



# **ANNUAL REPORT**

2006-07

**MINISTRY OF WATER RESOURCES  
NEW DELHI**

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## OVERVIEW

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

(a) Development, conservation and management of water as a national resource; overall national perspective of water planning and coordination in relation to diverse uses of water.

(b) General Policy, technical assistance, research and development training and all matters relating to irrigation, including multi-purpose, major, medium, minor and emergency irrigation works; hydraulic structures for navigation and hydropower; tube wells and groundwater exploration and exploitation; protection and preservation of ground water resources; conjunctive use of surface and ground water, irrigation for agricultural purposes, water management, command area development; management of reservoirs and reservoir sedimentation; flood (control) management, drainage, drought proofing, water logging and sea erosion problems; dam safety.

(c) Regulation and development of inter-State rivers and river valleys. Implementation of Awards of Tribunals through Schemes, River Boards.

(d) Water quality assessment.

(e) Water Laws, legislation including

International Water Law.

(f) International organisations, commissions and conferences relating to water resources development and management, drainage and flood control.

(g) Matters relating to rivers common to India and neighbouring countries; the Joint Rivers Commission with Bangladesh, the Indus Waters Treaty 1960; the Permanent Indus Commission.

(h) Bilateral and external assistance and cooperation programmes in the field of water resources development.

The Ministry is headed by Hon'ble Prof. Saifuddin Soz as the Union Minister of Water Resources. Hon'ble Shri Jai Prakash Narayan Yadav is the Minister of State for Water Resources since 24.10.2006. Smt. Gauri Chatterji joined as Special Secretary on 27.6.2006 and took charge of Secretary, Ministry of Water Resources on 1.8.2006. Shri S. Manoharan joined the Ministry as Additional Secretary on 4.10.2006. Dr. A. K.Yogi joined on 29th December, 2006 as Additional Director General and Smt. A Ray joined as Joint Secretary & Financial Adviser on 21.02.2007. The Ministry has ten wings namely; Administration, Finance, Policy & Planning, Projects, Ganga, Indus, Command Area Development & Water Management, and Brahmaputra & Barak, Ground Water Wing and Economic Wing.

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## **ORGANIZATIONS AND BODIES UNDER THE MINISTRY OF WATER RESOURCES**

1. Central Water Commission.
2. Central Soil and Materials Research Station.
3. Central Ground Water Board. / Central Ground Water Authority
4. Central Water & Power Research Station.
5. Farakka Barrage Project.
6. Ganga Flood Control Commission.
7. Sardar Sarovar Construction Advisory Committee.
8. Brahmaputra Board.
9. Narmada Control Authority.
10. Betwa River Board.
11. National Institute of Hydrology.
12. National Water Development Agency.
13. Bansagar Control Board.
14. Tungabhadra Board.
15. Upper Yamuna River Board.
16. Water and Power Consultancy Services (India) Ltd.
17. National Projects Construction Corporation Limited.

### ***Important conferences/meetings/discussions during the year 2006-07: The Ministry of Water Resources held/ participated in number of conferences, meetings & discussions at both national and international level. Some of the important conferences/meetings held are indicated below:***

1. The Hon'ble Minister (WR) participated in the discussions between the Hon'ble Prime Ministers of India and Bangladesh held on 20-22 March, 2006 at New Delhi. During these discussions, it was agreed that the meetings of the bilateral institutional organisations such as Joint Rivers Commission would be held more frequently.

2. Hon'ble Minister for Water Resources inaugurated the function to mark "World Water Day" organized by Central Water Commission in association with Central Soil & Materials Research Station and Upper Yamuna River Board on 22.03.2006.

3. The Hon'ble Minister of Water Resources in a meeting in the ministry on April, 2006 with

the Chief Minister of UP urged for the release of 300 cusecs of water for Sonia Vihar to relieve the people of Delhi from water shortage. Discussions were also held with the Chief Minister of Delhi. The cumulative result of these meetings was that U.P. government released water for Sonia Vihar.

4. An Inter-State meeting was taken by Hon'ble Union Minister of Water Resources on 04.04.2006 with the Hon'ble Chief Ministers of Goa, Karnataka and Maharashtra to discuss the issues relating to Mahadayi Water Dispute among the states of Karnataka, Goa and Maharashtra.

5. A meeting was held by the Hon'ble Union Minister for Water Resources with the Chief Ministers of Andhra Pradesh and Maharashtra



*The Union Minister of Water Resources Prof. Saifuddin Soz greeting the Prime Minister, Dr. Manmohan Singh, at the first meeting of Artificial Recharge of Ground Water Advisory Council, in New Delhi on July 22, 2006.*



*Shri Montek Singh Ahluwalia, Deputy Chairman, Planning Commission (centre) flanked by the Union Minister for Water Resources Prof. Saifuddin Soz (left) and Shri Jai Prakash Narayan Yadav, Minister of State, Ministry of Water Resources (right) inaugurating 12th National Symposium on Hydrology in New Delhi on 14th November 2006.*



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on 04.04.2006 to discuss the issues relating to construction of Babhali Barrage and 11 other barrages in Godavari Basin by Maharashtra.

6. The Third meeting of the Upper Yamuna Review Committee (UYRC) was held on 12th April 2006 at New Delhi under the Chairmanship of the Hon'ble Minister of Water Resources . During the meeting various agenda items on the issues related to the Upper Yamuna Basin were discussed and directions were given. It was after a lapse of 9 years that the Committee held its meeting and took important decisions.

7. The Hon'ble Union Minister of Water Resources presided over the 22nd Annual General Meeting of National Water Development Agency held on 25.4.2006 at New Delhi. The meeting was attended by representatives from various States like Andhra Pradesh, Assam, Bihar, Chhattisgarh, Kerala, Madhya Pradesh, Haryana, Punjab, Orissa, Maharashtra, Rajasthan, Karnataka, Uttar Pradesh, Uttaranchal, Tamilnadu etc.

8. Central Water Commission organised a Special Lecture by Prof. Asit K. Biswas, President, Third World Centre for Water Management, Mexico on "Global Water Future : Challenges and Perspectives" on 24.7.2006. The function was inaugurated by the Hon'ble Minister of Water Resources. Ms. Sunita Narain, Director, Centre for Science and Environment and Senior Officers of the Ministry of Water Resources and Central Water Commission attended the Lecture.

9. Meeting of the Parliamentary Consultative Committee of Ministry of Water Resources were held in New Delhi under the Chairmanship of Hon'ble Minister (WR) on the subjects of "Rain Water Harvesting" on 11.7.2006 "Pilot Scheme for National Project for Repair, Renovation & Restoration of Water Bodies directly linked to Agriculture" on 22.8.2006, "Role and functions of Central

Water Commission" on 18.10.2006 and "Role & functions of National Water Development Agency on 17.1.2007.

10. As per 36th meeting of Indo-Bangladesh Joint River Commission meeting held in Dhaka. A joint visit of Ministers of Water Resources of India and Bangladesh to various sites of bank protection, dredging, lift irrigation etc. was undertaken from 13-21 September, 2006. Both the Ministers of Water Resources alongwith their delegation visited Bank Protection Works, Minor Lift Irrigation and Drinking Water Supply Schemes proposed on river Feni and Muhuri in Tripura and also flood embankment at Belonia on river Muhuri.

11. The Hon'ble Minister of Water Resources participated in the International workshop on rainwater harvesting held at Kandi, Sri Lanka, during 27-29 September 2006.

12. A meeting was held on 4.10.2006 by the Hon'ble Minister of Water Resources to discuss the Polavaram and Inchampalli Projects. The meeting was attended by the Chief Minister Andhra Pradesh and Water Resource Minister of Chhattisgarh. Minutes of the meeting have been sent to the Chief Ministers of the concerned states i.e. Andhra Pradesh, Maharashtra, Orissa, and Chhattisgarh for necessary action.

13. The Hon'ble Minister of Water Resources visited Bhutan from 11-15 October 2006 to inspect the various Hydro-electric projects undertaken by India, particularly the progress of Tala H.E. Projects at Gedu.

14. Ministry of Water Resources participated in the 27th India International Trade Fair (IITF) – 2006 at Pragati Maidan, New Delhi during the period 14th to 27th November, 2006. Ministry of Water Resources organised a pavilion depicting Models of Rain Water Harvesting and Artificial Recharge Structures. The pavilion was inaugurated on 14th November, 2006 by Hon'ble Minister of Water

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Resources and Minister of State for Water Resources and awarded bronze medal.

15. 12th National Symposium on Hydrology with focal theme on “Ground Water Governance: Ownership of Ground Water and its Pricing” was held on 14-15 November, 2006 at New Delhi. The symposium was inaugurated by Shri Montek Singh Ahluwalia, Deputy Chairman, Planning Commission. and presided over by Minister of Water Resources with Minister of State for Water Resources. Watershed Atlas of India was released by Shri Montek Singh Ahluwalia, Hon’ble Deputy Chairman, Planning Commission of India and Hon’ble Minister of Water Resources.

16. Hon’ble Minister of Water Resources visited Narmada Control Authority, Indore on 6-8 April 2006, National Water Academy, Pune on 4th September 2006, Jaipur on 15th November, 2006 to attended the International Seminar on Water Management organized by Rotary International and Coimbatore on 7th February 2007 with regard to feasibility studies of peninsular rivers interlinking.

17. The Hon’ble Minister of State for Water Resources visited Bihar on 16.11.2006 and held discussion with Regional Director to review the progress of work of Central Ground Water Board.

18. Hon’ble Minister of Water Resources convened an inter state meeting on 26th November 2006 of the Chief Ministers of Tamil Nadu and Kerala on Mullaperriyar dam issues. They agreed to discuss the issues further in a meeting under the auspices of the Hon’ble Minister of Water Resources in the near future.

19. The Hon’ble Minister of Water Resources took a meeting of the Irrigation Ministers of Upper Yamuna Basin States on December 20th 2006 to review projects like Renuka Dam and Keshau Dam and Lakhawar –Vyasi dam.

20. The 12th meeting of National Water Board was held after 4 years on 5th January 2007, in which the issues related to implementation of irrigation projects in time bound manner, ground water management, participatory irrigation management, sustainability of resources and facilities created were discussed.

### **Water Scenario**

The annual precipitation including snowfall, which is the main source of water in the country, is estimated to be of the order of 4000 Billion Cubic Meters (BCM). The estimated precipitation during the monsoon season (June to September) is of the order of 3000 BCM. The average availability of water in the country is assessed at 1869 BCM. Out of which, the utilizeable water resources are 1123 BCM ( 690 BCM of Surface water and 433 BCM of replenishable ground water) A total storage capacity of 212.78 Billion Cum (BCM) has been created in the country through major & medium projects. The projects under construction will contribute to an additional 76.26 BCM, while the contribution expected from projects under consideration is 107.54 BCM. Central Water Commission is monitoring the storage position of 76 important reservoirs spread all over the country. The Total Storage capacity at Full Reservoir Level(FRL)) in these reservoirs is 133.021 BCM. The total availability of water in the 76 major reservoirs was 109.77 BCM at the end of the monsoon of 2005 against 85.12 BCM at the end of the monsoon last year.

