functions of the R.M.Wing in the field of Flood Plain Management, Diester Preparedness and Flood Mitigation and Anti Sea Erosion studies, Hydrometeorology for Flood Forecasting, Advance Communication Technology studies and River Flow modelling for Flood Forecasting by way of Setting of specialised units/Cells.		4.22				0.09	0.17	0.95	4.22
9.	Flood Forecasting Ghaggar, Beas & Sutlej.		2.50				0.02	0.20	0.50	2.50
10.	The comprehensive schemes of Hydrological Observation and F.F. on rivers common to India & Bhutan.		1.83				-	0.39	0.42	1.83
11.	G & D Observation & Barak Basin and small rivers flowing directly to Bangladesh.		3.52				-	-	-	3.52
12.	Survey & Investigation of Flood Control Projects on rivers common with Nepal and Bhutan.		-				0.10	0.10	0.30	0.50
13.	Indo French Collaboration.		10.00				-	-	0.47	2.00
	Total: New Schemes(Flood Control):						1.54	2.79	13.64	38.35

1	2	3	4	5	6	7	8	9	10	11
M.H.4701-CAPITAL SECTION.										
1.	Scheme for construction of non-residential and residential buildings for field units of Central Water Commission at different places(as per annexure attached).	59.57					0.47	3.50	6.00	30.00
2.	Construction of Exhibition pavalion for Ministry of Water Resources.	1.25					0.03	0.10	0.20	1.25
	Total: CAPITAL SECTION:						0.50	3.60	6.20	31.25

7th Plan outlay 27.93 Crores.
7th Plan Expt. 24.89 "

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STATEMENT-II

DRAFT EIGHTH FIVE YEAR PLAN AND ANNUAL PLAN 1991-92
CENTRAL SECTOR - PHYSICAL TARGETS AND ACHIEVEMENTS

MINISTRY WATER RESOURCES.
DEPARTMENT CENTRAL WATER COMMISSION.

Sl. No.	Name and Scheme	Seventh Plan Target	Seventh Plan achievement	Annual Plan Target	Annual Plan achievement (antcd.)	Annual Plan 1991-92 proposed target	Eighth Plan proposed target
1	2	3	4	5	6	7	8
	Major & Medium Irrigation.					There are all activities oriented towards Water Resources Developmental and Planning.	
	Flood Control.					These activities are aimed at improvement the Flood Forecasting system in the Country.	

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ANNEXURE -II

FINANCIAL OUTLAYS : EIGHTH PLAN

Major Head: 2701-Major & Medium Irrigation.
2711-Flood Control.
4701-Capital Section.

Ministry - Water Resources
Department - Central Water Commission.

(Rs. in Crores)

	Central	Centrally sponsored	Total
1	2	3	4
SEVENTH PLAN 1985-90			
1988-89 (Actuals)	6.24	-	6.24
1989-90 (Actuals)	5.89	-	5.89
1985-90 (Actuals)	24.89	-	24.89
1990-91 (Outlays as Budgeted)	12.44	-	12.44
1990-91 (Anticipated)	18.24	-	18.24
EIGHTH PLAN (PROPOSED)	618.44	-	618.44
1991-92 (Proposed)	88.93	-	88.93

More Items: All major heads and sub-heads should be grouped under the relevant Plan Heads of Development as per Budget Documents.

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EXPANSION SCHEME OF CWPRS IN EIGHTH FIVE YEAR PLAN (1990-95)

1.0 BACKGROUND

1.1 The Central Water and Power Research Station (CWPRS), Pune, which was founded in 1916, is the premier organisation in the country devoted to research in the area of water resources development and water-borne transport. The activities of the institution encompass a number of sectors, with Irrigation and Flood Control, Energy, and Shipping and Transport, each accounting for approximately 30% of the manpower effort, the remaining being divided into services offered to other sectors such as Industry, Atomic Energy. Water Supply and Sanitation etc. The three major sectors serviced by CWPRS with regard to their R&D efforts in the areas of water and energy resources, and water-borne transport have had an increasing share of the Plan allocations commencing with about 35% in the earlier Plan periods to as much as 50% in the Plans that followed. Thus the institution is required to advise on a variety of R and D aspects pertaining to river training and flood control, development of river basins and setting up multipurpose projects, design and testing of turbines and pumps, design of ports and harbours, ship model testing, geophysical and seismological investigations, foundation and structural engineering and a number of other disciplines associated with the development of water and energy resources. It would thus be seen that CWPRS has been called upon to shoulder a very high degree of responsibility with regard to critical sectors of various Plans since the independence of the country.

1.2 Initially the work of the Research Station centered around the construction of individual physical models pertaining to various projects in water and energy resources which require the adequacy of various designs to be examined with reference to both safety and economics. Thus, the earlier Plans called for the development of institution to provide the necessary infrastructure in terms of water supply, power and other services necessary for the purpose, as well as the setting up of a small Ship Model Testing Tank and a Photoelastic Laboratory for the examination of complex structural problems with static loading. Major capital works for the setting up special purpose laboratories with sophisticated instrumentation commenced towards the end of the Third Plan with the setting up of a Cavitation Research Laboratory for R and D and testing work pertaining to hydraullic turbines. This Laboratory was commissioned in the Furth Plan.

1.3 Taking into account the worldwide development in instrumentation and control engineering emerging technologies and the R and D requirements of the water and energy resources sectors, CWPRS proposed various development schemes in each of the subsequent plans to be taken up in accordance with the availability of funds.

2.0 POSITION AT THE END OF THE FIFTH PLAN

2.1 Towards the end of the Fourth Plan, CWPRS undertook a major development scheme with UNDP assistance for the setting up a Coastal Engineering Research Centre and Development of Hydraulic

Instrumentation. This scheme was completed during the Fifth Plan. In a mid-term review of the scheme, it was seen that the physical and financial inputs in terms of equipment, training and manpower were inadequate to fulfil the objectives set down earlier and accrodingly extension projects in both the areas of Coastal Engineering and Hydraulic Instrumentation were commenced towards the end of 1977 which spilled over to the Sixth Plan. The mother project together with the two extension projects in the Coastal Engineering and Hydraulic Instrumentation resulted in major advances in the capability of the institution to service the R and D requirements of both in the water resources and surface transport sectors.

2.2 In the area of Coastal Engineering, CWPRS developed a major capability for testing maritime structures against the impact of random ocean waves as they occur in nature. The facility was built around a UNDP supplied computer-controlled servo-hydraulic random wave generator which permits the design of maritime structures on a more realistic basis than the then existing facilities based upon mechanically operated sinusoidal wave generators. The setting up of the Coastal Engineering Research Centre also marked the entry of CWPRS into field measurements as opposed to the earlier practice of carrying out only laboratory tests. This was accomplished by acquiring a large amount of sophisticated equipment for the measurement of wave hight and period, magnitude and direction of the current, salinity, discharge and temperature, tidal elevation and a number of other water quality parameters, thereby increasing the quality of the

data serving as an input into the mathematical and physical models of various coastal and harbour projects being serviced by CWPRS.

2.3 The Hydraulic Instrumentation Centre brought about a complete change in measurement techniques at CWPRS. Hitherto measurement of various parameters on physical models was undertaken by individual instruments restricted to a single parameter at a particular point in space. The manpower requirement of such a methodology was in itself a constraint both in terms of accuracy of measurement and in the quantity of data necessary for providing a reliable engineering judgement. The project not only provided a vast area of instrumentation for the measurement of different parameters but also upgraded the very technology of measurement with the introduction of a three-tiered data acquition system, consisting of a central mini-computer with major storage and graphic capabilities forming the first layer, the secondary layer consisting of satelite mini-computers with graphic peripherals, and a tertiary layer consisting of microprocesser based data acquisition and control at the individual experiment or model. This project has placed CWPRS as one of the foremost laboratories in the world working in the area of hydraulic research.

2.4 In addition, during the Fifth Plan, CWPRS undertook the expansion of its field laboratory, upgrading of electrical installations and construction of Staff Colony.

3.0 POSITION AT THE END OF THE SIXTH PLAN

3.1 The Sixth Plan has seen the completion of the two extension projects mentioned at para 2.1 para above as well as the setting up of two laboratories which were commenced towards the end of the Fifth Plan viz. Applied Earth Sciences and a Hydromechanics Laboratory for the Development and Testing of Pumps. The Applied Earth Sciences Laboratory has upgraded the capabilities of the institution particularly in the areas of Vibration Technology, Hydrogeology and Sub-surface Tracer Hydrology.

3.2 The Hydromechanics Laboratory for Pumps has been considerably delayed as a result of delayed supply of the design report which was given to an international consulting engineer on the basis of global tenders. A considerable overshoot in costs has resulted in a decision to curtail the scope of the planned project in the Sixth Plan, with the completion of the laboratory in stages during subsequent Plans. The Stage-I laboratory was completed by the end of 1988. It is proposed to take up the remaining works, envisaged in the original proposal, during the current Plan.

3.3 Two new projects to upgrade the technical facilities and provide the necessary trained manpower were undertaken with the assistance of UNDP in the latter half of the Sixth Plan in the areas of Hydraulic Structures and Water and Power Information. These schemes were originally contemplated to spillover into the Seventh Plan. Other schemes commenced in the Sixth Plan include Investigations pertaining to Estuarine Systems and the construction of a Staff Colony (Phase -II) consisting of 208

quarters. These schemes had spillover components during the Seventh Plan and have since been completed.

4.0 POSITION AT THE END OF SEVENTH PLAN:

4.1 The expansion schemes of CWPRS in Seventh Plan were formulated with emphasis on completion of all spill over schemes from the Sixth Plan. Accordingly, Hydraulic Structure Research Centre, Hydromechanic and Calibration Laboratory and Water and Power Information System have been completed during the Seventh Plan period. Three new schemes with low initial investment and high anticipated returns such as Sediment Disposal Research, Mathematical Modelling Centre for Fluivial and Ocean Hydromechanics and Automated Operation of Irrigation Canal Systems which commenced at the end of the Seventh Plan would continue during Eighth Plan as spillover schemes.

5.0 Keeping with the worldwide development relating to application of numerical methods to solution of engineering problems, CWPRS has entered into the area of mathematical modelling in a major way. Thanks to the UNDP Project "Hydraulic Structures Research Centre" under the aegis of which a powerful mainframe computer CYBER 840-A with a central memory of 16 Mega bytes has been installed at CWPRS. As a consequence, an increasisng number of problems on water resources, structural, coastal and hydraulic engineering is being solved by numerical methods.

The activities in this area were strengthened by implementation of the project 'Mathematical Modelling Centre for Fluvial and Ocean Hydromechanics' which would lcontinue during the Eighth Plan.