### **WATER YEAR”-2007**

The Government of India has declared Year 2007 as “Water Year” with a view to address the water related issues, in a focused manner, ensure successful implementation of policies and programmes and to launch a massive awareness programme all over the country.





*The Hon'ble Minister of Water Resources Prof. Saifuddin Soz alongwith Smt Gauri Chatterji, Secretary (Water Resources)(right) and Shri S. Manoharan Addl Secretary(Water Resources) (extreme right) being presented the dividend cheque from WAPCOS for the year 2005-06 on October 6,2006*



*The Pavilion of the Ministry of Water Resources in the International Trade Fair,2006 was widely hailed by visitors, experts and the Jury. Shri. K.S.Ramasubban, Joint Secretary Ministry of Water Resources receiving Bronze medal awarded to the pavilion from Shri Jayram Ramesh Minister of State, Department of Commerce, Ministry of Commerce & Industry*

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Some of the important activities planned during the Water Year-2007 include : (a) National Congress on Ground Water; (b) Farmers Participatory Action Research Programme in 5000 villages to promote 'more crop and income per drop' of water; (c) Training of Water Masters in each Pani Panchayat and institution of an Award for the best Pani Panchayat; (d) Wider dissemination of know-how to the user level through electronic & print media.(e) Organisation of Workshops/ Seminars on water related technical and management issues; (f) Participation in festivals, fairs, training programme, mass awareness programmes etc.

### **Prime Minister Package for Agrarian Distress District**

Assured irrigation facilities to the farmers of 31 Agrarian distress districts is important component of the Prime Minister Package for 31 Agrarian Distress Districts of four states namely Andhra Pradesh, Karnataka, Kerala and Maharashtra. 32 major and 33 medium irrigation projects are for providing the benefits have been identified for support under Accelerated Irrigation Benefit Programme as per norms. An amount of approximately Rs. 300 Crores has been released during 2006-07 to various major and medium irrigation projects identified under it.

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## CHAPTER 1

# MAJOR AND MEDIUM PROJECTS

### **ACCELERATED IRRIGATION BENEFITS PROGRAMME (AIBP)**

There were 171 major, 259 medium and 72 Extension, Renovation and Modernization on-going Irrigation projects in the country at various stages of construction at the end of the VIIIth Plan (i.e., end of 1996-97) with spillover cost of Rs.75690 crore which was a matter of grave concern for the Union Government. These projects were languishing due to various reasons, particularly paucity of funds. Therefore, the Central Government, launched the Accelerated Irrigation Benefits Programme (AIBP) in 1996-97 to provide Central Loan Assistance (CLA) to approved major and medium irrigation projects and to expedite implementation of projects which were beyond resource capability of the States or were in an advanced stage of completion and could yield irrigation benefits in the next four agricultural seasons. The AIBP has undergone liberalization from time to time and surface minor irrigation schemes have also been included in AIBP. Funding patterns have also been liberalized from time to time to expedite completion of ongoing projects.

### **AIBP Releases & Benefits**

The funds are released by the Ministry of Finance on the recommendations of the Ministry of Water Resources. Since inception of this programme in 1996-97, an amount of Rs.19437.88 Crore has been released for various major/medium/minor irrigation projects as Central Assistance up to 2005-06 in the form of loans and grants. The State Government has been able to create additional irrigation potential of 32.5 lakh hectare up to March, 2005 from major/medium projects and 1.622 lakh

hectares from surface Minor Irrigation schemes up to March, 2006. 50 major/ medium projects (Table-II) and 4187 surface minor irrigation schemes have since been completed up to March, 2006 with the help of this programme.

There is enhancement in the annual rate of irrigation potential creation in the country from VIIIth Plan to IXth Plan from an annual rate of 4.4 lakh ha./annum to 8 lakh ha./annum i.e. nearly an increase of 3.6 lakh ha./annum, mostly contributed by AIBP. In the Xth Plan, the potential creation is nearly 10 lakh ha./annum out of which 50% is contributed by AIBP. The contribution of AIBP in the completion of projects is significant and it has progressively helped in accelerating the completion of projects. During IXth Plan, out of 96 Major / Medium Irrigation Projects completed in the country, 17 were those which received AIBP assistance. However, during Xth Plan, out of 38 Major / Medium Irrigation Projects completed in the country, 29 were those which received AIBP assistance.

During 2006-07, there is a budget provision of Grant to the tune of Rs.2098.38 crore (with total outlay of Rs. 8017.79 crore) in the Union Budget for AIBP and an amount of Rs.336.57 crore has been released to various major/ medium/ minor irrigation projects as grant under this programme at the end of December, 2006 and there is a target of completion of 45 more major/ medium Projects in the year 2006-07. The Central Assistance amounting to Rs.19,774.46 crore in the form of loan and grant has been released under AIBP since inception up to 31<sup>st</sup> December, 2006 and the State wise details are given at Table-I.

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The AIBP has evolved as a major programme of the Central Government in the irrigation sector and the pace of implementation of project and creation of irrigation potential has increased. However, there is a need to further enhance this rate to achieve the ambitious target of creation of irrigation potential under the Bharat Nirman Programme.

### ***Relaxation of criteria and procedures under AIBP***

Government of India envisages to extend irrigation to one crore (Ten Million) hectares within a period of four years under Bharat Nirman started w.e.f 2005-06. In order to achieve the targets, Ministry has decided to include more projects under AIBP by relaxing the eligibility criteria and simplifying the procedure.

The Union Cabinet in its meeting held on 16<sup>th</sup> November, 2006 considered the following proposal of this Ministry and accorded approval:

(i) All the approved projects in (a) drought-prone areas, (b) tribal areas, (c) States with lower irrigation development as compared to National average and (d) districts identified under PM's package for agrarian distress should be provided support under AIBP in relaxation to 1:1 criteria. For other projects, 1:1 criteria i.e., taking up of another project in the State after completion of one ongoing project will remain applicable.

(ii) The sanctioned grants to be released in two installments, the first based on projected outlay and the second after confirmation of expenditure. The grant component amounting to 90% of the total grant sanctioned will be released immediately and the balance 10% of the grant when 70% of the agreed expenditure is incurred.

(iii) Removing distinction of Fast Track Projects, Reforming and Non-Reforming States and release of grant of 25% of Project Cost for all irrigation projects in Non-Special Category States and 90% for Special Category States.

(iv) It is proposed that the stipulation of 100 hectares in respect of surface water minor irrigation schemes predominantly benefiting backward regions be brought down to 50 hectares. The stipulation of 10% beneficiary contribution in cost for post construction maintenance for Surface Water Minor Irrigation Schemes benefiting backward regions in non-Special Category States is also proposed to be done away with.

### ***Minor Irrigation Projects***

To accelerate minor irrigation development in special category states of North-Eastern regions and other Hilly states namely, Himanchal Pradesh, Sikkim, J&K, Uttarakhand and KBK districts of Orissa, central assistance is being given under AIBP. From 1.4.2005 onwards, this assistance has been further extended to include non-special category states also for development of surface water minor irrigation schemes with potential of more than 100 ha with preference to Tribal areas and drought prone areas which wholly benefit Dalits and Adivasis. From December, 2006 the Surface Minor Schemes having potential of more than 50 ha have also been included under AIBP. Since inception of AIBP for minor irrigation projects, a total of 5825 schemes with a combined total estimate cost of Rs. 1451.4804 crores have been taken up in the special category states, of which 4189 have been completed upto 31.12.2006. Total central assistance of Rs. 688.6584 crore has been released to different states till December, 2006. State Governments have reported that an irrigation potential of 1.68 lakh ha has been created upto 31.3.2006. For Non-special category states, grant of Rs. 34.515 crore has been released for taking up 88 new MI schemes in 2006-07 till December, 2006.

### ***BHARAT NIRMAN: Irrigation Sector***

The ultimate irrigation potential for the country has been estimated as 139.88 million hectares (Mha) which include potential through major & medium irrigation projects (58.46 Mha), surface water based minor irrigation schemes

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(17.42 Mha) and ground water development (64.00 Mha). So far, the irrigation potential of about 100.97 Mha has already been created up to March 2006.

Irrigation is one of the six components for development of rural infrastructure under Bharat Nirman. The irrigation component of Bharat Nirman aims at creation of irrigation potential

of 10 million hectare (Mha) in next four years i.e., from 2005-06 to 2008-09.

Strategy for achieving target under Bharat Nirman includes the development of irrigation potential through completion of on-going projects along with restoration of potential which has gone in disuse or could not be utilised.



*The Hon'ble Minister of Water Resources Prof. Saifuddin Soz addressing the 7<sup>th</sup> Editor's conference on Social Sector Issues alongwith Smt Gauri Chatterji, Secretary (Water Resources)*



Table-I

## Statewise details of CLA/grant released under AIBP (As on 31.12.2006)

State	Amount														Grand Total
	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05			2005-06	2006-07		
									Loan	Grant	Total		Grant	Grant	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
Andhra Pradesh	35.2500	74.0000	79.6700	65.0150	95.0200	281.6600	33.1860	205.5300	61.2829	26.2641	87.5470	311.3815	139.3140	1407.5735	
Arunachal Pradesh	0.0000	0.0000	0.0000	7.5000	7.5000	15.0000	1.5000	20.0000	1.0000	9.0000	10.0000	18.0000		79.5000	
Assam	5.2300	12.4000	13.9500	14.5400	24.0770	14.5210	16.2738	19.2015	1.6930	15.2370	16.9300	34.9332	14.6700	186.7265	
Bihar	13.5000	5.1500	36.1850	129.6950	151.7750	3.4200	14.4805	74.6440	26.0805	11.1645	37.2150	16.2380		482.3025	
Chhattisgarh	0.0000	4.5000	9.5000	10.5200	13.9300	48.2000	104.0000	74.6300	2.0475	0.8775	2.9250	7.6645	7.5150	283.3845	
Goa	0.0000	5.2500	0.0000	3.5000	61.6500	58.0000	0.0000	2.0000	0.4550	0.1950	0.6500			131.0500	
Gujarat	74.7730	196.9000	423.8200	272.7000	421.8500	581.6900	1000.3300	650.3590	484.7500	45.7500	530.5000	339.6000		4492.5220	
Haryana	32.5000	12.0000	0.0000	0.0000	0.0000	0.0000	18.0000	7.7350	7.7945	3.3405	11.1350	6.0000		87.3700	
Himachal Pradesh	0.0000	6.5000	5.0000	11.0470	18.0150	3.2440	8.1500	14.6920	0.3690	3.3210	3.6900	30.0785		100.4165	
Jammu & Kashmir	1.3000	0.0000	0.0000	4.6800	10.4600	11.0700	34.9990	21.5450	1.2744	11.4701	12.7445	36.6878	12.3646	145.8509	
Jharkhand	0.0000	8.8900	11.6400	14.3450	5.7150	10.8200	9.6700	1.8330	14.8995	6.3855	21.2850	5.0370		89.2350	
Karnataka	61.2500	90.5000	94.5000	157.1400	171.0000	492.5000	620.8500	266.4780	314.7921	81.5031	396.2952	140.7759		2491.2891	
Kerala	3.7500	15.0000	0.0000	0.0000	22.4000	11.2750	5.6650	31.0000	34.6080	14.8320	49.4400	9.3591		147.8891	
Madhya Pradesh	63.2500	110.0000	81.2500	95.3250	151.3280	215.4100	220.0000	568.4400	361.6907	155.0103	516.7010	168.0966		2189.8006	
Maharashtra	14.0000	55.0000	50.8600	49.8750	97.0200	39.1000	133.1341	164.3950	370.5002	158.7858	529.2860	167.3822		1300.0523	
Manipur	4.3000	26.0000	10.7800	21.8100	1.5000	9.3600	19.5000	15.5000	1.3000	11.7000	13.0000	75.7035	33.4800	230.9335	
Meghalaya	0.0000	0.0000	0.0000	2.6938	5.5120	4.4700	1.5000	1.0880	0.1744	1.5694	1.7438	1.5750		18.5826	
Mizoram	0.0000	0.0000	0.0000	1.4330	1.4330	2.0000	0.7500	9.3000	0.5000	4.5000	5.0000	9.3150	9.0000	38.2310	
Nagaland	0.0000	0.0000	0.0000	2.7300	5.0000	5.0000	2.6590	8.0000	0.4000	3.6000	4.0000	7.9987	10.0095	45.3972	
Orissa	48.4500	85.0000	71.5000	90.2500	100.3200	168.4750	179.5700	154.6850	16.9561	7.2669	24.2230	151.3742		1073.8472	
Punjab	67.5000	100.0000	0.0000	42.0000	55.6200	113.6900	36.6600	0.0000				26.3166		441.7866	
Rajasthan	2.6750	42.0000	140.0500	106.6650	78.4670	96.3150	174.3850	499.8370	247.0328	105.8712	352.9040	90.2952		1583.5932	
Sikkim	0.0000	0.0000	0.0000	1.3600	0.0000	2.4000	0.7500	0.7500	0.0750	0.6750	0.7500	0.9113	1.4244	8.3457	
Tripura	3.7730	5.1000	3.9750	34.6530	13.8830	21.0630	13.3947	13.3769	1.1000	9.9000	11.0000	31.9950	6.6785	158.8921	
Tamil Nadu	20.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						20.0000	
Uttar Pradesh	43.5000	78.0000	76.5000	286.0000	315.9000	354.6900	359.0000	274.7850	123.1440	52.7760	175.9200	133.1280	70.8054	2168.2284	
Uttaranchal	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	25.1625	25.5525	3.8992	35.0925	38.9917	80.4387	25.3125	195.4579	
West Bengal	5.0000	20.0000	10.0000	25.0000	26.8250	38.6080	28.1330	3.1440	9.4227	4.0383	13.4610	0.0287	6.0000	176.1997	
Total	500.0010	952.1900	1119.1800	1450.4768	1856.2000	2601.9810	3061.7026	3128.5009	2087.2115	780.1257	2867.3372	1900.3142	336.5739	19774.4576	



**Table-II****Statewise details of Major/Medium Projects completed under AIBP**

<b>S.No.</b>	<b>Project (Started in Plan)</b>	<b>Entry</b>	<b>Completion</b>
<b>(1)</b>	<b>(2)</b>	<b>(4)</b>	<b>(5)</b>
1.	<b><u>Andhra Pradesh</u></b>	Cheyyeru (Annamaya) (v)	2002-03
2.		Nagarjunsagar	2003-04
3.		Sriram Sagar St.I	2005-06
4.		Madduvalasa	2005-06
5.	<b><u>Assam</u></b>	Rupahi	2005-06
6.		Bordikarai (V)	2001-02
7.	<b><u>Bihar</u></b>	Bilasi Reservoir (v)	1997-98
8.	<b><u>Chhattisgarh</u></b>	Shivnath Diversion (v)	1997-98
9.	<b><u>Haryana</u></b>	Gurgaon Canal (III)	2000-01
10.	<b><u>Jharkhand</u></b>	Latratu (VII)	1996-97
11.		Tapkara Res. (VI)	1997-98
12.	<b><u>Gujarat</u></b>	Umaria (V)	1997-98
13.		Deo (V)	1996-97
14.		Harnav-II (IV)	1997-98
15.		Jhuj (A.P. 1978-80)	1996-97
16.		Sipu (A.P. 1978-80)	1999-00
17.		Damanganga (IV)	1996-97
18.		Karjan (V)	1997-98
19.		Sukhi (V)	1999-00
20.		Watrak (A.P. 1978-80)	1997-98
21.	<b><u>Karnataka</u></b>	Maskinala	1997-98
22.	<b><u>Kerala</u></b>	Kallada	2002-03
23.	<b><u>Madhya Pradesh</u></b>	Upper Weinganga (V)	1996-97
24.		Urmil (V)	2002-03
25.		Banjar (V)	2002-03
26.	<b><u>Maharashtra</u></b>	Kadvi	2000-01
27.		Khadakwasla (II)	2002-03
28.		Kasari	2004-05
29.		Upper Tapi	2004-05
30.		Wan	2005-06
31.		Jayakwadi St-II	2004-05
32.		Kasar sai	2004-05
33.		Jawalgaon	2004-05
34.		Vishnupuri	2004-05
35.	<b><u>Orissa</u></b>	Upper Kolab	2000-01
36.		Potteru	2005-06
37.		Sason Canal	2004-05
38.		Salki	2004-05
39.	<b><u>Rajasthan</u></b>	Jaisaand (VI)	2003-04
40.		Gambhiri (VI)	2004-05
41.		Chhapi	2000-01
42.		Panchana	1996-97
43.	<b><u>Punjab</u></b>	Ranjit Sagar Dam (VI)	1998-99
44.	<b><u>Uttar Pradesh</u></b>	Rajghat Dam (V)	2000-01
45.		Gunta Nala Dam (VI)	2002-03
46.		Sarda Sahayak (III)	2004-05
47.		Gyanpur Pump Canal (VII)	2005-06
48.		Madhya Ganga & Upper Ganga Mod. (V)	2000-01
49.		Providing Kharif Channel in Hindon	2001-02
		Krishni Deob	2003-04
50.	<b><u>West Bengal</u></b>	Kangsabati (II)	1996-97

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## **NATIONAL WATER DEVELOPMENT AGENCY**

### **Introduction**

National Water Development Agency (NWDA) was established in July, 1982 as a registered Society under the Societies Registration Act, 1860 under the Ministry of Water Resources to study the feasibility of the Peninsular Component of National Perspective Plan. The NWDA is fully funded by Government of India through Grants-in-aid. Subsequently in 1990-91, NWDA Society resolved to take up the studies of Himalayan Component also.

The Agency functions with the following main objectives:

- (a) To carry out detailed surveys and investigations of possible reservoir sites and inter-connecting links in order to establish feasibility of the proposal of Peninsular Rivers Development and Himalayan Rivers Development Components forming part of the National Perspective for Water Resources Development prepared by the then Ministry of Irrigation (now Ministry of Water Resources) and Central Water Commission.
- (b) To carry out detailed surveys about the quantum of water in various Peninsular River systems and Himalayan River systems which can be transferred to other basins/States after meeting the reasonable needs of the basin/States in the foreseeable future.
- (c) To prepare feasibility report of the various components of the scheme relating to Peninsular Rivers development and Himalayan Rivers development.
- (d) To prepare detailed project report of river link proposals under National Perspective Plan for Water Resources Development after concurrence of the concerned States.
- (e) To prepare pre – feasibility / feasibility reports of the intra – state links as may be proposed by the States.

- (f) To do all such other things the Society may consider necessary, incidental, supplementary or conducive to the attainment of above objectives.

### **Organisational Setup**

The NWDA is headed by the Director General of the rank of Additional Secretary to Govt. of India. He is the Principal Executive Officer of the Society, responsible for the proper administration of the affairs and funds of the Society assisted by Chief Engineer(HQ) and Directors and is also responsible for coordination and general supervision of the activities of the Society. The Headquarters of the Agency is at New Delhi. NWDA has 2 field organisations each headed by a Chief Engineer, 5 Circles each headed by a Superintending Engineer, 15 Divisions each headed by an Executive Engineer and 10 Sub-Divisions each headed by an Assistant Executive Engineer/Assistant Engineer.

NWDA has completed water balance studies of 137 basins/sub-basins, water balance studies at 68 diversion points. Topo sheet and storage capacity studies of 74 identified reservoirs, topo sheet studies of 36 water transfer links including identification of command area enroute, preparation of prefeasibility studies of 31 link projects, identification of 30 links for preparation of feasibility report, 16 link projects under Peninsular and Himalayan Rivers Development Components of National Perspective Plan.

## **MAJOR ACTIVITIES**

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

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

### **Peninsular Rivers Development Component**

Under the Peninsular Component, National Water

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

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

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

Under the Himalayan Rivers Development Component, NWDA has completed water balance studies at all the 19 diversion points, toposheet studies of 16 storage reservoirs & 19 water transfer links and pre-feasibility report of 14 links. Based on these studies, NWDA has identified 14 water transfer links under Himalayan Component for Surveys and Investigations and preparation of Feasibility Reports.

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

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

National Water Development Agency has identified the States which are to be benefited

from the inter-basin water transfer links and assessed the annual irrigation benefits likely to accrue to the concerned States from these link schemes. While the Himalayan Component of the inter-basin water transfer proposal will benefit directly Uttar Pradesh, Uttaranchal, Haryana, Rajasthan, Gujarat, Assam, West Bengal, Bihar, Jharkhand and Orissa and enrich the peninsular component from the surplus waters of Brahmaputra, the Peninsular Component will benefit Andhra Pradesh, Orissa, Karnataka, Tamil Nadu, Kerala, Pondicherry, Madhya Pradesh, Rajasthan, Maharashtra & Gujarat.

### ***National Common Minimum Programme***

The National Common Minimum Programme (NCMP) of the Government envisages that the UPA Govt. will make a comprehensive assessment of the feasibility of linking the rivers of the country starting with the South bound rivers. This assessment will be done in a fully consultative manner. It will also explore the feasibility of linking sub-basins of rivers in States like Bihar. An assessment of Interlinking of Rivers (ILR) programme has been carried out at the level of Secretary (WR) through detailed discussions and interaction with various Stakeholders, officers of Ministry of Water Resources and other Central deptts. and State Govts. A power point presentation was made before the Hon'ble Prime Minister on 11th October, 2004. After above presentation and comprehensive assessment of the feasibility of linking the rivers in the country, a number of important decisions were taken. The follow up action on these decisions such as creation of Special Cell on ILR, Constitution of Committee of Environmentalists, Social Scientists and other Experts on ILR, identification of priority links, placing the information on the public domain etc. have already been accomplished.