6.0 LINKAGE OF THE EIGHTH PLAN PROPOSALS WITH SECTORAL ACTIVITIES AND OBJECTIVES:

6.1 As mentioned at para 1.1, CWPRS services the requirements of various sectors such as irrigation, energy and transport. The National Ship Hydrodynamics Centre representing the largest single proposal of the institution for development in the Eighth Plan pertains primarily to the Shipping and Transport sector which has no idependent R & D facilities. CWPRS has served this sector with regard to design, development and maintenance of all major/medium and minor ports in the country. The Ministry of Surface Transport and Indian Navy have accordingly given full support to the setting up of a National Ship Hydrodynamics Centre within the institutional framework of CWPRS.

7.0 EXPANSION OF CWPRS DURING THE EIGHTH PLAN:

7.1 Three schemes will spill over from the Seventh Plan into the Eighth Plan. These are shown at Part A of the enclosed Table. The total outlay required during the Eighth Plan for completion of these Schemes in the Eighth Plan is estimated to be Rs.171.00 lakhs. Foreign Exchange requirements of the three schemes amount to US $ 29.48 lakhs, of which US $ 28.05 lakhs is expected to be met from UN and/or bilateral assistance.

8.0 MANPOWER PLANS

8.1 It has been recognised that trained manpower is the single most important resource of the institution and accordingly continuing efforts have been made to provide training both in-country and abroad. This is an absolutely essential feature of an institution that seeks to remain on the frontiers of knowledge. As such, the schemes proposed provide for obtaining the services of consultants from abroad and deputation of staff members for training in country and abroad. In-house training also forms a very important element within the institution.

A proposal for the setting up of a Training Cell has therefore been included. This scheme is estimated to cost Rs. 25 lakhs during the plan. The need to establish a training cell at the Research Station has been emphasised by the Technical Advisory Commitee to the Governing Council for CWPRS.

9.0 MONITORING CELL

The Government of India had set up a Review Committee in 1976 under the Chairmanship of Dr. M.S. Swaminathan, the then Director General, ICAR, to review the functioning of the CWPRS and recommend measures for improving the effectiveness and efficiency thereof. Amongst the several recommendations made, one related to the necessity of setting up a Monitoring Cell within the institution not only to monitor the various Plan schemes being executed in the institution, but also to keep track of the research problems received by CWPRS from its vast clientele whose

requirements are sought to be met by the setting up of various capital schemes under the Plan. Accordingly the proposal of setting up a Monitoring Cell has been included at an estimated expenditure of Rs. 25 lakhs during the Eighth Plan.

10.0 MAJOR SCHEMES

10.1 In order to meet the power demands to sustain essential services which are crucial to running the institution, it is proposed to generate electricity to the tune of 1 MW from a pumped storage scheme locally within the campus. The project would simultaneously facilitate research on various aspects of 'small hydro' scheme. The proposal envisages setting up a small hydro project by utilising the available head difference after pumping and making up the losses. The project offers unlimited scope for research on small hydro. It is estimated that this 8-Year Project cost about Rs. 7.50 Crores of which it is estimated that Rs. 5.0 crores would be utilised during the VIII Plan.

10.2 Other schemes include development of Analogue Computers, Installation of Subsurface Facilities for Research in Rock Mechanics, Earthquake Response Centre, etc., aimed at efficient exploitation of the Naition's water resources. These activities are proposed to be associated by projects in the related areas such as expansion of Pump Laboratory, Measurement of turbulence.

10.3 In order to understand the behaviour of mighty rivers in floods and to device measures in controlling the same, it is proposed to include two projects viz, River Simulation Study Unit and Experimental Flood Protection Works. Other projects are

aimed at strengthening and augmenting the services in the prime sectors of national importance,. viz, transport, power, etc.•

10.4 These proposals have made keeping view the anticipated investments during the Plan period in Water Resources Sector and the attendant R & D requirements.

11.0 FINANCIAL IMPLICATIONS IN BRIEF - VIII PLAN

Twenty new schemes, a few of which have been dealt with briefly above, at an estimated expenditure component of Rs.74 crores and US Dollars 30.7 million in foreign exchange, proposed to be met through UN/Bilateral sources, have been proposed during the VIII Plan. The total outlay of the Research Station works out to Rs.77.2 crores including the spillover component of the schemes at Item A of the statement enclosed. Of this amount, a sum of Rs.26.13 crores is earmarked towards notional provision for adjustment of UN aid material. The foreign exchange requirements of the schemes proposed to be met from Government of India funds amount of Rs.0.62 crore. The exchange rate adopted in arriving at the foreign exchange component of the above schemes is Rs.14 per US Dollar.

The above schemes are presented in order of priority.

ANNEXURE - I

EXPANSION SCHEME OF CWPRS IN EIGHTH FIVE YEAR PLAN : 1990-95

(Rs.in lakhs/US $ in lakhs)

Sr. No.	Name of the scheme	Total Cost		Provision in VIII Plan		Year wise provision in VIII Plan (1990-95					Spill over in IX Plan
		IC	FE in US $	IC	FE	IC / FE 1990-91	IC / FE 1991-92	IC / FE 1992-93	IC / FE 1993-94	IC / FE 1994-95	
A.	Continuing Scheme										
1.	Sediment Disposal Research	119.38	1.43	77.38	1.43	25.00 -	24.00 1.43	28.38 -			
2.	Mathematical Modelling Centre for Fluvial and Ocean Hydromechanics UN/BL	57.17	21.05	46.17	21.05	10.00 5.00	20.00 10.00	16.17 6.05			
3.	Automated Operation of Irrigation Canal System UN/BL	52.45	7.00	47.45	7.00	15.00 1.50	16.00 4.00	16.45 1.50			
B.	New Schemes										
1.	National Ship Hydro-dynamics Centre UN/BL	925	140.62	800.00	135.00	96.00 3.00	128.00 29.00	160.00 40.00	200.00 38.00	216.00 25.00	125.00 5.62
	Hydrometry Research Centre	350.00	40.00	350.00	40.00	40.00 4.00	50.00 10.00	70.00 10.00	75.00 10.00	115.00 6.00	
3.	Earthquake Response Analysis Centre UN/BL	160.00	53.00	160.00	53.00	24.00 3.00 4.00	28.00 10.00 10.00	32.00 15.00 10.00	37.00 15.00 10.00	39.00 10.00 6.00	
4.	Staff Colony Phase III	600.00	..	600.00	..	72.00	96.00	120.00	150.00	162.00	
5.	Scheme for Augmentation of Water and Power Supply	145.00	..	145.00	..	48.00	18.00	22.00	27.50	29.50	

Sr. No.	Name of the scheme	Total Cost		Provision in VIII Plan		Year wise provision in VIII Plan (1990-95					Spill over in IX Plan
		IC	FE in US $	IC	FE	IC / FE 1990-91	IC / FE 1991-92	IC / FE 1992-93	IC / FE 1993-94	IC / FE 1994-95	
6.	Centre for Studies of Density Currents and Hydraulics of Two Density Thermal and Effluent Studies UN/BL	235.00	23.30	235.00	23.30	28.00 2.50	38.00 4.50	45.00 7.50	58.00 5.50	66.00 3.30	
7.	Centre for Dredging Studies UN/BL	265.00	10.00	265.00	10.00	40.00 1.00	50.00 2.00	50.00 3.00	50.00 2.00	75.00 2.00	
8.	Training Cell	25.00	..	25.00	..	1.50	4.00	5.00	6.25	8.25	
9.	Monitoring Cell	25.00	..	25.00	..	1.50	4.00	5.00	6.25	8.25	
10.	Pilot Scheme on Small Hydro	750.00	..	500.00	..	75.00	100.00	125.00	100.00	100.00	250.00
11.	Demonstration of Experimental Flood Protection Works	810.00	..	810.00	..	30.00	180.00	200.00	200.00	200.00	
12.	Laboratory for Turbulence and Air Entrainment Research UN/BL	91.00	13.13	91.00	13.13	11.00 2.00	15.00 2.00	15.00 3.00	23.00 4.00	27.00 2.13	
13.	Subsurface Facility for Advanced Research in Rock Mechanics	80.00	0.50	80.00	0.50	10.00	15.00	20.00 0.50	15.00	20.00	
14.	Extension of Pump test facility UN/BL	267.00	20.70	267.00	20.70	30.00 ..	50.00 5.0	57.00 5.0	62.50 5.0	67.50 5.70	
15.	Establishment of Large pump test facility	209.00	..	209.00	..	65.00	65.00	79.00	..	..	
16.	National Centre for Information System and Data Bases UN/BL	100.00	10.00	100.00	10.00	12.00 1.0	16.00 1.0	20.00 4.00	25.00 2.00	27.00 2.00	
17.	Water Resources Management/ Operation Studies for Command Area Development	15.00	0.36	15.00	0.36	2.00 ..	2.00 ..	3.00 0.10	3.75 0.10	4.25 0.16	
18.	Design and Development of Flood Forecasting Analogue Computers	28.00	0.72	28.00	0.72	3.00 0.10	4.00 0.12	6.00 0.15	7.00 0.15	8.00 0.20	

Sr. No.	Name of the scheme	Total Cost		Provision in VIII Plan		Year wise provision in VIII Plan (1990-95					Spill over in IX Plan
		IC	FE in US $	IC	FE	IC -- FE 1990-91	IC -- FE 1991-92	IC -- FE 1992-93	IC -- FE 1993-94	IC -- FE 1994-95	
19.	River Simulation Study Unit	120.00	1.43	120.00	1.43	15.00	20.00 0.50	30.00 0.50	25.00 0.43	30.00	
20.	Application of Remote Sensing for Water Resources Evaluation and Geo-engg. and Coastal Morphology UN/BL	300.00	6.00	48.50	2.00	10.00 ..	10.00 0.50	10.00 0.50	10.00 0.50	8.50 0.50	
21.	Civil Construction Wing	25.00	-	25.00	-	5.00	5.00	5.00	5.00	5.00	
22.	Notional Provision for adjustment of UN/BL Aid (Equipment)	2612.70	-	2612.70	-	-	600.00	700.00	700.00	612.70	

1. VIII Plan GOI : 5069.50

2. Notional Provision at $ = Rs.14 : 2612.70

3. GOI Foreign Exchange requirement : 62.16

Total Rs.: 7744.36

Say Rs. 77.5 Crores

Note: Items 21 and 22 would have to be necessarily provided in accordance with the scale of the approved plan.