### ***Other Initiatives***

#### ***(a) Preparation of Detailed Project Report of Ken-Betwa link project***

After signing a tripartite Memorandum of Understanding (MoU) by the Union Minister

of Water Resources, Chief Minister of Madhya Pradesh & Uttar Pradesh on 25<sup>th</sup> August 2005 for preparation of Detailed Project Report (DPR) of Ken-Betwa link by Central Government, the Ministry of Water Resources has decided that the preparation of Detailed Project Report (DPR) of Ken-Betwa link project will be done by NWDA with active support and guidance of Central Water Commission. Accordingly, the survey & investigation works for preparation of DPR of this link project have been started by NWDA in January, 2006. An EFC memo for preparation of DPR of this link project was prepared and submitted to MOWR for approval. The Ministry of Water Resources has constituted a Committee headed by Chairman, CWC in February, 2006 to monitor and supervise the overall preparation of DPR of this link project. The Terms of Reference (ToR) of this Committee are to suggest the manner of execution of works related to DPR, to review the specifications to be adopted for field work and also to assist in resolving the interstate issues that may arise during preparation of DPR.

A Steering Committee under the Chairmanship of Secretary (WR) has also been constituted by MoWR in June, 2006 to review the progress for preparation of DPR works of Ken-Betwa link.

Two meetings of the Monitoring Committee were held on 27<sup>th</sup> March, 2006 & 1<sup>st</sup> August, 2006. As decided in the 1<sup>st</sup> meeting, two Committees, one for Hydrological studies under CE(HQ), NWDA and the other for Socio-economic & Environmental studies under CE (EMO), CWC have been constituted in May, 2006 to prepare TOR for the respective studies, to recommend suitable agency for award of the studies and to monitor & review the studies of DPR of Ken-Betwa link. The Hydrology Committee has held four meetings where as the Committee on Socio-economic & EIA studies has held six meetings.

**(b) Consensus Group headed by Chairman, CWC**

The object of the Consensus Group headed by

Chairman, CWC is to discuss & expedite the process of arriving at consensus amongst the States regarding sharing of surplus water in river basins/sub-basins and quantum of surplus water to be transferred from surplus basins to deficit basins/areas as per the proposals of interbasin water transfer of NWDA and helping the States. The Consensus Group held its 7<sup>th</sup> meeting on 12.5.2006 to sort out the issues involved in the link projects of Par-Tapi-Narmada and Damanganga-Pinjal. The necessary secretarial assistance was provided by NWDA.

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

As a follow up action on comprehensive assessment of Interlinking of Rivers, the Ministry of Water Resources had constituted a Committee of Environmentalists, Social Scientists and other Experts in December, 2004 under the Chairmanship of Secretary, MoWR to make the process of proceeding on Interlinking of Rivers fully consultative. The Committee held its 3<sup>rd</sup> meeting on 4<sup>th</sup> Sept., 2006 during which, the Committee was apprised with the updated status of the various statutory clearances required from MoEF for carrying out survey and investigation works for preparation of DPR of Ken-Betwa link.

**(d) Intrastate links**

Two meetings of officers of Govt. of Bihar and NWDA were held to discuss possibility of Intra State links in Bihar. It has been agreed to prepare Project Feasibility Reports (PFRs) of 6 such links. For firming up the 15 Intra State links as proposed by Govt. of Maharashtra, NWDA is holding discussions with Govt. of Maharashtra. Vamsadhara-Rushikulya link proposal of Govt. of Orissa has been examined and a request made to furnish details of water availability, levels etc. Govt. of Jharkhand has proposed for transfer of surplus water from South Koel basin to Kharkai basin.

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## CHAPTER 2

# COMMAND AREA DEVELOPMENT AND WATER MANAGEMENT

### **Objective**

The Centrally sponsored Command Area Development (CAD) Programme was launched in 1974-75 with the objective of bridging the gap between irrigation potential created and that utilized through efficient utilization of created irrigation potential and optimizing agricultural production from irrigated lands on a sustainable basis. The programme envisages integration of all activities relating to irrigated agriculture in a coordinated manner with multidisciplinary team under an Area Development Authority.

### **Coverage**

Initially 60 major and medium irrigation projects were taken up under the CAD Programme, covering a Culturable Command Area (CCA) of about 15 million hectare. From 1974-75 till now 314 projects with a CCA of 28.65 Million ha have been included under the programme. After inclusion of new projects, deletion of completed projects and clubbing of some projects, there are now 136 projects under implementation.

### **Programme Components**

In view of the recommendations of the Working Groups of the Planning Commission for X Plan and meetings with State Secretaries, Administrators of CADAs in States, the CAD Programme was restructured and renamed as

Command Area Development & Water Management (CADWM) Programme, with effect from 1.4.2004. The components of the CADWM Programme are as follows:

- a) Survey, planning and designing of On-Farm Developments (OFD) works;
- b) Construction of field channels with a minimum 10% beneficiary contribution;
- c) Full package OFD works including construction of field channels, realignment of field boundaries, land leveling and shaping (also with a minimum 10% beneficiary contribution);
- d) Construction of field drains, intermediate and link drains for letting out surplus water;
- e) Correction of system deficiencies above the outlet upto distributaries of 150 Cusec capacity;
- f) Renovation and desilting of existing irrigation tanks including the irrigation system and control structures within the designated irrigation commands with a minimum 10% beneficiary contribution as maintenance fund, the interest from which has to be used for maintenance in future;
- g) Reclamation of waterlogged areas (with a minimum 10% beneficiary contribution) including use of location specific bio-drainage techniques to supplement conventional techniques for reclamation of



waterlogged area;

- h) Warabandi;
- i) Trainings/ adaptive trials/ demonstrations through Water and Land Management Institutes (WALMI) and other institutions and monitoring & evaluation of the programme with 75% funding from Government of India;
- j) Institutional support to Water Users' Associations;
- k) Establishment cost – 20 % of OFD works and
- l) R & D Activities.

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

- i) Central assistance to States has been linked to enactment of PIM legislation. Till this is done, alternative arrangements have to be in place for formation and empowerment of Water Users' Associations (WUAs);
- ii) WUAs have to be in position before Project Components are taken up so that beneficiaries are involved in the implementing of Programme activities, since inception;
- iii) A minimum 10% beneficiary contribution has been made mandatory in the construction of field channels, reclamation of waterlogged areas and renovation of Minor Irrigation Tanks to ensure increased beneficiary participation and thereby improve the quality of works;

Central assistance for correction of system deficiencies upto distributaries of 150 Cusec capacity has been linked to formation of Distributaries Committees and handing over of the distributaries to such Committees for maintenance in future.

### ***Programme Implementation***

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

### ***Financing Pattern***

The funding pattern for all the Programme components is 50:50 on sharing basis between Centre and State/farmers for all the components except for State sponsored software components such as trainings of farmers and field functionaries & officials, adaptive trials & demonstrations, action research for Participatory Irrigation Management, seminars/ conferences/ workshops, monitoring & evaluation of the programme etc. for which the funding pattern is 75:25 basis between the Centre and States. The funding pattern for national level training courses for Senior level officers and Monitoring & Evaluation of the Programme sponsored by Central Government is 100%.

### ***Revised Targets Under The Restructured Command Area Development and Water Management Programme***

The total outlay for the restructured programme for the last year of Tenth Plan is Rs. 204.30 crores. The details of physical targets for the



period 2004-07 as per Xth Plan estimate are as under :-

<b>(Million Hectares)</b>		
<b>Sl No.</b>	<b>Achievement</b>	<b>Target(as per X Plan estimate)</b>
1.	Field channel/full package OFD works	0.68
2.	Field Drains/intermediate drains/link drains	0.10
3.	Warabandi	0.68*
4.	Reclamation of waterlogged areas	0.05
5.	Correction of system deficiency up to design discharge of 150 cusecs	1.00
6.	Renovation of Tanks	0.18

\*No central assistance to be provided from 2004 onwards

However, the State Governments fixed their own targets according to availability of funds and other factors.

### **Financial Achievements**

An amount of Rs. 3193.26 crores has been released to States as Central Assistance under the CAD Programme upto 10<sup>th</sup> January, 2007 since its inception. During the year 2005-

2006, an amount of Rs.199.89 crores was released to States. An outlay of Rs. 204.30 crores has been provided under the Central Sector for implementation of the Programme during 2006-2007 and an amount of Rs.131.18 crore has been released to the States, till 10.1.2007. Total release made under CAD/CADWM Programme is given in the Table below:

<b>(Rs.in crore)</b>				
<b>Plan</b>	<b>Year</b>	<b>Approved Outlay</b>	<b>Release</b>	<b>% of releases</b>
IX Plan	1997-2002	854.77	764.27	89.41
X Plan	2002-2003	202	152.16	75.32
	2003-2004	202	144.02	71.29
	2004-2005	181.5	142.44	78.48
	2005-2006	200	199.89	100
	2006-2007	.3	131.18*	64.21

\*Released upto 10.1.2007

### **Physical Achievements**

The core components of physical works are construction of field channels and field drains and implementation of warabandi (rotational water supply). The cumulative progress of works on these respective components upto the end

of IX Plan is 15.75 M.ha, 1.124 M. ha. and 10.18 M. ha. The physical targets and achievements in respect of the core components of works during the IX Plan, progress up to March 2006 and targets and achievements during 2006-07 are given in the table below:

<b>( in Million hectare)</b>							
<b>Item of work</b>	<b>Progress during IX Plan</b>	<b>Progress during 2002-03</b>	<b>Progress during 2003-2004</b>	<b>Progress during 2004-2005</b>	<b>Progress during 2005-2006</b>	<b>Progress during 2006-07</b>	
						<b>Target*</b>	<b>Achievement**</b>
Field Channels	1.802	0.471	0.454	0.375	0.371	0.23	0.095
Warabandi	1.538	0.340	0.342	0.172	0.075	0.23	0.02
Field Drains	0.351	0.139	0.122	0.155	0.061	0.03	0.039

\* As per X Plan Estimate \*\* Till September, 2006 (Provisional)

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No progress could be achieved in the case of components on correction of system deficiencies and renovation of MI tanks due to following reasons.

### ***Correction of System Deficiencies***

This component was included under the restructured CADWM Programme with the objective of improving supply of irrigation water at the outlet head. However the progress under this component did not pick up as the irrigation systems are under the command and control of irrigation departments and the CADAs could not mobilise them to prepare the proposals on correction of system deficiencies. Also, it has been realized that correction of system deficiencies merely up to the distributaries will not be much help in improving the water supply unless the system deficiencies of the entire irrigation network from the main canal down to the minors are taken care of.