A. CONTINUING SCHEMES:

1. SEDIMENT DISPOSAL RESEARCH CENTRE:

The scheme, at an estimated cost of Rs.139.38 lakhs has been approved in principle by the Ministry of Water Resources. The administrative approval and expenditure sanction is expected shortly. The scheme is expected to commence during the last year of VII Plan. An amount of Rs.42.0 lakhs has been provided for the year 1989-90. The balance of Rs.97.38 lakh is needed in VIII Plan as under:

Rs.20.0 lakhs (US $ 1.43 lakhs), included in Rs.97.38 lakhs would be needed in FE component and is proposed to be met from the Government of Inida fund.

	(Rupees in lakhs)
CAPITAL	
Land and Building	25.00
Plant and Machinery	28.00
REVENUE	
Establishment (Including training)	20.38
Research work and Miscellaneous	24.00

UNDP : United Nations Development Programme

BL : Bilateral

FE : Foreign Exchange

Note : A more detailed profile of the project is separately tabled at the meeting

2. MATHEMATICAL MODELLING CENTRE FOR FLUVIAL AND OCEAN HYDROMECHANICS (UN/BL) :

This scheme, at an estimated Government of India counterpart contribution of Rs.57.17 lakhs and Rs.104.00 lakhs towards notional provision for adjustment of UN/BL aid material has been approved in principle. The component of external assistance is US $ 2,100,000. Administrative Approval and expenditure sanction are expected shortly. The scheme is expected to commence in 1989-90 and hence provision of Rs.11.0 lakhs has been made in the annual plan 1989-90. Spillover cost in VIII Plan would be Rs.46.17 lakhs & Rs.104.00 lakhs as notional provision) as under:

(Rupees in lakhs)

CAPITAL	
Land and Building	10.00
Plant and Machinery	9.00
Notional provision	104.00
REVENUE	
Establishment	19.17
Experimental and Miscellaneous	8.00

Note : A more detailed profile of the project is separately tabled at the meeting

3. AUTOMATED OPERATION OF IRRIGATION CANAL SYSTEM (UN/BL) :

The scheme, having a Government of India counterpart provision of Rs.52.45 lakhs and Rs.45.50 lakhs as notional provision for adjustment of UN/BL aid material has been approved in principle. Foreign Exchange component from external assistance is estimated to be US $ 700,000. The administrative approval and expenditure sanction are expected to be received shortly. The scheme is programmed to commence during 1989-90 and hence a provision of Rs.5.0 lakhs has been made in the annual plan 1989-90. The spillover expenditure in VIII Plan would be Rs.47.45 lakhs and Rs.45.50 lakhs for adjustment of aid equipment. Major headwise requirement would be as follows:

(Rupees in lakhs)

CAPITAL	
Land and Building	-
Plant and Machinery	35.00
Notional provision	45.50
REVENUE	
Establishment	12.45

Note : A more detailed profile of the project is separately tabled at the meeting

B. NEW SHCMES

1. NATIONAL SHIP HYDRODYNAMIC CENTRE (UN/BL):

The existing ship model testing tank at CWPRS was commissioned in 1953. The tank was then designed to cater to the testing requirements of the Indian Ship building industry and those of Indian Navy. The requirements have since continuously grown and it has become necessary to carry out tests on large tankers and bulk carriers upto 1,00,000 DWT or more. At present these studies are being referred to the Research Laboratories abroad. Therefore there is an urgent need of creating necessary R&D facilities within the country. It is therefore proposed to establish a National Ship Hydrodynamic Centre at CWPRS. Under this scheme it is proposed to set up the following facilities:

(i) A Deep Water Towing Tank, (ii) A Large Manouvring and Sea Keeping basin, (iii) Cavitation Test Tunnel for the study of Marine Propellers.

The scheme is estimated to cost Government of India Rs.925.00 lakhs The Foreign Exchange component from UN/BL source is estimated to be US $ 140.62 lakhs. A provision of Rs.800.00 lakhs has been proposed during VIII Plann. The balance would spillover in IX Plan. Notional provision for adjustment of part of aid material worth Rs. 700 lakhs is also made in VIII plan.

Suggested Provision - VIII Plan

Item	Proposed Expenditure (Rupees in lakhs)
CAPITAL	
Land and Building	640.00
Plant and Machinery	15.00
Notional Provision (Part)	700.00
REVENUE	
Establishment including training	132.00
Miscellaneous & Experimental	13.00

2. HYDROMETRY RESEARCH CENTRE (UN/BL)

The High Level Technical Committee on Hydrology (HILTECH) had in various meetings reviewed all the problems of different areas of hydrology in detail and had identified the areas needing immediate attention for improvement. The HILTECH recommended that an area among other four viz. Hydrologic Instrumentation need immediate attention for improvement of hydrology in general and project hydrology in particular. HILTECH also recommended that the area of instrumentation would have CWPRS as lead/coordinating organization. Accordingly, in the proposal for National Hydrologic Project (Surface Water) for Indian River Basins (excluding Indus, Ganga, Brahmaputra and Barak) funds provision of Rs.560 lakhs, of which Rs.225 lakhs are in foreign exchange, has been proposed, of which the CWPRS with its expertise in Instrumentation has been allocated funds of Rs.250.00 lakhs, of which Rs.110 lakhs is foreign component.

The National Advisory Committee for Research and Development (NACRD) for application of High Technology and Instrumentation and Measurement Techniques in its special meeting has identified CWPRS as the premier national institution in the areas of hydraulic instrumentation, hydrologic instrumentation and seismological instrumentation. The committee has also indicated the requirement of funds for the basic, applied and action research; education and training within India and outside India.

The present proposal for setting up of Hydrometry Research Centre at CWPRS, Pune, is intended to meet the requirements of

Instrumentation in terms of design and development activities of the hydrological and hydraulic instruments, incorporating latest technology especially incorporating developments in electronics.

The need of Hydrometry:

It is a well taken fact that the hydrological data collection in the country suffers from quality on account of the type of instrumentation being deployed for the purpose of measurements. The following are the reasons:

- poor quality of instruments
- dependance on manual data collection
- poor maintenance
- lack of standard guidelines
- lack of properly trained manpower

It is, therefore, very necessary that appropriate action is initiated to attain the capability in India to design, develop and produce suitable and reliable instruments, employing latest technologies and modern methodology, which are being extensively used in developed countries and have provided good results. It would, therefore, be necessary to take up the activity of design, development of instruments based on the technology being used in developed countries, especially making use of the advances in electronics to be introduced in this field of measurement. Considering the emphasis on electronics in this country it would be possible with the available manpower and trained engineers to take up this challenge in a shortest time possible.

Objectives:

Under the proposal of setting up of the Hydrometry Research

Centre it is envisaged to take up

1. Design and development of hydrometeorological instruments for
   - precipitation : rainfall, snow fall
   - wind velocity
   - direction
   - relative humidity
   - air temperature
   - evaporation
   - soil moisture
   - solar radiation
   - automatic weather stations
   - remote reporting gauges etc.
2. Design and development of stream flow measuring equipment
   - propeller currentmeters
   - moving boat method
   - ultrasonic flow measuring devices
   - optical currentmeter
   - electronic type water level recorders based on float, bubbler and pressure sensors
3. Design and development of measuring techniques for river and harbour models and basic hydraulic studies
   - flow velocity measurement techniques
   - water velocity and depth measurements
   - measurement techniques on hydraulic structure models

4. Model prototype confirmity studies in respect of .
   - pressure measurements on spillways ,
   - energy dissipitation structures &
   - air vent characteristics etc.

5. Development of instruments for prototype observation.

6. Training of personnel.

The Project:

The Hydrometry Research Centre is proposed to be established at the Central Water and Power Research Station, Pune, which is a premier national institute, having Instrumentation and control engineering as one of its discipline. The Instrumentation and Control Engineering discipline of CWPRS has been engaged, among other activities, on design and development of hydrometeorological instruments based on latest technology for over a decade and has gained an expertise in the field. It is equipped with sophisticated test equipment, laboratory facilities and precision workshop needed for execution of the project. Its trained engineers, many of them trained abroad in the field and the manpower are capable to take up the project.

The CWPRS also has a towing tank for calibration of currentmeters and other calibration facilities needed for calibration and testing of most hydrological instruments.

The proposal:

In order to establish the Hydrometry Research Centre at CWPRS,

strengthening in terms of added facilities, equipment, training as well as creation of calibration, testing and experimental facilities with latest type of equipment is envisaged.

The scheme is expected to cost Rs.350.00 lakhs and Rs.300.00 lakhs towards notional provision for adjustment of UN/BL aid material. The FE Component requirement is estimated to be US $ 40.00 lakhs.

CAPITAL

	Rs.in lakhs
Land and Building	40.00
Plant and Machinery	120.00
Notional provision for adjustment of aid material	300.00

REVENUE

Establishment	100.00
Training	15.00
Research work and Miscellaneous	75.00

3. EARTHQUAKE RESPONSE ANALYSIS CENTRE (UN/BL)

India has a broad seismic zone all along the Himalaya and Kachchh region of Gujarat where highly damaging earthquake had been experienced in the past. Even the peninsular shield of India, which is relatively less seismic, has exhibited considerable enhancement of seismicity in some of the reservoir areas after impounding of the reservoirs. It is necessary, therefore, to evaluate realistic seismic risk and analyse, the response of hydraulic and other structures like dams, power houses etc. under static as well as dynamic loads.

The ideal design of a water retaining or a conveyance structure for a hydropower or irrigation project requires a correct evaluation of the dynamic forces caused by the most probable earthquake likely to occur in the lifetime of a structure. In the absence of adequate design and research tools to evaluate response of structures to earthquake forces, recourse is often taken to consider the earthquake excitation as represented by an equivalent static force.

The 3-D finite element analysis of complex structures with foundation-water-structure interaction is still beyond the present day capacity of digital computers at an economic cost. Recourse has therefore to be taken to testing of scale models of such structures in centrifuge capable of producing a realistic earthquake and gravity loads and is able to model the hydrodynamic and foundation effect as well.

The study of breakwaters and maritime structures such as quays and jetties, offshore platforms etc. is yet another area where a design and research capability is required to be built up for the study of earthquake resistant design. This becomes all the more important if major tidal power structures are contemplated in any area such as the Gulf of Kachchh which has been traditionally prone to major earthquakes. All these problems call for detailed numerical modelling supported by laboratory experiments on a system which can simulate the random forces generated by a natural earthquake. Foundations related to above structures subjected to earthquake forces could very well be studied on a geotechnical centrifuge.

A major problem in scale model testing of earth structures is the question of generating gravity induced forces. One of the methods utilized in the laboratory to overcome this problem is the technique of using a centrifuge to increase the gravitational stresses. Centrifuge modelling in geotechnical engineering is rapidly becoming an accepted technique in Europe, USA and Japan.