### ***Renovation of Minor Irrigation Tanks***

This component was included under the restructured CADWM Programme with the view to augment water supplies in the command by integrating the renovated MI tanks with the main irrigation system. The Ministry of Water Resources also launched a separate scheme on restoration of Water bodies with 75:25 funding pattern between the centre and the state as against the funding pattern of 50:50 under the CADWM Programme. The financing pattern under that scheme being more attractive, the State Governments preferred to avail of central assistance under the scheme of restoration of water bodies.

### ***Training Programmes***

The Central Government provides financial assistance of 75% to the State Government for training of functionaries and farmers on various aspects of the CADWM Programme. This includes various aspects of efficient water management technologies and agriculture

practices, methods of survey and reclamation of waterlogged areas, participatory irrigation management etc. The training programmes are meant for officials of the State Government as well as the farmers. The national level training Programmes for senior/middle level officers are sponsored and fully financed by the Ministry and are organized through various State/central Agencies. The senior level officers are trained on aspects of policy planning and preparation of action plans, while middle and junior level officers are trained on technical, procedural and implementation aspects. Farmers, on the other hand, are educated about agricultural development and efficient management of water for irrigation. They are also motivated and made aware about the benefits of Participatory Irrigation Management (PIM). During the year 2006-07, 27 national level training courses are planned to be organized by the Ministry through various institutions.

### ***Reclamation of Water Logged Areas***

Although development of irrigation has increased agriculture production, it has also caused adverse effect in the form of water logging and associated problem of soil salinity/alkalinity in many irrigation commands. The problem of water logging can be mitigated to a large extent by efficient water management and by adopting suitable preventive measures. However, in spite of best efforts, the problem of water logging has surfaced in many irrigation commands and thus it is essential to reclaim such areas so as to have optimum agricultural production from them. The Ministry of Water Resources, Govt. of India introduced a component of Reclamation of Water Logged Areas under the Centrally Sponsored Command Area Development Programme w.e.f. 1<sup>st</sup> April, 1996. So far 446 schemes of nine States namely Bihar, Gujarat, Madhya Pradesh, Jammu & Kashmir, Karnataka, Kerala, Maharashtra, Orissa and Uttar Pradesh have been approved at an estimated cost of Rs. 45.35 crores for reclamation of 57,764 ha of water logged area.

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Out of this, an area of 46,466 ha has been reported to be reclaimed by these States upto March'05.

### ***Participatory Irrigation Management (PIM)***

The National Water Policy 2002 stresses participatory approach in water resources management. It has been recognized that participation of beneficiaries will help greatly for the optimal upkeep of irrigation system and effective utilization of irrigation water. The participation of farmers in the management of irrigation would include transfer of responsibility for operation & maintenance and also collection of water charges to the Water Users' Association in their respective jurisdiction. One time functional grant @ Rs.600/- per ha to be shared by the Centre, State and farmers @ Rs.270 : 270 : 60 respectively is being paid to outlet level Water Users' Association as incentive, the interest from which is to be used for maintenance.

As a result of various conferences/ seminars organized by the Ministry, there has been an increased consciousness in States about the need for actively involving farmers in

management of irrigation systems. Accordingly 11 States of Andhra Pradesh, Assam, Bihar, Goa, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu and Kerala have either enacted exclusive legislation or amended their Irrigation Acts for involvement of farmers in irrigation management. Gujarat had experimented with the idea of farmers' co-operative movement in irrigation management and is in the process of enacting act for Participatory Irrigation Management (PIM). Other States are also taking steps in this direction. So far, 61022 Water User's Associations have been formed in various States covering an area of 12.548 M. ha under various commands of irrigation projects.

Under the restructured 'Command Area Development & Water Management (CADWM)' Programme more emphasis is being given to participatory approach. Under this programme, payment of central assistance to States is linked with the formation of Water Users' Associations. Apart from this, farmers will have to contribute 10% cost of the works in form of cash/labour in the construction of field channels/ full package OFD, water logging, desilting and renovation of tanks etc.

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## **CHAPTER 3**

# **GROUND WATER AND MINOR IRRIGATION**

### **CENTRAL GROUND WATER BOARD**

#### **Organisation**

The Central Ground Water Board is entrusted with the responsibilities of scientific surveys, investigations, exploration, monitoring, assessment, augmentation and regulation of ground water resources of the country. The data generated provide a scientific base for user agencies. Besides advising states and other user agencies on planning and management of ground water schemes, the Board is also taking up special studies on R&D, Artificial Recharge, Conjunctive use of Surface & Ground Water, Water balance and geogenic contamination, etc.

The Central Ground Water Board is headed by the Chairman and has four main wings namely 1) Exploratory Drilling & Materials Management 2) Sustainable Management & Liaison 3) Survey, Assessment & Monitoring and 4) Training and Technology Transfer Each wing is headed by a Member. One of the Members is designated as Commissioner (GW) at MOWR. The Board has 18 Regional Offices, each headed by a Regional Director with 17 supporting Engineering Divisions and 10 state unit offices for undertaking various field activities in the country. Central Ground Water Authority (CGWA) has been entrusted with regulation and control of ground water development and management under the Environment (Protection) Act, 1986.

### **Achievements**

#### **Ground Water Management Studies**

These studies are carried out to evaluate the impact of various developmental activities like withdrawal of ground water, urbanization and introduction of surface irrigation scheme on local ground water regime. The study comprises of ground water survey, Key well monitoring, Aquifer Parameter determination, and collection of statistical data pertaining to irrigational structure, land use, hydrology and hydrometeorology. The Board lays special emphasis to this study in Tribal areas, drought area and problematic areas with high stage of ground water development, water logged areas and those having problems of water quality through geogenic sources. During 2006-2007 upto Nov'06, an area of 1.88 Lakh sq. km was covered under pre-monsoon against the target of 1.83 Lakh sq. km. Post-monsoon studies are in progress and an area of 49944 sq. km has been covered.

The entire data generated during these studies will be analysed & accordingly the future scenario for development of ground water will be visualized in order to plan ground water development & management in the area.

#### **Ground Water Exploration**

The Ground Water Exploration is being carried out to study the sub-surface hydrogeological setup and evaluate various aquifer parameters of the different aquifer systems. The entire



*Combination rig in operation in Kalka area of Panchkula District, Haryana*



*Rain Water Harvesting structure in the complex of Bhujal Bhawan, Chandigarh*



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exercise is aimed at quantitative & qualitative evaluation of ground water in the area. It is being carried out by the Board with a fleet of 86 drilling rigs (32 Direct Rotary, 41 Down the Hole and 13 Percussion Combination types). During the year 420 wells (EW-267, OW-93, PZ-59, SH-01) have been constructed up to 1<sup>st</sup> December, 2006 against a target of 811 wells.

The exploratory wells have also been constructed in the Arsenic affected areas in Bihar, U.P & West Bengal. Exploration has also been done in fluoride infested area of Madhya Pradesh and fluoride free zone has been delineated.

High yielding wells with discharge range 9000 lph to 60000 lph have been found in the states of Andhra Pradesh, Chhattisgarh, Karnataka, Kerala, Maharashtra, Orissa, Rajasthan and Tamil Nadu. These studies will help in identifying ground water sources and help in guiding the states to adopt follow up action with regard to ground water development for drinking water supply and other requirements.

### ***Monitoring of Ground Water Regime***

The Board is monitoring the ground water levels in the country four times a year (Jan/May/Aug/Nov) through a network of 15513 Ground Water Monitoring Wells. The ground water samples collected during the pre-monsoon monitoring are analysed for the purpose of ascertaining the changes in chemical quality of ground water. Monitoring of May, August, and November 2006 is completed in all the offices and respective reports have been submitted indicating the fluctuation in water levels compared to monitoring of previous year, decadal average and pre-monsoon monitoring. The water level data so far generated by these ground water monitoring wells are analyzed to ascertain seasonal and long term water level changes in ground water regime.

### ***Geophysical Studies***

The Board undertakes geophysical studies as an integral part of its activities to support and supplement ground water management studies, ground water exploration and short-term water supply investigations to demarcate bedrock configuration and thickness of overburden and saline -fresh water interface etc. During 2006-2007( up to Nov'06), 762 Vertical Electrical Sounding, 24.2 line kilometer resistivity profiling and 72 bore hole logging have been conducted in the various parts of the Country.

### ***Water Quality Analysis***

There are 15 well equipped Regional Chemical Laboratories to carry out chemical analysis of water samples collected during various studies. All the Laboratories are equipped with Atomic Absorption Spectrophotometer to carry out the analysis of toxic elements and heavy metals. Four chemical laboratories are also equipped with Gas Chromatograph (GC) to take up the analysis of organic pollutants (Pesticides etc). Thirteen laboratories are equipped to carry out bacteriological analysis. 11,964 samples have been analyzed during the year up to Nov'06. Out of which 10003 samples are analysed for basic constituents and 1759 samples have been analyzed for heavy metals such as Cu, Zn, Fe, Mn, CO, Cd, Cr, Ni, Pb etc. 91 samples for organic constituents and 111 samples for specific analysis have been analysed.

### ***Short Term Water Supply Investigations***

Central Ground Water Board assists various user organizations in the country to solve their immediate water supply problems by selecting sites and areas for developing ground water supplies. In this effort, it also extends the benefit of its expertise in the estimation of quantum of water supply against the projected demands. It helps defense establishments on priority basis, in the selection of sites for tubewells and solving related water problems. Besides, it is assisting



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Defence, Urban, Railways, Industrial Establishments and other Government Organizations in locating water supply sources and industrial water supplies. During 2006-2007 up to Nov'06, 160 investigations have been carried out.

### ***Reports and Hydrogeological Maps***

Results of investigations carried out by Central Ground Water Board are suitably documented in the form of reports and maps which are categorized under four main heads viz. survey reports, district reports, state reports, basic data reports and maps. 13 Ground Water Year Books have been completed during 2006-2007 up to Nov'06. 40 District Ground Water Resources Development & Management Reports, 40 Hydrogeological Maps, 10 Ground Water Year Books and 6 State Reports are under different stage of completion.

### ***Technical Examination of Major and Medium Irrigation Schemes***

As per the directives of the Planning Commission, the Board is scrutinizing the major and medium irrigation project reports/proposals sent by the State Governments / Central Water Commission / National Water Development Agency / Command Area Development & Water Management Wing of the Ministry of Agriculture from the point of view of their impact on ground water regime and specific recommendations are being made to protect quality and quantity of ground water. During the year 2006-2007 up to Nov'06, thirteen major irrigation projects of CWC, four irrigation projects of CADWM and one link project of NWDA were examined and area specific recommendations were made.