Another important aspect is to determine constitutive laws and failure strains of materials like concrete under dynamic loads. Necessary testing facilities for this purpose would be created under this project.

Monitoring of prototypes is another area of great significance. Use of large vibrators is made to artificially vibrate dams and other hydraulic structures to determine natural frequencies and damping characteristics to verify results of mathematical models.

There is also need of establishing attenuation laws for Indian rocks and alluvial soil by installing SMAs (strong motion acclerographs) at different distances near and away from epicentres. Koyna could be one such area.

It is therefore proposed to supplement the existing facilities in the area of hydraulic structures, coastal engineering and applied earth sciences by setting up of an Earthquake Response Analysis Centre.

The scheme is expected to cost Rs.160 lakhs in national currency and Rs.750 lakhs in foreign exchange which is proposed to be met from United Nations/Bilateral agencies. The break up of the proposed outlay is as follows :

Item	Provision (Rs.in lakhs)
CAPITAL	
Land and Building	50
Plant and Machinery	30
Notional provision	600
REVENUE	
Establishment including training	65
Experimental and Miscellaneous	15

4. STAFF COLONY PHASE III:

Staff Colony, located at Khadakwasla is at present having 264 quarter of type I, II, III, IV & V. Khadakwasla is 16 km away from the city of Pune and as such the residents find it difficult to procure essential commodities and services required for day to day life. Small children of the residents do not have any pre-primary/primary school nearby. No recreational facilities for the residents are also available. In order to make the stay in such remote locality more comfortable certain ancillary facilities are proposed to be created. These include a Health Centre, a Primary School, a Shopping Centre, as well as a Community/Recreation Centre, a Park, a Bank, a Petrol Pump, Fire Station and a Garrage for Inspection Bungalow etc. About 140 more residential quarters, augmentation of water supply, construction of roads, etc. are also required to be taken up. The scheme to be taken up in VIII Plan is estimated to cost Rs.600.00 lakhs as under.

(Rupees in lakhs)

CAPITAL	
Land and Building	600.00
Plant Machinery	-
REVENUE	-

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5. AUGMENTATION OF POWER AND WATER SUPPLY AT CWPRS

During the last four plan proposals viz. 4th, 5th, 6th and 7th CWPRS undertook major development schemes with UNDP assistance for setting up of Coastal Engineering Research Centre, Development of Hydraulic Instrumentation, Hydraulic Structures Research Centre, Hydromechanics & Calibration Laboratory etc.

Under these schemes CWPRS acquired large amount of sophisticated equipments including Cyber 840A main frame computer. These equipment need to be operated under specified temperature (air-conditioning) resulting in additional power requirement. The field hydraulic laboratories constructed under various plan schemes have also been put into operation and pumping capacity has been enhanced to cater for water supply demand of the hydraulic models which has also resulted in additional power requirement. The testing facilities set up under Cavitation Research Centre and Hydromechanics & Calibration laboratories have also its effect in increasing demand for the power supply. In addition large number of models such as Bombay Port, Karwar Port Model have been constructed, which has also resulted in additional power requirement for the instrumentation installed on the model and the general purpose lighting requirement of the models. Large number of models having self circulating system to cater for their water demand have also been constructed which has it's effect in additional power requirement. The power requirement of the Research Station in the year 1960 was 4000 KVA, with the scheme of augmentaqtion of power supply system at CWPRS under the work head of extension of Field Hydraulic

Laboratory it has been enhanced to 6500 KVA. With the acquisition of the large number of sophisticated equipments and putting up them in operation in the various field hydraulic laboratories the actual power requirements of CWPRS is now 12500 KVA.

Under this schemes it is porposed to construct new sub-stations to cater for the demand of National Ship Hydrodynamic Centre, Hydraulic Engineering Hangar of HSRC division, power supply to new filtration plant and also strengthen the existing sub-stations to cater for the demand of power to various models constructed in an around the sub-stations. In addition it is proposed to construct 2 KM of hightension overhead line, bifurcation of hightension feeder installation, construction of low tension overhead line 2 km and supply and installation of feeder pillars 10 Nos. for distribution of power. It is also planned ~~of~~ Laying of a new feeder line from Pune Parwati sub-station in order to have constant voltage supply as the present line is being ~~supply~~ tapped at number of places resulting in low voltage supply. The construction of new feeder line will ensure 99% reliability.

In addition to above to cater for the water requirement of various Hydraulic models, it has been planned to provide one additional 20 cusses pump in 100 cusses circulating main pump house in Compartment No.1 and in Compartment No.15. There has been also increasing demand for drinking water and it has been planned to enhance capacity of the filtration plants by providing

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additional pumps. The schemes is estimated to cost Rs 145 lakhs in VIII plan as under :

CAPITAL

	RUPEES IN LAKHS
Land and Building	40.00
Plant and Machinery	70.00
Laying new feeder line	35.00
REVENUE	-

6 CENTRE FOR STUDIES OF DENSITY CURRENTS AND HYDRAULICS OF TWO DENSITY THERMAL AND EFFLUENT STUDIES (UN/BL)

The Central Water and Power Research Station is called upon to render advice on problems of disposal of heated water from power plants into the environment, cooling ponds in particular. Through physical and mathematical model studies, economic solutions for prevention of recirculation of heated discharges have been offered for projects such as Obra Thermal Power Station (U.P.), Satpura Thermal Power Station, Birsinghpur Thermal Power Station (H.P.), etc.

Use of cooling ponds for disposal of waste heat from power plants is going to be an inevitable feature of thermal power development in India. In order to cater to the ever increasing demand for electricity, the Government of India have taken up a programme of installation of Super Thermal Power Plants.

The problems faced by thermal power stations in India are unique, in that it is required to deal with cooling water where the environmental temperature is high, where the inequitable distribution of the rainfall over the years results in most of the rivers flowing for barely two or three months in a year, and wherein a continental geography of the country necessitates location of the power station far from the ample supply of water along coast. Cooling water therefore necessarily has to be stored in a reservoir or a pond and the super thermal power plants coming up at Rihand, Obra, Satpura, Korba and a most of other small units have to rely on limited water bodies to be utilised for cooling purposes.

Selection of sites for cooling water intakes and hot water discharges would demand detailed studies of various heat transfer processes responsible for dissipation of heat from the large waterbody.

In order to understand the behaviour of the cooling ponds, it is necessary to set up controlled environmental conditions within the laboratory on a large scale to obtain meaningful results. The proposal of establishing a centre for studies of density currents and hydraulics of two density thermal and effluent flows therefore envisages taking up the above mentioned studies with specific reference to problems of waste heat disposal from power plants into cooling ponds.

The scheme is estimated to cost in VIII Plan Rs.235.00 lakhs in addition Rs. 280.00 lakhs towards notional provision for UN/BL aid adjustment. The foreign exchange Component from UN/BL assistance is estimated to be US $ 23.30 lakhs.

(Rupees in lakhs)

CAPITAL	
Land and Building	115.00
Plant and Machinery	35.00
Notional provision	280.00
REVENUE	
Establishment	60.00
Experimental work and Miscellaneous	25.00

7. CENTRE FOR DREDGING STUDIES (UN/BL) :

The rapid industrialization of the country after the independence in 1947 has given an impetus to the growth of a number of ports in India. Considerable development took place on all the major ports and numerous small ports. Prior to independence the depths in the navigation channels of most of the major ports were of the order of 8 metres. With the change in the shipping pattern the drafts of various ports were required to be increased considerably involving huge amount of capital and maintenance dredging. At present, approximately 50 million cubic metres of meterial are removed from the navigation channels of various ports every year by our dredgers. Taking into consideration that the average rate of dredging is Rs.35/- per cubic metre the annual cost involved in dredging alone is of the order of Rs.1750 million, which takes away a major portion of the port revenue. Reduction in the cost of dredging is absolutely essential and calls for research. Any attempt to reduce the cost of dredging through improved techniques could result in substantial savings to port organisations.

In most of the western countries including U.S.A., there is a great concern that the dredging and dredged material disposal cause environmental problems. The environmental impact due to dredging could be (i) Physical (ii) Chemical and (iii) Biological. The dredging operation causes resuspension of the bed material which if highly polluted could affect water quality and fish and the food chain in the ocean. In India very little

attention has been paid to this important aspect. The proposed Dredging Research Centre could go into the details of the environmental aspects of dredging.

Inland water transport is still in its infancy in India and needs to be developed. Dredging is of vital importance for development of inland navigation and in view of certain limitations special type of dredging equipment is required for deepening inland waterways and research to develop such equipment is essential.

The problems of dredging in India are quite complex. Handling of littoral drift of the order of 1.5 million cubic metres poses a major problem along the east coast of India. Pre-dredging of sand traps in a short period of the fair season and nourishment of the eroding beaches on the downdrift side also pose some serious difficulties needing research into the different aspects of the problem. With the setting up of the proposed Dredging Research Centre, it would be possible to develop suitable dredging equipment and methodology to solve the intricate dredging problems.

At any site the problems of dredging are mainly due to site conditions, type of bed material, the dredging equipment available and the environmental constraints at the site. The conditions for dredging at various important ports in the South East Asia region could be quite different from those along the two coasts of India. As a Regional Laboratory for the ESCAP, CWPRS is often called upon to solve the various port development problems of the region. It would be desirable to study the

dredging problems of the ESCAP region carefully and find satisfactory solutions to these problems. A research facility at CWPRS will be of immense help to study such problems.

Most of the research carried out in the field of dredging belongs to the dredging industry. In view of its proprietory nature very little information on such research is available in literature. An independent research effort in the field of dredging is therefore necessary for a country such as India. It is, therefore, proposed to set up a Centre for Dredging studies at CWPRS.

The scheme is estimated to cost Government of India in VIII Plan Rs. 765.00 lakhs. A notional provision of Rs. 100.00 lakhs for adjustment of UN/Bilateral aid material is also required. Itemwise provision proposed is as under. The foreign exchange component from UN/Bilateral source is US $ 10.00 lakhs.

(Rupees in lakhs)

CAPITAL	
Land amd Building	75.00
Plant and Machinery	60.00
Notional Provision	100.00
REVENUE	
Establishment	80.00
Miscellaneous and Experimental works	50.00

8 TRAINING CELL

Training is an instrument of change and is a short cut to experience. It renders the individuals receptive and responsive to changes and imparts the ability to adjust to the environment. The pre-employment formal education is prone to obsoleascence in the present context of rapid technological advancement.