### ***Artificial Recharge of Ground Water Advisory Council***

Government of India constituted the "Artificial Recharge of Ground Water Advisory Council"

vide Ministry of Water Resources Resolution no. 18/6/2002-GW(Pt) dated 17<sup>th</sup> April 2006 under the Chairmanship of Hon'ble Minister of Water Resources, Govt. of India. The Council had its 1<sup>st</sup> meeting on 22.07.2006 at New Delhi which was inaugurated by Hon'ble Prime Minister of India. Central Ground Water Board has been instrumental in implementing the actions identified in the 1<sup>st</sup> meeting of the council.

The action for holding a National Congress on Ground Water, preparation of Area specific guidelines for Artificial Recharge and Rainwater Harvesting, Policy for water for Industries etc have been initiated under the Sub-groups as constituted by the Ministry of Water Resources.

### ***Basic Hydrogeological Research/ Special Studies***

During X<sup>th</sup> plan it was proposed by CGWB to take up Special Studies/ R&D Studies covering different areas like Urban Hydrogeology, mapping of water logged areas and feasibility studies for anti-water logging measures, Conjunctive Use Studies, Sea water ingress, Remote sensing studies, Mathematical Modeling studies, Isotopic Studies, Studies in Arsenic affected areas. etc. Stress has been given for evolving new methodologies during the studies for meaningful conclusions. During 2006-07, 18 Special studies have been undertaken out of which 1 study has been completed and 17 are under different stage of progress.

### ***Central Ground Water Authority (CGWA)***

Central Ground water Authority Constituted vide notification no. S.O. 38(E) dated 14.1.97 with mandate to regulate and control of ground water development and management in the country under Environment (Protection) Act, 1986. Activity wise achievements during the period of 1st April 2006 to 1st Dec 2006 are summarized below.

**a. Regulation of ground water development**

During the period, CGWA had notified additional 23 severely overexploited areas for regulation of groundwater development in the states Haryana, Madhya Pradesh, Punjab and Rajasthan. In addition to the above regulation of ground water development is already being done in 20 areas in the State of Andhra Pradesh, Punjab, Haryana, Gujarat, NCT of Delhi, Rajasthan, Uttar Pradesh, West Bengal, UT of Diu notified earlier.

In the notified areas of Andhra Pradesh, the regulation of ground water development is being undertaken by Andhra Pradesh Ground Water Authority. In the remaining notified areas, the regulatory measures are being enforced through the concerned District Collector/Deputy Commissioner of concern district.

**b. Registration of ground water structures**

In order to put more areas under regulation, 37 new over exploited areas of 22 districts in Andhra Pradesh, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Tamilnadu, Uttar Pradesh and UT of Pondicherry have been identified and notified for registration of ground water structures. The registration work in theses notified areas is to be undertaken by the respective state governments.

**c. Notification for taking suitable measures for Artificial Recharge and Rain Water Harvesting**

Total of 1065 Blocks/Mandals are notified with the directives to Chief Secretary for taking suitable measures for artificial recharge to ground water / Rainwater harvesting to augment ground water resources and save it from further depletion in the states as per Table below.

**Table 1 - Details of notified areas for taking suitable measures for Artificial Recharge and Rain Water Harvesting**

Sl. No	States/Union territories	Blocks/Mandal/Talukas	
		Critical	Over - exploited
1.	Andhra Pradesh	77	219
2.	Delhi	0	7
3.	Gujarat	12	31
4.	Haryana	11	55
5.	Karnataka	3	65
6.	Kerala	15	5
7.	Madhya Pradesh	5	24
8.	Maharashtra	1	7
9.	Punjab	5	103
10.	Rajasthan	50	140
11.	Tamil Nadu	33	142
12.	Uttar Pradesh	13	37
13.	Uttaranchal	0	2
14.	West Bengal	1	0
15.	Daman & DIU	0	1
16.	Pondicherry	0	1
	<b>Total</b>	<b>226</b>	<b>839</b>

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#### ***d. Regulation of ground water withdrawal by Industries***

In order to regulate the ground water development by the industries, a list of over exploited /critical areas have been circulated to statutory organizations like State Pollution Control Boards, Ministry of Environment and Forest etc., which refer new industries/projects to CGWA for permission prior to setting up of industries/projects. The proposals received are evaluated on case to case basis, based on site specific recommendations of Central Ground Water Board and are accorded ground water clearance. During the period thirty one (31) industries have been accorded permissions.

#### ***e. Registration of drilling agencies***

Registration of water well drilling agencies are being undertaken by CGWA to develop micro level data base on ground water development and to control indiscriminate drilling activity in the country. During the period 22 agencies were registered with CGWA.

#### ***f. Mass Awareness and Training programmes***

Details of Mass Awareness and training Programs conducted during the periods are given below:

- i. 8 Mass awareness programmes were organized in the States of Andhra Pradesh, Assam, Karnataka, Madhya Pradesh, Tamilnadu and West Bengal for ground water conservation, artificial recharge and ground water protection in which around 100 Persons in each programme representing Panchayats, National Government Organization, Voluntary Organization, local Govt. department, General Public and farmers etc have participated.
- ii. 11 Ground water management training programmes were organized in the States of Andhra Pradesh, Assam, Gujarat, Karnataka, Kerala, Madhya Pradesh, Tamilnadu and West Bengal for designing rain water harvesting structures for augmenting the water. During the

training around 25 persons from local Govt. Department, National Government Organization and Voluntary Organization in each program were trained.

- iii. Training course on Ground Water Management (Regulation and Control) was conducted by CGWA at Faridabad from 20th to 25th November 2006 for 16 officers of CGWB from various states under the aegis of Rajiv Gandhi National Ground Water Training and Research Institute.

#### ***Rajiv Gandhi National Ground Water Training and Research Institute***

Ten training courses including one special training course out of proposed 16 training programmes have been conducted successfully during 2006 - 2007 up to 1<sup>st</sup> December 2006 under Rajiv Gandhi National Ground Water Training and Research Institute. The details of training courses are given below :-

- i. A special training course on “Ground Water Management and Modeling” was completed in New Delhi. Five officers from Yemen and five officers of CGWB successfully completed the course.
- ii. A training course on “Management Principles and Practices” was completed in August, 2006.
- iii. A training course on “Material Management for Officers of Central Ground Water Board” was completed at Nagpur.
- iv. A training course on “Artificial Recharge Techniques in Different Hydrogeological Conditions” was conducted at Ansal Bhawan, New Delhi.
- v. “Administrative Training Course for staff of CGWB” was conducted during September, 2006 at Institute of Secretarial Training and Management (ISTM), New Delhi.
- vi. “Induction Level Training Course 2006 on hydrogeological Investigations, Development and Management of Ground Water Resources

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Techniques, Equipments and Practices” was completed at Bhopal.

vii. A Refresher Course for Chemist on “Analysis of Organic Constituents and Trace Elements in Ground Water” was completed in November 2006.

Total 182 trainees have been trained in the above training courses conducted at various places.

### ***Research & Development Schemes***

Central Ground Water Board under its R&D activities is assisting Ministry of Water Resources in the form of a sub-committee of Indian National Committee on Hydrology (INCOH), with a view to accelerate the development programme in ground water sector and giving due consideration to the increased need of taking up research in the field of ground water. This Committee examines the project proposals received by INCOH in the field of Ground Water for their suitability for funding by MoWR and also monitors the research schemes funded by INCOH.

### ***National Symposium Organized by CGWB and NIH***

12th National Symposium on Hydrology with focal theme on “Ground Water Governance: Ownership of Ground Water and its Pricing” has been organized jointly by CGWB and NIH during 14-15 November, 2006 at New Delhi. The symposium was inaugurated by Sh. Montek Singh Ahluwalia, Hon’ble Deputy Chairman Planning Commission of India and inaugural function was presided over by Hon’ble Minister of Water Resources Prof. Saif-ud-din Soz. Hon’ble Minister of State for Water Resources Sh Jai Prakash Narayan Yadav was guest of Honour. On this occasion proceedings of the Symposium and Watershed Atlas of India was released by Sh. Montek Singh Ahluwalia, Hon’ble Deputy Chairman Planning Commission of India and Hon,ble Minister of

Water Resources Prof. Saif-ud-din Soz in the presence of Secretary, Ministry of Water Resources respectively.

The symposium was attended by the Eminent Scientist, Planners, Administrators, Engineers as delegates from various Central and State Governments departments viz Ground Water, Irrigation, PHED, Water supply Agricultural, Rural Development, Planning Commission, NABARD, REC, IITs, NGRI etc., It was also attended by the representatives from NGOs and experts from the field of ground water.

The recommendations included scientific development of ground water resources and their assessment at macro and micro level; adoption of newer technologies and integrated ground water information system; R&D activities with more integrated, multi-disciplinary approach including ground water management models; emphasis on rain water harvesting and artificial recharge to ground water involving stakeholders participation; strengthening of database for resource planning; clear cut demarcation between ownership, regime of water rights and entitlements; establishing centers of excellence; redrafting of national water policy by including policy for ground water governance; and strengthening of ground water institutions in all the states etc.

### ***MINOR IRRIGATION***

Minor Irrigation schemes are those ground water and surface water schemes, which have a culturable command area upto 2000 ha. individually. Surface Water Minor Irrigation schemes are generally funded from the public sector outlay. The ultimate irrigation potential from minor irrigation schemes has been assessed as 81.43 Mha, of which the contribution from surface has been assessed to be 17.3 Mha. The irrigation capacity created in the minor irrigation sector (including groundwater schemes) covers about two third of the country’s total irrigation capacity.

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## **CHAPTER 4**

# **FLOOD MANAGEMENT**

### **FLOOD MANAGEMENT**

Although flood management falls within the purview of State Governments, however the Central Government has been initiating various measures including providing financial assistance to the States in this regard. Various Centrally Sponsored Schemes taken up by the Government of India under which financial assistance was provided to the State Governments during the year 2006-07 are detailed as under:

**(i) Critical anti – erosion works in Ganga Basin States**

In order to take up critical anti-erosion works in the Ganga basin States, a Centrally Sponsored Scheme was initially approved at an estimated cost of Rs. 178.85 crore (with a Central Share of Rs. 136.17 crore) as a continuing scheme for implementation during 2004-07 to provide financial assistance to the States of Bihar, Jharkhand, Himachal Pradesh, Uttar Pradesh, Uttaranchal, West Bengal & Farakka Barrage Project (FBP). The cost of the scheme was subsequently enhanced to Rs.242.17 crore (comprising central share of Rs. 195.63 crore) vide this Ministry's order dated 27.06.2005. The cost of the scheme has further been enhanced to Rs. 305.03 Crore (comprising central share of Rs. 251.02 Crore) vide this Ministry's order dated 9.11.2006

The funding pattern under the scheme provides for Centre and State Share in the ratio of 75 : 25 to the States and 100% funding for FBPA. The funds are provided as advance to the State Government to take up works. A total of Rs.