A proposal for establishing a separate cell to deal with regular training of CWPRS personnel as well as other officers deputed for training to CWPRS is therefore included in the expansion scheme in VIII Plan in accordance with the recommendation of the High Level Committee chaired by Dr. M.S. Swaminathan. The proposal has been approved by the Technical Advisory Committee for the Governing Council of CWPRS. The scheme is estimated to cost of Rs. 25 lakhs the break-up of which is as follows :

CAPITAL	-
REVENUE	
Establishment	Rs. 20.00 lakhs
Other Expenses	Rs. 5.00 lakhs

9 MONITORING CELL

The voluminous business - technical, financial, constructional and administrative - to be transacted by the office of the Director CWPRS calls for a co-ordinated monitoring of the progress of works these fronts. Though the Research Station is currently monitoring the progress in respect of each work on an individual basis, the performance of such an exercise has not been satisfactory. There have been instances where the delays have been attributed to CWPRS which is claimed to be taking long time to complete the studies entrusted to it. With the increasing workload, these backlogs could assume alarming proportions if not checked on time. The monitoring Cell will take care of all such problems.

The scheme is estimated to cost Rs.25 lakhs in VIII Plan under revenue.

CAPITAL	-
REVENUE	
Establishment	Rs. 20.00 lakhs
Other Expenses	Rs. 5.00 lakhs

10. PILOT SHCHEME ON SMALL HYDRO

Small hydroelectric schemes are attractive sources of energy which can be exploited with well developed technology. One of the major problems in developing such schemes is the high ratio of cost of research to the capital cost of the concerned small hydro project. Cost reduction can be effected by generic research on civil engineering design, standardisation of turbines, simplified controls, and utilising local expertise and material. Keeping this in view, a scheme to construct a test rig for small hydro is proposed catering to a power of 500 - 1000 kw. The project proposals have been framed to undertake R&D works, aimed at evolving advanced designs of various elements which will bring about considerable economy during construction as well as operation of small-hydro projects. The objective of this scheme is to set up research facilities for undertaking :

- Design and development of cross flow turbines
- Design and development of Francis Turbines with improved performance
- Development of wave reflectors to reduce Water Hammer, surges in penstocks
- Protection of performance of pumps operating as turbines
- Development of simplified governing system for pumps operating as turbines using sluice, butterfly valves
- Design and development of shortened draft tubes and effective of tail race geometry.
- Steady of Intake problems
- Economic design of penstocks
- Problems of the storage pond

Since the proposed test rig would need a high level pond for storage, which would require pumping from the low level pond, a separate and parallel pump test rig is also contemplated which would be useful in carrying and generic studies for lift irrigation schemes.

The proposed scheme has been planned for a period of eight years commencing in April 1990. The cost of the project is estimated at Rs.750 lakhs.

The break up of the cost is as follows :

	(Rupees in lakhs)
CAPITAL	
Laboratory building, Storage Reservoir, Sump and other civil engineering works	410.00
Equipment	260.00
REVENUE	
Establishment	60.00
Experimental works	15.00
Miscellaneous	5.00

It is proposed to allocate Rs.500 lakhs in Eighth Plan period. The balance shall be spent in Ninth Plan.

11 DEMONSTRATION OF EXPERIMENTAL FLOOD PROTECTION WORKS :

The hydraulic engineers are frequently required to design channels, canals, floodways and navigable waterways. In the past most of the designs were carried out by assuming a rigid boundary channel system. However, the rivers are dynamic and a realistic analysis must consider a channel as a movable bed system. The assessments of sediment movement and stream morphology are certainly of vital importance for a proper channel design. Quite often bank protection measures are required to protect the area that is particularly vulnerable to erosion.

Being a dynamic system, a river is often subjected to changes due to the process of aggradation and degradation. This may alter the stream form and pattern, cause additional flood hazards and loss of agricultural land, endangering cities on the river bank, and induce other environmentally adverse impacts.

Floods cause immense damages to human life and properly almost every year. Annual report of Ministry of Water Resources for the year 1987-88 indicates flood affected areas and expenditure incurred on various flood control works as shown below :

1.	Total area prone to flood	40.00 Million ha
2.	Area which can be given reasonable degree of protection	32.00 Million ha
3.	Flood control works carried by the end of VIth Plan	Rs.1,762,77 Crores
4.	Expenditure approved in VIIth Plan	Rs. 947,39 Crores

5. Expenditure(Plan) during 1986-87 Rs. 185.93 Crores
1987-88 Rs. 188.45 Crores

6. Flood control works carried upto March 1987

(a) Embankments	14,511 Kms
(b) Drainage channels	28,038 Kms
(c) Town protection works	459
(d) Villages raised	4,701
(e) Reasonable protection provided upto March 1987	13.37 Million ha

Flood control programme has been in existence since 1954. Of the country's total geographical area of about 328 million ha, roughly 1/8 of the area (i.e. 40 million ha) has been assessed as flood-prone. Out of this, only 13.37 million ha have been provided with reasonable protection by the end of March 1987. The expenditure on flood control works are capital intensive as well as costly to maintain. It is therefore seen that a considerable portion of financial resources of the country is diverted towards flood control works. Savings in capital as well as maintenance cost could provide flood protection to additional areas. It is proposed to carry out research studies which will enable design of more economic structures and use of new and possibly cheaper materials in flood control works and demonstrate the performance of such structures through one or more pilot schemes in selected areas. The pilot scheme would facilitate evaluation of the benefits derived from research in use of such materials and technology.

The scheme envisages laboratory studies for developing protection measures with alternative materials to stone, such as sand mortar bags from the locally available material and synthetic fabric as substitute for natural filter. Field studies have also been planned to demonstrate application and utility of new methods and materials for flood control measures.

The provision of Rs.810 lakhs required in the VIII Plan is tentatively distributed as under :

	Rs. in lakhs
(1) LABORATORY STUDIES :	
CAPITAL	
Land and building	50
Plant and Machinery	10
REVENUE	
Establishment	15
Experimental works and miscellaneous	10
(2) FIELD DEMONSTRATION STUDIES :	
CAPITAL	
Construction of spurs (3)	400
Bank protection works for selected river reach of 1 km	300
REVENUE	
Establishment	15
Experimental works and Miscellaneous	10

72. LABORATORY FOR TURBULENCE AND AIR ENTRAINMENT RESEARCH (UN/BL) :

The simple and easier sites of Water Resources development have been utilised by now and sites with difficult topography and geology are required to be explored. At the same time, greater awareness of the environmental problems arising due to thermal and nuclear plants makes larger demands on development of high head hydroelectric resources. Thus future dam building activity will involve more complex problems, high velocity flows and associated problems of turbulence, cavitation and air entrainment. A small beginning has been made for measurement of turbulence and air entrainment with the avilable instrumentation. The experimental research is proposed to be pursued under the scheme in the following area:

- Turbulence measurement in hydraulic jump
- Relationship between supercritical Froude Number and Reynolds stress distribution
- Effect of inflow conditions on turbulence characteristics of hydraulic jump
- Turbulence characteristics of energy dissipators utilising various appurtenances
- Relationship between velocity excess index and local scour below hydraulic jump

The project provides funds for setting up of laboratory for turbulence and air entrainment research.

The scheme is estimated to cost Rs.91.00 lakhs. A sum of Rs.118.00 lakhs as notional provision for UN/BL aid material in VIIIth Plan would also be requiured. The foreign exchange

component from UN/BL and is estimated to be US $ 13.13 lakhs.

(Rupees in lakhs)

CAPITAL	
Land and Building	28.00
Plant and Machinery	25.00
Notional Provision	118.00
REVENUE	
Establishment	23.00
Experimental work	15.00

13. SUB-SURFACE FACILITY FOR ADVANCED RESEARCH IN ROCK MECHANICS

With the so-called safe sites having been utilised, it has become necessary to build large structures like dams, tunnels and underground openings at need based sites of complex geology. Safe and economic design and construction of these structures largely depend on the accuracy with which the behaviour of the rock masses could be predicted and their properties evaluated. Continued research is essential to cope with these demands.

In order to meet the above requirements it is proposed to develop a sub-surface facility within the CWPRS campus. The facility would consist of a rock mass bed to be excavated to a depth of about 3 metres in rock. This bed would be covered with a hangar with facilities for experimental research work.

Several experimental and empirical approaches are in use for measuring rock mass properties. These are beset with theoritical as well as procedural limitations. These are required to be validated under controlled testing conditions.

Knowledge of discontinuity frequency and orientation is a pre-requisite for modelling, analysis and understanding of the response of rock mass to the changes brought about by the induced or applied loads. Methods to collect and codify this information are required to be developed. Application of rock mass classification systems to classify and estimate the rock mass properties need to be upgraded.

Measurement of in-situ stresses in rock mass in an important but highly complex problem. Flar Jack and Overcoring methods, presently in use need to be improved to fully exploit their potential and increase the level of confidence in the measured data. Hydraulic fracturing method of measuring in-situ stresses needs to be developed.

Permeability of the rock mass and measures of reducing the permeability is an integral part of rock engineering structure. Methods to measure permeability in relation to the discontinuity frequency are required to be evolved. Pressures that could be safely applied during grouting operations as a function of rock quality need quantification.

The response of the dam-foundation interface to the applied load needs to be clearly understood with respect to a) the cracking at the heel, and b) the role of asperities in the mobilisation of shear strength. Geomechanical models on different foundation profiles could be tested to failure to study the behaviour of the interface.

Testing and calibration of equipment before they are deployed for in-situ investigations is an essential and continuing process. The test facility could be conveniently used for this purpose.

The facility could also be used to study problems in related fields such as micro-acoustics and geophysics.

The scheme is expected to cost Rs.87.00 lakhs out of which Rs.7.00 (US $ 0.50) lakhs would be in the form of foreign exchange proposed to be met by Government of India. Itemwise requirement of funds is as under :

	(Rupees in lakhs)
CAPITAL	
Land and Building	30.00
Plant and Machinery	30.00 (FE component Rs.7.00 lakhs)
REVENUE	
Establishment	15.00
Research work and Miscellaneous	12.00

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14. EXTENSION OF PUMP TEST FACILITIES (UNDP)

For the development and testing of rotodynamic pumps, a high precision test laboratory was established with UN aid. It comprises the following test rigs:

1. Small Pump Test Rig
2. Flowmeter Calibration Circuit

At the time of signing the Project Document for the above Project, technical approval by both the Government of India and UNDP was accorded to two more test facilities i.e. Main Pump Test Rig and Pump Tunnel for which engineering designs are readily available. Due to financial constraints, the above mentioned facilities could not be established which have now been proposed to be taken up during the Eighth Plan.

Main Pump Test Rig is meant to develop and test irrigation pumps upto 2 cubic metre per second capacity, 300 mwc head and 500 kw power (max). The Pump Tunnel is meant for conducting cavitation tests and fourquadrant tests of pumps upto 1 cubic metre per second capacity, 100 mwc head aznd 500 kw power (max). Thest facilities when established would form a neutral laboratory for assessing the performance guarantee of medium/large pumps.

The existing test facilities include a primary gravimetric cablibration rig for high precision calibration of flowmeters upto 250 mm size and having measuing capacity upto 5 tonne. Another calibration test loop flowmeters upto 1000 mm size having measuring capacity of 100 tonne is expected to be ready by the

end of the present plan period. It is necessary to have an inter-comparison of CWPRS facilities with high precision test facilities of international repute, available elsewhere in the world. The scheme proposed also includes a proposal to conduct calibration of flowmeters at laboratories like National Engeering Laboratory, UK., Cranfield Institute of Technology, UK., Delft Hydraulics Laboratory, The Netherlands etc., after establishing their characteristics on the test rigs available at CWPRS. Thus it would be possible to establish the credentials of CWPRS facilities in the international shpere. Likewise, it is also proposed to conduct exhaustive tests on pumps in newly established rig at CWPRS which will be followed by tests in the facilities available at international laboratories, mentioned earlier.

The scheme is estimated to cost Rs.267.00 lakhs plus Rs.221.00 lakhs for adjustment of UN/BL equipment. Total foreign exchange requirement from UN/BL source is US $ 20.70 lakhs.

Major head-wise requirement of fund is as under :

CAPITAL	Rs. in Lakhs
Land and Building	100.00
Plant and Machinery	136.00
National provision	221.00
REVENUE	
Establishment	Nil
Experimental work and Miscellanenous	31.00

15. ESTABLISHMENT OF A LARGE PUMP TEST FACILITY

There has been an ever increasing demand for a large capacity pumps (range of flowrate 4 to 13 cubic metres per second) mainly for cooling water requirements of thermal and nuclear power stations. Such large capacity pumps are also widely used in other applications like large irrigation schemes, water and sewage projects etc. Successful operation of major plants depends on reliable and efficient operation of the large pumps installed therein. The imperative need is experienced for an independent and neutral laboratory, capable of conducting full load tests on large pumps, keeping pace with the manufacturing capability. This has also been the demand of Indian Pump Manufacturers' Association (IPMA), expressed through R & D subgroup of DGTD Pump Panel which concluded in one of its meetings that "Bearing in mind that there are a few facilities with existing manufacturers in the country to cater to such requirement, there will still be a clear gap in testing facilities for catering to the requirement of arount 30 large pumps per annum. The DGTD pump panel, therefore, recommends that CWPRS takes necessary steps to carry out the required modifications/additions".

In view of the above, it is proposed to establish a large pump test facility at CWPRS, having the fcllowing capabilities:

Maximum flow rate	:	12.5 cubic metres/sec
Maximum head	:	50 mwc
Maximum power	:	4000 kw

This facility, if established, would have a good workload from the pump manufacturers; about 28 pumps per year as indicated by Chairman, IPMA. The scheme is expected to cost Rs.209 lakhs as follows:

CAPITAL	Rs. in Lakhs
Land and Building	105.00
Plant and Machinery	98.00
REVENUE	
Establishment	Nil
Experimental and Miscellaneous	Rs. 6.00

16. NATIONAL CENTRE FOR INFORMATION SYSTEM & DATA BASES (UN/BL)

The project envisages establishing an Integrated Information System based on HP 3000/58 Computer which has been installed at CWPRS. The system has 4 Mega bytes of main memory, 2 disk drives of 570 MB capacity each, 6250/1600 cpi, 9 track tape drives, printers, etc. The MINISIS software developed by IDRC, Canada, specially for bibliographic applications and library management, has been installed for the management of information. It is proposed to link the HP system to the NICNET which will link both the library information systems at CWPRS and CWC/CBIP, New Delhi.

In the recent past CWPRS has installed a mainframe computer viz. Cyber 180/840A having 16 Mega Bytes of central memory, 4.5 Gbyte disk space, 3 mag tape transports and other peripherals to cater to the mathematical modelling needs of the Research Station. The system is also used for storage of bibliographic information about books. However, the system does not have any data base management software or special software required for retrieval of information.

The computer systems at CWPRS will provide basic facility for storage of international data bases contemplated to be procured under the proposal. However, some peripherals and software may have to be added at a later stage. In order to provide SDI (Selective Dissemination of Information) service to the field users one or two international data bases will be identified to begin with in consultation with potential users. The data bases will be procured on lease basis on magnetic/optical media either

by DST or by CWPRS. These data bases will be downloaded to the computers at CWPRS for storage.

CWPRS along with the available expertise in the country will conduct regular workshops for potential users in the field of online data bases and bibilographic information system.

The present library personnel at CWPRS with necessary training will offer SDI Service by mail to all the interested users. However, a dedicated group of personnel may be required, at a later date, when the demand increases. Once the computer system at CWPRS is linked to the national network, the users may be able to access the information in an on-line mode. If the response of the users is encouraging a link will be established, at CWPRS, for accessing international data bases through proposed gateway at Bombay.

It is evident from above that CWPRS has basic infrastructure for creation of a centralised national water related data base and providing nationwide on-line access to the information.

The scheme is estimated to cost Rs.100.00 lakhs and another Rs.126.00 lakhs towards UN/BL aid adjustment (Notional provision) Itemwise provision in VIII Plan is as under. Foreign exchange component from UN/BL aid is US $ 10.00 lakhs.

(Rupees in lakhs)

CAPITAL	
Land and Building	40.00
Plant and Machinery	36.50
Notional provision	126.00
REVENUE	
Establishment	13.50
Miscellaneous	10.00

17 WATER RESOURCES MANAGEMENT/OPERATION STUDIES FOR COMMAND AREA DEVELOPMENT :

Of late, CWPRS is required to give consultancy in the field of water resources development and management for the Command area development. CWPRS has already undertaken such studies for Chambal Command area development and it is quite possible that it may be asked to take up similar development for Upper Mahanadi Command area. This is a highly interdisciplinary area and requires pooling of resources from various fields such as hydrology which includes surface and groundwater, agronomy, meteorology, electronics and telecommunications, civil engineering, etc. In view of the fact that CWPRS, at the moment, is not having the requisite knowhow in all of these areas, it is carrying out the Chambal studies in association with WAPCOS. As this type of work would continue and CWPRS would be required to shoulder greater responsibilities in this field, it is desirable that it is equipped, more or less, in all the disciplines so that it can independently deliver these services. These requirements need the following financial inputs.

The scheme is estimated to cost Rs 20.00 lakhs out of which Rs 5.00 lakhs (US $ 0.36 lakhs) would be in foreign exchange component to be provided by Govt. of India as under :

	Rupees in lakhs
CAPITAL	-
REVENUE	
Establishment	10.00
Training and Misc.	10.00 (5.0 lakhs in FE)

18 .DESIGN AND DEVELOPMENT OF FLOOD FORECASTING ANALOGUE COMPUTERS :

During the Eighth Five Year Plan, it is proposed to undertake development of flood forecasting analogue computers for some of the river basins of our country. CWPRS has already developed the flood forecasting analogue computer for Tapi river basin and is currently developing the same for Godavari river basin. In the process it has gained the requisite knowhow to develop these analogue computers. Though for individual river basins like the Tapi and the Godavari such analogue computers are developed with financial support from the concerned irrigation projects it is not possible to undertake a large scale development for several river basins at a time with such resources; as such this scheme is framed.

For a developing country like India, this is an appropriate technology. These are economical and cost effective. They can be manufactured with indigenous knowhow and components. As they work on continuous time scale, they are accurate. It would be easy for the practising Civil Engineers, who may or may not have background in electronics to operate these computers and issue flood forecasts based on them. These solve the differential equation related to flood wave movement through rivers and take care of appropriate inreach additions and local flows unlike methods like stage to stage corelation. They are useful to issue flood forecasts, and proper management of impounded water for the benefit of urban and rural populations.

In view of the recurring loss of life and property taking place year after year in our country, the importance of this need not be further emphasized. It may not be out of place to mention here that this does not require any foreign training nor inviting consultants from abroad. The following will be the financial requirements of the project.

The scheme is estimated to cost Rs.38.00 lakhs out of which Rs.10.00 lakhs (US $ 0.72 lakhs) would be in the form of foreign exchange to be met from Government of India funds:

CAPITAL	Rupees in lakhs
Plant and Machinery	30.00 (10.00 lakhs in US $)
REVENUE	
Establishment	8.00

19. RIVER SIMULATION STUDY UNIT

It is proposed to study the aspects of river control with particular reference to the major alluvial Indian rivers which cause considerable flood damage year after year. All aspects connected with the river behaviour, training and control are proposed to be studied by establishing a comprehensive national River Simulation Study Unit.

Immediately after the devastating flood of 1978 in the Yamuna river at Delhi, the question of co-ordinated flood control planning of the major alluvial rivers was discussed at the highest level and as a result of these discussions, it was agreed that the Central Water and Power Research Station should immediately initiate action for taking up model studies pertaining to major alluvial rivers of India. Keeping this in view, both the physical and mathematical model studies have been contemplated as a part of the programme of the proposed unit. The physical models would be equipped with automatic instrumentation synchronised by a single timing device.

Floods in a river basin are due to the combination of inflow from various tributaries and the main river as a result of high precipitation in their catchments. Various measures are in a vogue for flood control, among them being construction of flood moderating reservoirs in the upper reaches of the river basin, channel improvement works, floodways and marginal embankments in the valley. The effect of inflow from the tributaries and of flood control measures is to cause fluctuations in water level

and discharge in the various reaches of the river. These are required to be assessed over the entire river basin for various possible combinations. Such a comprehensive study can be made on hydraulic models as well as by mathematical models.

The proposed models would simulate design floods which are normally non-historical and predict stages, storages, discharges, backwater effects at constricted areas, flood embankment levels and their effects in other reaches.

Thus this unit would help in a detailed study with several combinations which are likely to occur including synchronisation of floods in the main river and its tributaries. The model will also supplement unobserved prototype conditions. At present flood forecasting system exists for major rivers such as Ganga, Brahmaputra, Yamuna etc. The parameters required by these forecasting centres on different combinations of flow can be obtained by the proposed River Simulation Study Unit. These data would be useful for real time flood forecasting. Thus the study would also be very useful in supplementing the efforts for an integrated flood forecasting and control system for the overall development of the valley.

The physical and mathematical model studies would act in a complementary manner, both being utilised to their respective advantages in the study of natural phenomena.