19.84 crore to Bihar, Rs. 10.74 crore to Uttar Pradesh; Rs. 1.77 crore to Uttaranchal; Rs. 14.84 crore to West Bengal; Rs. 1.32 crore to Himachal Pradesh and Rs. 1.50 crore to Jharkhand was released during Financial Year 2005-06. Further releases of funds during 2006-07 are contingent upon receipt of utilization certificates of the funds provided to State Governments and monitoring report of schemes duly recommended by Ganga Flood Control Commission.

**(ii) Maintenance of flood protection works of Kosi & Gandak Projects**

This Centrally Sponsored Scheme, which provides protection to the banks of the river Kosi & Gandak in and around existing barrages from erosion, has been continuing since VIIIth Plan. The works are executed by the State Governments of Bihar and Uttar Pradesh in respect of Kosi and Gandak respectively. The full cost of maintenance works incurred by the State Governments is reimbursed by the Central Government on the recommendations of Kosi and Gandak Standing Committee. The recommendations of Kosi and Gandak Standing Committee are awaited from GFCC during current Financial Year following which funds will be released.

**(iii) Raising, Strengthening and extension of embankments on Lalbakeya, Bagmati, Khando and Kamla rivers**

The scheme has been continuing since IXth Plan with the purpose to extend the embankments along these rivers in Indian Territory to Nepal



and tie to high ground in Nepal with corresponding strengthening of embankments on Indian side. The full cost of the works is borne by the Central Government and the funds are released on the recommendation of the Ganga Flood Control Commission after authentication of utilization certificates and inspection of the works. Central Assistance under the scheme is released in advance to enable the State Government to take up the works. An amount of Rs. 13.53 crore was released to Govt. of Bihar during 2005-06 for Kamla Balan and Bagmati rivers. An amount of Rs. 4.98 crore has been released to Govt. of Bihar during the year 2006-07 for Kamla Balan river. Government of Bihar has also submitted a proposal of river Bagmati to Ganga Flood Control Commission amounting to Rs. 11.78 crore for undertaking earth works (upto 17.50 km reach) which has been approved by GFCC.

**(iv) Improvement of drainage in critical areas of the country**

Government of India sanctioned a Centrally Sponsored Scheme at an estimated cost of Rs. 54.57 crore (with a Central Share of Rs. 49.62 crore) to take up works relating to improvement of drainage in critical areas of the country. The scheme aims at improving drainage conditions of critical areas affected due to floods in States of Andhra Pradesh, Bihar, Orissa and Uttar Pradesh with Central Share of Rs. 5.45 crore, Rs. 27.38 crore, Rs. 13.13 crore and Rs. 3.65 crore respectively. A scheme of Govt. of Jammu & Kashmir with central share of Rs. 4.78 crore has also been included in 2006-07 due to saving in the scheme (Now State Sector Scheme) within the approved outlay of Rs. 49.62 crore. The scheme among other benefits will also increase agricultural production in these areas. Works under the scheme are being executed by the respective State Governments and to be completed within the Xth Plan period. An amount of Rs. 3.00 crore to Orissa, Rs. 5.00 crore to Bihar and Rs. 2.50 crore to Jammu &

Kashmir has been released during 2006-07.

**(v) Committee regarding erosion problem at Panchanandpur, district Malda and Paraspur Taltoli, district Murshidabad, West Bengal**

In view of seriousness of erosion problem at Panchanandpur, district Malda and Paraspur Taltoli in district Murshidabad of West Bengal, a Committee of experts under the Chairman of GFCC with members from CWC, CWPRS, Government of West Bengal etc. was constituted to critically examine the entire problem of erosion in these areas and suggest remedial measures in this regard. The committee visited the affected areas and suggested remedial measures for Panchanandpur and Paraspur Taltoli to be executed before floods of 2006. Farrakka Barrage was entrusted with the works in Panchanandpur area before floods of 2006. The works in Paraspur Taltoli area were entrusted to the Govt. of West Bengal to execute these works before floods of 2006.

**BRAHMAPUTRA BOARD**

**Introduction**

The Brahmaputra Board a statutory body was set up by an Act of Parliament called Brahmaputra Board Act (Act 46 of 1980) under Ministry of Water Resources. The Board functions from Guwahati. The jurisdiction of the Board covers the entire area of the seven States in the North Eastern Region falling under Brahmaputra and Barak Valley. The limits of Brahmaputra Board were extended to cover the entire area of Sikkim and Northern part of West Bengal falling within Brahmaputra and Barak Basin.

The main functions assigned to the Board are to carry out survey and investigation and to prepare Master Plan for the control of floods, bank erosion and improvement of drainage



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congestion, giving due importance to the development and utilization of Water Resources of the Brahmaputra and Barak Valleys for irrigation, hydropower, navigation and other beneficial purposes. Its assignment also includes preparation of detailed Project Report of the dams and other Projects identified in the Master Plan as approved by Central Government and to take up construction & Maintenance of the projects approved by the Central Government.

Since inception, the Brahmaputra Board has been performing its statutory functions like preparation of Master Plans for flood moderation, improvement of Master Plans for flood moderation, improvement of drainage congestion along with integrated development of the basin to ensure proper utilization of vast water resources of the North Eastern Region. These Master Plans are of immense utility for water user agencies of the region.

### **Organization**

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

### **Activities of Brahmaputra Board**

The Master Plan preparation has been taken up in 3(three) parts.

Part-I : Main Stem of Brahmaputra

Part-II : Barak and its tributaries and

Part-III: Tributaries of the river Brahmaputra & Barak and the rivers Tripura (49 Nos)

So far, 36 Master Plans out of 51 have already

been approved by Govt. of India.

Brahmaputra Board has identified 34 drainage congested areas in Brahmaputra and Barak basin i.e. 22 in Brahmaputra Basin, 8 in Barak Basin and 4 in Tripura.

The North Eastern Hydraulic & Allied Research Institute (NEHARI) was established near Guwahati with facilities of Hydraulic Modeling, Soil Testing, Concrete and rock Mechanics Laboratory in association with CSMRS, CWPRS. The Board has successfully carried out sample testing as requested by various organizations like NEPCO, CWC, NEC, NHPC, State Govt of Assam, Manipur, Meghalaya and Mizoram for their on-going projects.

So far, NEHARI has completed physical model studies of (i) Jiadhal River (ii) River Brahmaputra from Porvita to South Salmara (iii) Majuli Island and (iv) Kameng River.

The 5<sup>th</sup> High Powered Review Board Meeting held on 22-09-2005 at Guwahati and 07-11-2005, at New Delhi under the Chairmanship of Hon'ble Minister of Water Resources.

### **Schemes under execution by the Board**

- Pagladiya Dam Project
- Harang Drainage Development Scheme
- Protection of Majuli Island (Phase-I), Assam
- Barbhag Drainage Development Scheme
- Protection of Kushiabil and Durgajan village at Dimapur (Nagaland) Avulsion of Brahmaputra at Dhola-Hatighuli.
- Amjur Drainage Development Scheme
- Other 6 (six) Nos Drainage Development Schemes namely:

Joysagar Drainage Development Scheme, Kailasahar Drainage Development Scheme, East of Barpeta Drainage Development Scheme, Singla Drainage Development

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Scheme, Jengrai Drainage Development Scheme, Jakaichuk Drainage Development Scheme

### ***Critical Flood Control & Anti-Erosion***

The Govt. of India had approved a scheme of Rs. 150 Crores With 90% grant and 10% loan in December, 2004 for taking up Critical Flood Control and Anti-Erosion Schemes in Brahmaputra and Barak Valley including Sikkim and West Bengal. The Brahmaptura Board has been nominated as nodal and monitoring agency. There is an Empowered Committee under Chairman, Brahmaputra Board with Members from the Planning Commission and State governments for prioritizing the schemes. Seven meetings of this Committee have so far been held. The EFC memo was revised taking into consideration the schemes recommended by the Task Force under immediate and short term measures. The revised EFC Memo has been approved for Rs. 225.00 crore for implementation within the plan period with Rs. 20.00 crore for implementation by Brahmaputra Board. The projects to be implemented with this additional fund were identified and recommended by 7<sup>th</sup> Empowered Committee.

### ***Amount Released for the year 2005-06 and 2006-07***

During the year 2005-06, an amount of Rs49.01 crores was released for execution of these schemes. During the year 2006-07, the position regarding funds released to various states upto 31.12.2006 is as follows:

- 1) Manipur - Rs.4.725 Crores.
- 2) Nagaland - Rs.2.6955 Crores.
- 3) Sikkim - Rs.5.508 Crores
- 4) West Bengal - Rs.6.075 Crores

Further proposals for release of funds amounting to Rs. 46 crores to other North Eastern states are under process.

## ***GANGA FLOOD CONTROL COMMISSION***

### ***Introduction***

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

### ***Organisation***

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

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

### ***Achievements During The Year 2006-07***

#### ***Maintenance of Flood protection works of Kosi and Gandak Projects***

The Flood Protection works on river Kosi and Gandak is being done based on site inspection after every flood season and on the recommendations of Kosi High Level and Gandak High Level Committees respectively. The reimbursement of expenditure incurred for maintaining the flood protection works executed

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in Nepal portion is done by Government of India after utilisation certificate of the same based on the recommendations of KHLC/GHLC is received from the respective State Government of Bihar for Kosi and Uttar Pradesh (for Gandak).

### ***Flood Proofing Programme in North Bihar***

Flood proofing programme in North Bihar was continued for implementation during the first two years of the 10<sup>th</sup> plan. The scope of this scheme was enlarged to include the States of Bihar, Uttar Pradesh, West Bengal, Orissa, Assam and Andhra Pradesh for implementation during 2004-07. Continuation of works under this programme shall be based on performance evaluation of the completed schemes of Bihar entrusted to WAPCOS(I) Ltd. The evaluation is under progress.

### ***Updating of Comprehensive plan for flood management***

Comprehensive plans for flood management for all the 23 river systems of the Ganga basin have already been prepared between 1975 and 1990. The updating of the Comprehensive Plans is under way. This is a continuing activity of GFCC. Upto March 2005, Comprehensive Plans for 22 river systems have been updated. Updating of plans for Kosi river system and Burhi Gandak river system are in progress and likely to be completed very shortly.

### ***Monitoring of important flood management schemes***

GFCC is monitoring the following flood management schemes:

- Ghea-Kunti Drainage scheme, West Bengal
- Tamruk basin drainage scheme, West Bengal
- Urgent Development work in the

Sunderbans in West Bengal

- Maniram Domingarh Embankment scheme, U.P
- In addition, the following centrally sponsored schemes are also being monitored:
- Maintenance of flood protection works of Kosi and Gandak Projects.
- Flood proofing programme in North Bihar.
- Extension of embankments along Lalbakeya, Kamla, Bagmati and Khando rivers
- Critical anti-erosion schemes being executed by the states of West Bengal, Bihar, Jharkhand, Uttar Pradesh and Uttaranchal.