This project would provide the necessary infrastructure by means of staff and equipment to service such specific studies, the cost

of operation of models being borne by the appropriate River Authorities or the State referring these studies. This proposal is estimated to cost Rs.120.00 lakhs towards construction of any one major river basin model including construction of hangars, instrumentation and establishment. The provision is also made for construction and operation of mathematical model of the same major alluvial river. Foreign exchange component of the scheme would be about Rs 20.00 lakhs. (US $ 1.43) to be met from Government of India funds.

The proposed studies would enable the drawing up of an integrated overall scheme of flood forecasting and control for alluvial river systems for which very heavy allocations are being made by various states. This would also help in correct estimation of river flood stages and thus to avert severe damage due to sudden floods. It would help in evolving the most economical design and planning of flood control works such as cutoffs, flood levees, floodways, channel improvement works, storage dams etc.; thereby effecting considerable economy in expenditure.

Provision required during VIIIth Plan is as under :

CAPITAL	Rs. in lakhs
Land & Building	15.00
Plant & Machinery	30.00 (FE component is Rs.20 lakhs)
Hydraulic model construction	50.00
REVENUE	
Establishment	10.00
Research works and Miscellaneous	15.00

20 APPLICATION OF SPACE TECHNOLOGY FOR WATER RESOURCES EVALUATION GEOENGINEERING AND COASTAL MORPHOLOGY (UN/BL)

In past through UNDP schemes some of the officers have undergone training in the area of space technology in the Institutes in India and Abroad, and a few equipments such as Stereoscope and Transfer scope are also obtained by the Research Station. This scheme is proposed to strengthen and utilize the resources available with the Research Station to offer more reliable and economical solutions to the problems referred by the clients in the area of water resources evaluation, geoengineering and coastal morphology.

Application of space technology involves photo interpretation and remore sensing techniques which are fast fundamental source for obtaining geological, hydrogeological, geomorphological information of the area of interest. The coastal morphological changes at the mouth of river etc. also can be studied with the help of such techniques. An aerial photograph gives observable patterns, colours and relief which makes it possible to distinguish different geological formations, soil, vegetation etc. and indicates their lateral extent. Apart from this, identification of areas of depressions, seepage zones and artificial water features can be studied by photo interpretation. It also reveals features which can be related to porosity, permeability, vegetation, drainage pattern, springs and marshy areas depicts their locations. Thermal infrared imagery, which records differences in apparent surface temperatures, provides information on soil moisture, groundwater circulation and faults functioning as barriers. Near infrared imagery can furnish an

idea of subsurface flow patterns from canals. Radar imagery, which records differences in surface roughness, can provide information on the presence of moisture on ground surface as well as at shallow depth. Landsat imagery helps in identification of lineaments, drainage patterns, moist and water logged areas and in turn permits better usage of land and its planning.

Objectives:
---

1) Identification of surfacial features such as topography geomorphology, geology, drainage etc.

2) Identifying of subsurface conditions such as vegetation, soil moisture content, seepage patterns, leakages etc.

3) Identifying water bearing zones and hydromorphological features.

4) Selection of potential areas for detailed investigation for silting of dams, power houses, tunnels, ports and other structures and projects of interest (in relation with the large scale features in the region).

5) For effective coastal zone management, study of coastal evaluation for development of offshore projects and its effects on existing structures.

6) Effects of effluent hot water discharges and its effects on environment

The scheme is estimated to cost of Rs.48.50 lakhs and notional provision of Rs.18.20 lakhs for adjustment of UN/BL aid material. The total FE Component requirement is estimated to be US $ 2.00 lakhs.

CAPITAL

Land and Building	- Nil
Plant and Machinery	- Rs.13,00,000
Notional provision	- Rs.18,20,000

REVENUE

Establishment	- Rs. 3,00,000
Training	- Rs. 7,50,000
Experimental and Miscellaneous Expenses	- Rs.25,00,000

2 1 Provision of Civil Construction Wing at CW&PRS

An amount of Rs.16 crores is allocated for land and building in the VIIIth Five Year Plan. Presently Executive Engineer (Civil) with the assistance of one Assistant Executive Engineer (Civil) and two Overseers looks after the construction works of models, buildings, recirculating system etc. and their maintenance. In addition to the maintenance and construction works, Executive Engineer (C) as a Drawing and Disbursing Officer maintains the accounts of the expenditure of the Research Station and also purchases stock materials, scientific equipments (indigenous and foreign) provided under CSSA and Deposit, Plan and Non Plan budget works of Government of India. On an average yearly expenditure on construction, maintenance, stores etc. is at an average of Rs.1.85 crores as follows:

1.	Construction of model trays, hangar, Data Acquisition rooms, inlet outlet chambers etc.	Rs.70 lakhs
2.	Maintenance of office and non-residential buildings, re-circulating channel systems, new and old residential colony, Inspection Bungalow and general maintenance of CWPRS open spaces and gardens.	Rs.25 lakhs
3.	Procurement of stores to be borne on stock for the use on various works at CWPRS, procurement of specific material required for the client oriented works under CSSA, Deposit and materials provided under Non-Plan and Plan funds of the Government of India.	
	Stock	Rs.40 lakhs
	Specific	Rs.50 lakhs

The present Civil Engineering Unit is not adequate to handle the existing work load of Civil construction works, purchase of stores and maintenance of an area spread over 200 hectares. In addition a proposal of acquisition of 48 hectares of land is under consideration of Government of Maharashtra. TAC has further desired to acquire additional 50 hectares of land during the VIIIth Five Year Plan. It would therefore be seen that a total out-lay of 16 crores for land and building in the VIIIth Plan shall be effectively and timely utilised only if the present civil engineering unit is strengthened adequately by creating civil construction wing explicitly for taking up the civil construction works. The division shall comprise -

Sr.No.	Category	No.of posts	Scale of pay Rs.
1.	Executive Engineer (C)	1	3000-100-125-4500
2.	Asst. Executive Engineer(C)	1	2200-75-2800-EB-100-4000
3.	Overseer / Jr.Engineer	6	1400-40-1800-EB-50-2300 1640-60-2600-EB-75-2900
4.	Steno Gr.III	1	1200-30-1560-EB-40-2040
5.	U.D.C	1	1200-30-1560-EB-40-2040
6.	L.D.C	2	950-20-1150-EB-25-1500
7.	Jr. Draftsman II	1	1200-30-1560-EB-40-2040
8.	Tracer	2	975-25-1150-EB-30-1540
9.	Helper Gr.I (Mukadam)	6	825-15-900-EB-20-1200
10.	Messenger	1	750-12-870-EB-14-940

(T.S.Patil)
Executive Engineer (Civil)

NAME OF UNDERTAKING/DEPARTMENT/MINISTRY : CWPRS, PUNE
MINISTRY OF WATER RESOURCES

(Physical Targets/Benefits in relevant units of measurements)

PROJECTS	CODE NO. MAJOR HEAD/ MINOR HEAD	NATURE AND LOCATION OF THE SCHEME	COMMENCEMENT YEARS	ESTIMATED COST ORIGINAL	ESTIMATED COST REVISED	CUMULATIVE EXPENDITURE UPTO END OF 7TH PLAN	UPTO THE END OF SEVENTH PLAN CAPACITY CREATION	UPTO THE END OF SEVENTH PLAN UTILISATION	EIGHTH PLAN (1990-95) PROPOSED OUTLAY	ANNUAL PLAN 1990-91 ORIG. REVI. OUTLAY	ANNUAL PLAN 1990-91 OUTLAY	ANNUAL PLAN 1991-92 PROPOSED OUTLAY	ANTICIPATED BENEFITS (in Units) EIGHTH PLAN	1990-91	1991-92	BEYOND EIGHTH PLAN	REMARKS (Specifically environmental Measures/costs
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
D-1 Completed Schemes as on 31.3.90 (Spillover liability)	12701	R&D Scheme CWPRS, Pune															Environmental aspects are not disturbed by the execution of scheme.
i) Hydraulic Structures Research Centre			1980	2.26	4.83	4.27	Not applicable		0.40	0.40	0.40 *	-					
ii) Staff Colony Ph.II			1982	1.56	2.22	2.03	being R &D		0.12	0.12	0.12 *	-					
iii) Water and Power Information System			1982	0.39	0.75	0.77	Schemes		0.08	0.08	0.08 *	-					
Total (D-1) *				4.31	7.80	7.07			0.60	0.60	0.60						
D-2 Critical ongoing Schemes as on 01.04.1990	12701	R&D Scheme CWPRS, Pune															
(Non-Plan) i) Ongoing activities of CWPRS as SSI Institution			90-91	55.20	-	22.54	- do -		55.20	8.34	8.34	9.00	44.00	6.00	7.20	On an average 50%	Non-Plan activities
ii) Calibration Laboratory			1984	1.90	-	1.23	- do -		0.80	0.80	0.80	0.20 *	-				
iii) Sediment Disposal Research			1989	1.39	-	0.005	- do -		1.30	0.45	0.45	0.50	-				
Total (D-2)				58.29	-	23.78			57.18	9.59	9.59	10.30					
D-3 Sanctioned Schemes/ Committed in 1990-91	12701	R&D Schemes CWPRS, Pune															
i) Automated Operation of Irrigation Canal Systems			1990	0.52	-	-	- do -		0.52	0.20	0.15	0.20					

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ii) Mathematical Modelling Centre for Fluvial and Ocean Hydromechanics				0.57	-	-			0.57	0.18	0.15	0.30					
iii) Staff Colony Ph-III				6.00	-	-			6.00	0.05	0.05	0.50					
iv) Augmentation of Water and Power Supply				1.45	-	-			1.45	0.07	0.05	0.20					
v) National Ship Hydrodynamic Centre				9.25	-	-			8.00	0.63	0.30	1.00	Yet to be sanctioned. Provision made in approved Annual Plan 1990-91.				
vi) Hydrometry Research Centre				3.50	-	-			3.50	0.26	0.05	0.20					
vii) Earthquake Response Analysis Centre				1.60	-	-			1.60	0.14	0.05	0.20					
Total (D-3)				22.89					21.64	1.55	0.80	2.70					

* Spillover for meeting the commitments of VII plan.

DRAFT TH PLAN (1990-95) - PROPOSALS FOR PROJECTS/PROJECTS

NAME OF UNDERTAKING/DEPARTMENT/MINISTRY

: CWPRS, PUNE, MINISTRY OF WATER RESOURCES

Outlay/Expenditure in Rs. crores and physical Targets/Benefits in relevant units of measurements)

PARTICULARS	CODE NO. MAJOR HEAD/ MINOR HEAD	NATURE AND LOCATION OF THE SCHEMES	COMMENCEMENT YEAR	ESTIMATED COST	EIGHTH PLAN (1990-95) PROPOSED OUTLAY	ANNUAL PLAN 1990 91 APPD. OUTLAY	ANTI. OUTLAY	ANNUAL PLAN 1991 92 PROPOSED OUTLAY	ANTICIPATED BENEFITS (in Units) EIGHTH PLAN	1990-91	1991-92	BEYOND EIGHTH PLAN	REMARKS (Specifically environmental Measures/costs
1	2	3	4	5	6	7	8	9	10	11	12	13	14
NEW SCHEMES ##	12701	R&D Schemes CWPRS, Pune.											Not applicable being Research Schemes. Environmental aspects are not disturbed by the execution of these schemes.
i) Staff Colony Ph-III				6.00	6.00	0.05	0.05	0.50					
ii) Augmentation of Water and Power Supply				1.45	1.45	0.07	0.05	0.22					
iii) National Ship Hydrodynamic Centre				9.25	8.00	0.62	0.20	1.00	Provision made in approved Annual Plan 1990 91. Schemes yet to be sanctioned.				
iv) Hydrometry Research Centre				3.50	3.50	0.26	0.05	1.00					
v) Earthquake Response Analysis Centre				1.60	1.60	0.14	0.05	1.00					
vi) Centre for studies of Density Currents and Hydraulics of Two Density Thermal and Effluent Studies UH/SL				2.35	2.35	-	-	2.10					
vii) Centre for Dredging Studies UH/SL				2.65	2.65	-		2.10					
viii) Training Cell				0.25	0.25			0.25					
ix) Monitoring Cell				0.25	0.25	-	-	0.25					
x) Pilot Scheme on Small Hydro				7.50	5.00	-	-	0.25					

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xi) Demonstration of Experimental Flood Protection Works	8,10	8,10	-	-	0,30
xii) Laboratory for Turbulence and Air Entrainment Research UH/BL	0,91	0,91	-	-	0,05
xiii) Subsurface Facility for Advanced Research in Rock Mechanics	0,88	0,88	-	-	0,05
xiv) Extension of Pump Test Facility UH/BL	2,67	2,67	-	-	0,10
xv) Establishment of Large Pump Test Facility	2,09	2,09	-	-	0,10
xvi) National Centre for Information Systems and Data Bases UH/BL	1,00	1,00	-	-	0,10
xvii) Water Resources Management/Operation Studies for Command Area Development	0,20	0,20	-	-	0,02
xviii) Design and Development of Flood Forecasting Analogue Computers	0,30	0,30	-	-	0,05
xix) River Simulation Study Unit	1,40	1,40	-	-	0,05
xx) Application of Remote Sensing for Water Resources Evaluation and Geo-Engineering and Coastal Morphology UH/BL	0,40	0,40	-	-	0,05
xxi) Civil Construction Wing	0,25	0,25	-	-	0,05
(i) Notional Provision for Adjustment of UH/BL Bld (Equipment)	26,12	26,12	-	-	-
Total	57,41	51,08			1,57

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Summary Statement — Annexure-III'D'

DRAFT VIITH PLAN (1990-95) - PROPOSALS FOR PROGRAMMES / PROJECTS

NAME OF UNDERTAKING / DEPARTMENT / MINISTRY

CWPRS, Pune, Ministry of Water Resources

(Rs, Crores)

PARTICULARS	CODE NO. MAJOR HEAD/ MINOR HEAD	ESTIMATED COST (REV)	CUMULATIVE EXPENDITURE UPTO END OF 7TH PLAN	EIGHTH PLAN (1990-95) PROPOSED OUTLAY	ANNUAL PLAN 1990-91		ANNUAL PLAN 1991-92
					APPO. OUTLAY	ANTI. OUTLAY	PROPOSED OUTLAY
1	2	3	4	5	6	7	8
1. SCHEME AIMED AT MAXIMISING BENEFITS FROM THE EXISTING CAPACITY AS ON 31/3/1990	12701						
2. COMPLETED SCHEMES AS ON 31/3/1990 (SPILL-OVER LIABILITY)		7.90	7.39	0.63	0.63	0.63	-
3. CRITICAL ONGOING SCHEMES		58.29	23.78	57.18	9.57	9.57	10.33
4. SCHEMES SANCTIONED/ COMMITTED IN 1990-91		22.89	-	21.64	1.55	0.33	2.73
5. NEW SCHEMES		57.48	-	54.98	-	-	1.57
				134.40			

Annexure - IV

Statement showing Employment (schemewise) in the Seventh/Eighth Plan with the corresponding figures of Expenditure/Outlays

Ministry : Water Resources

Department : CWPRS

Sl No.	Head of Development Schemes	Estimated Continuing (Regular) Employment (Persons)					Estimated Employment (in person days) generated in the Construction phase *				Expenditure/Outlay (in Rs. Crores)							
		March 1985	March 1990	March 1995 (Target)	March 1991 (Anti.)	March 1992 (Target)	1985-90 (Actual)	1990-95 (Target)	1990-91 (Anti.)	1991-92 (Target)	1985-90 Total	1985-90 Of which Capital content	1990-95 Total	1990-95 Of which Capital content	1990-91 Total	1990-91 Of which Capital content	1991-92 Total	1991-92 Of which Capital content
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		It is difficult to assess the employment generated in each year of construction phase since these are R& D schemes. Only building component executed through CPWD generates temporary employment of construction trade.																

* should be arrived at by adding the employment (in person days) generated/to be generated) in each year of the construction phase

Foreign Assistance Routed Through Budget : Eighth Plan

(Rs. Crores)

Sl.	Name of the Project	Name of the P.S.U. if any	Foreign Aid Sources a) b) c)	1985-89 (Actuals)			1987-90 (Actuals)			Seventh Plan (Actuals)			1990-91 (Anticipated)			Eighth Plan (Proposal)			1991-92 (Proposals)		
				Foreign Component (million $)	Local Cost	Total	Foreign Component	Local Cost	Total	Foreign Component	Local Cost	Total	Foreign Component	Local Cost	Total	Foreign Component	Local Cost	Total	Foreign Component	Local Cost	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1)	Extension	CERC		0.88		0.93			-			0.93									
2)	Extension	HIC		1.46		1.29			-			1.29									
3)	Applied Earth Sciences			1.29		1.16			-			1.16									
4)	MM			1.23		1.55			-			1.55									
5)	WAPIS			0.56		0.53			-			0.53									
6)	ICRC			2.86		3.27			0.48			3.75									
				8.28		8.73			0.48			9.21									
7)	(For all new schemes together)														NIL			20.12			NIL
															----- do -----						

The foreign exchange component routed through budget and considered in this statement is for accounting U.N. aid material- Notional Provision.

Sl. No.	Development Head & Sub-Head	Outlay					Rural Component				
		Seventh Plan 1985-90 (Actuals)	1989-90 (Actuals)	Eighth Plan Proposals	1990-91 (Anticipated)	1991-92 (Proposals)	Seventh Plan 1985-90 (Actuals)	1989-90 (Actuals)	Eighth Plan Proposals	1990-91 (Anticipated)	1991-92 (Proposals)
0	1	2	3	4	5	6	7	8	9	10	11
I.	DIRECTLY IDENTIFIABLE RURAL OUTLAYS BY LOCATION AND BENEFIT										
1.	Agriculture & Allied Activities										
2.	Rural Development										
3.	Special Area Programmes										
4.	Irrigation & Flood Control			108.40	10.54	12.72	---------- Not Applicable ----------				
	Sub-Total (1 to 4)										
5.	Rural Electrification (RE)										
6.	Village Industries										
	6.1 Khadi & Village Industries										
	6.2 Handloom										
	6.3 Sericulture										
	6.4 Handicrafts										
	6.5 Coir										
7.	Rural roads										
8.	Rural Health										
9.	Village Health Guides (Family Welfare)										
10.	Rural Housing										
11.	Rural Water Supply										
12.	Rural Sanitation										
	Sub-Total - I (1 to 12)										
II.	OUTLAYS SUBJECT TO APPORTIONMENT TO RURAL AREAS BY LOCATION AND/OR BENEFIT										
13.	Energy										
	13.1 Power (other than RE)			5.00	-	0.35					
	13.2 Petroleum										
	13.3 Coal and Lignite										

Sl. No.	DEVELOPMENT HEAD & SUB-HEAD	OUTLAY					RURAL COMPONENT				
		SEVENTH PLAN 1985-90 (Actuals)	1989-90 (Actuals)	Eighth Plan Proposals	1990-91 (Anticipated)	1991-92 (Proposals)	SEVENTH PLAN 1985-90 (Actuals)	1989-90 (Actuals)	Eighth Plan Proposals	1990-91 (Anticipated)	1991-92 (Proposals)
0	1	2	3	4	5	6	7	8	9	10	11
15.	Transport										
	15.1 Railways										
	15.2 Other Transport (Excluding Rural Roads)			15.00	0.30	1.00	---------- Not applicable ----------				
16.	Communication										
17.	Science, Technology & Environment										
18.	Social Services										
	18.1 Education										
	18.2 Medical & Public Health (Excluding Rural Health)										
	18.3 Family Welfare (Excluding Village Health Guide)										
	18.4 Housing (Excluding Rural Housing)			6.00	0.05	0.50					
	18.5 Urban Development										
	18.6 Water Supply & Sanitation (Excluding Rural Water Supply & Rural Sanitation)										
	18.7 Other Social Services										
19.	Other Development Programmes										
	19.1 Public Distribution System (PDS)										
	19.2 Other than PDS										
	Sub-Total II (12 to 19)										
	Public Sector Outlay (1 to 19)										

* - Rural component to be specified in Rs. Crores and as percent of the sectroal outlay

- All the items listed may be retained but further sub-classification, if necessary, may be done under each head/sub-head.

FINANCIAL OUTLAYS : EIGHTH PLAN

Major Head : 12701 — Ministry : Water Resource

Sub-Head : — Departmer : CWPRS, Pune.

(Rs. Crores)

	Central	Centrally Sponsored *	Total *
1	2	3	4
Seventh Plan 1985-90			
1988-89 (Actuals)	5.80	-	5.80
1989-90 (Actuals)	2.32	-	2.32
[illegible]-90 (Actuals)	17.07	-	17.07
1990-91 (Outlays as Budgetted)	3.32	-	3.32
1990-91 (Anticipated)	2.65	-	2.65
Eighth Plan (Proposed)			
1991-92 (Proposed)	4.97	-	4.97

Memo Items : All major heads and sub-heads should be grouped under the relevant Plan Heads of Development as per Budget Documents.

(Statement I, listing the Heads of Development and Statement II, listing the Ministries/Departments governing them are enclosed for ready reference).

* Special attention is invited to paragraph (d) on " Zero-based Analysis" of the D.O. letter No. 11016/3/90-PC from Secretary, (PC) dated 4.6.90.