### ***Committees***

#### ***Standing Committee on inundation problem between India and Nepal***

Standing Committee on inundation problem between India and Nepal was set up in the year 1986 for dealing with the problems of inundation along Indo-Nepal border on a continuing basis. The Chairman, GFCC is the leader of the Indian side. The 14<sup>th</sup> meeting was held from 30.8.2006 to 1.9.2006 at Patna.

#### ***Indo-Nepal Sub-Committee on Embankment Construction***

As a follow up of the decision taken by the India Nepal Joint Committee on Water Resources (JCWR) in its first meeting held in October, 2000 the Indo-Nepal sub-committee on embankment construction was constituted.

So far, eight meetings of the sub committee have been held. The last meeting was held in June, 2006, in which the DPR of Kamla River

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Embankment and Protection works costing NRs. 210.6 crore was approved.

## ***FARAKKA BARRAGE PROJECT***

### ***Introduction***

Owing to the problem of deterioration of Kolkata Port a Barrage across the river Ganga at Farakka and a canal off taking up-stream of the Barrage for diversion of 40,000 cusecs of continuous supply of water into the Bhagirathi-Hooghly river system were constructed.

### ***Objectives Achieved***

- The increased upland supplies from the Ganga at Farakka into Bhagirathi have improved navigability, reduced salinity in the system and ensured sweet water supply to Kolkata and surrounding areas from Farakka since its commissioning in 1975.
- The road-cum-rail bridges built across the river Ganga at Farakka has established direct communication link to the North-Eastern States, Sikkim, Bhutan and Nepal.
- The Hooghly-Bhagirathi, the Feeder Canal and the navigation lock at Farakka is now a part of the Haldia-Allahabad Inland Waterway (National Waterways No. 1) which has opened a new era of inland Navigation at economical rate in Eastern India.

### ***The Principal components of the Project***

A 2245 metre long Barrage across the river Ganga with 109 No. bays and Head Regulator of 11 No. bays.

- A 213 metre long Barrage across the river Bhagirathi at Jangipur with 15 Nos. bays.
- 38.38 Km. long Feeder Canal with 1133 cumecs (40,000 cusecs) carrying capacity.
- Navigation locks at Farakka, Jangipur and

Kalindri, Lock Channels, Shelter basins, Navigation lights and other infrastructures.

- Left Afflux Bundh of Farakka Barrage of 33.79 Km. in right bank and 7 Km. in left bank and 16.31 Km. of Afflux bundh of Jangipur Barrage.
- Bank protection works up to 40 Km. up-stream and 80 Km. down-stream of Farakka Barrage in the extended jurisdiction.
- Two road-cum-rail bridges and two road bridges across the Feeder Canal.
- A number of Regulators at different locations in both Murshidabad and Malda District of West Bengal.
- Baghmari Syphon at RD. 48.00 of Feeder Canal and Jetties shelter basin at RD. 62.532 of Feeder Canal.

### ***Important Activities***

All the principal works concerned with the two Barrages and Feeder Canal have been completed. The Navigation lock at Farakka was completed and commissioned in November, 1987 and Navigation Control Tower in 1996. The Navigation lock at Jangipur is not completed fully. The anti-erosion works in up-stream and down-stream of Farakka Barrage and maintenance of Guide Bundhs, Afflux Bundhs and numerous vital structures including operation & maintenance of two Barrages, Feeder Canal as well as maintenance of three big township, the special repair of gates and operation system of Barrage is continuing work.

There are four Committees under whose guidance the works of Farakka Barrage Project were/are being carried. These Committees are:

- 1) The Farakka Barrage Control Board
- 2) The Technical Advisory Committee (TAC).

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- 3) Committee for monitoring progress.
- 4) Farakka Barrage Project Advisory Committee under the Chairpersonship of Additional Secretary (Water Resources). With a view to control erosion up to 40 Km. up-stream of Farakka Barrage up to Bhutni Diara and 80 Km. down-stream up to Jalangi has been entrusted to Farakka Barrage Project. The Farakka Barrage Project has also taken up restoration of embankments/anti-erosion works in Cheramati/ Kullick/ Mahananda/ Fulahar

rivers which have been completed by July, 2006. (except Cheramati).

The anti-erosion works on the right bank of river Bhagirathi at Kabilpur (Sagardighi) in the District of Murshidabad, (out of extended jurisdiction of Farakka Barrage Project) in a reach of 4 Km. have been identified as critical. Out of this 2 Km. works have been completed by July, 2006. Rest 2 Km. would be taken up shortly depending upon the decision of TAC of Farakka Barrage Project.



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## CHAPTER 5

# EXTERNAL ASSISTANCE IN WATER RESOURCES SECTOR

The Ministry of Water Resources assists the State Governments and its organizations for availing external assistance from different funding agencies to fill up the resource gap and state-of-the-art technology for water resources development of the country, particularly for the irrigation schemes.

The World Bank continues to be the primary source of external assistance in the water resources sector. Assistance is also being availed

from multilateral/bilateral agencies and countries.

A brief account of ongoing externally aided projects (11 in number) being implemented in various States with assistance from the World Bank and other bilateral agencies namely Japan Bank for International Cooperation (JBIC) and Kreditanstalt fur Wiederaufbau (KfW), Germany is as under:-

### EXTERNALLY ASSISTED ON-GOING PROJECTS

#### A. WORLD BANK

S.No	State	Name of Projects	Assistance amount in Million Donor Currency
1.	Karnataka	Karnataka Community Based Tank Management Project CR.3635-IN	SDR 80 Revised SDR 63.420
2.	Madhya Pradesh	Madhya Pradesh Water Sector Restructuring Project LN 4750-IN	US\$ 394.020
3	Rajasthan	Rajasthan Water Sector Restructuring Project Cr.3603-IN	SDR100.02
4.	Uttar Pradesh	UP Water Sector Restructuring Project Cr.3602-IN	SDR 90.471
5	Maharashtra	Maharashtra Water Sector Improvement Project-LN4796-IN	US\$325
6.	Multi-State	Hydrology Project Phase-II	US\$104.98

**B. BILATERAL ASSISTANCE (JBIC JAPAN – LOAN)**

S.No	State	Name of Projects	Assistance amount in Million Yen
7.	Andhra Pradesh	Modernization of Kurnool-Cuddapah Canal	(Tranche-I) 16049 (Tranche-II) 4773
8.	Orissa	Rengali Irrigation Project	(Tranche-I) 6844.227 (Tranche-II) 6342
9	Rajasthan	Rajasthan Minor Irrigation Improvement Project	11555

**GERMANY**

10	Maharashtra	Minor Irrigation Project	EURO 23.008
11.	Himachal Pradesh	Minor Irrigation & Rural Water Supply Project	EURO 2.659

**PIPELINE PROJECTS****A. WORLD BANK ASSISTANCE**

S.No.	Name of Project	Cost (Rs.in Crores/US \$)
1	Dam safety Assurance, Rehabilitation and Disaster Management Project Phase-II(Multi-state)	917.00
2	Tamil Nadu Water Resources Consolidation Project-II	3902.00
3.	Andhra Pradesh Water Sector Development Project, Modernization and Rehabilitation of Nagarjuna Sagar Project.	2250.00
4	West Bengal Minor Irrigation Project	1142.50
5.	Bihar Flood Management Information System (Grant under DFID Trust Fund of World Bank)	476,800 \$

**B. BILATERAL ASSISTANCE - JAPAN**

6.	Andhra Pradesh Irrigation Livelihood Improvement Project	1000.00 crores
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**RECENTLY NEGOTIATED****ASIAN DEVELOPMENT BANK**

S.No.	Name of Project	Amount of Assistance in Million (Donor Currency)	Status
1.	Chhattisgarh Irrigation Development Sector Project	US \$ 46.108	Project yet to be declared effective.
2.	Orissa Integrated Irrigation Agriculture & Water Management Project	US \$ 0.875	Letter of Agreement to be signed by DEA.
3.	Integrated Coastal Zone Management and Related Investment Project	US \$ 0.25	Draft Final Report of Consultant's Recommendations expected by January 2007.

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### ***National Level Steering Committee***

A National Level Steering Committee has been constituted under the Chairmanship of Secretary (WR) to look into various aspects and give policy directions in formulation and implementation of the projects. A Technical Committee headed by Member (D&R), Central Water Commission has also been constituted for providing technical inputs to the Steering Committee and finalisation of the technical details of the project.

### ***Japan International Cooperation Agency (JICA)***

JICA is responsible for the technical cooperation aspect of Japan's Official Development Assistance (ODA) programmes. The Technical Cooperation is aimed at the transfer of technology and knowledge that can serve the socio-economic development of developing countries. JICA carries out a variety of programmes to support the nation building of developing countries through such technical cooperation. At present, a proposal namely 'Development of Ground Water in Uttar Pradesh' is under implementation with assistance from JICA. In addition, the proposals "Integrated Water Resources Management for Poverty Eradication and Sustainable Development" from Andhra Pradesh, "Procurement of Drilling Rigs for Drilling Tubewells" from Jammu & Kashmir and "Sub-Himalayan Development Project – Integrated Water Resources Development and Management" from West Bengal has also been recommended to the Japanese side for consideration of JICA.

During the financial year 2006-07, an amount of Rs.169.622 crore has been received from the external funding agencies and utilized till September, 2006 by the Central/State Governments for implementation of various externally aided projects in Water Resources Sector.

### ***Hydrology Project Phase-II***

The World Bank assisted Hydrology Project Phase-II (HP-II) Project ID - P084632, Loan/Credit/ Grant Number : IBRD-4749 , which is an extension of the earlier Hydrology Project Phase-I (HP-I), has been taken up during the current year. In the HP-I Hydrological Observation Network and Data Processing System were modernized and upgraded along with strengthening of capabilities in the 9 participating states and 6 central agencies. Under the project, a Hydrological Information System (HIS) has been established for 284 sites to provide reliable hydrological data for long term planning, design and management of water resources and water use systems and for research activities in the related aspects together with improvement in the infrastructure for data collection.

The HP-II aims to extend and promote the sustained and effective use of the Hydrological Information System by all potential users concerned with water resources planning and management, both public and private, thereby contributing to improved productivity and cost-effectiveness of water-related investments in the 13 States (4 new) and eight Central agencies (2 new). The project has three main components: 1) Institutional strengthening consisting of consolidation of recently concluded Hydrology Project (HP I) activities in the existing States; Awareness raising, dissemination and knowledge sharing; and implementation support; 2) Vertical Extension comprising development of hydrological design aids; development of decision support systems; and implementation of purpose-driven studies; and 3) Horizontal Expansion supporting upgrading/establishment of data collection network; establishment of data processing and management systems; purpose-driven studies; and training.

The project objectives will be achieved by:

- (a) Strengthening the capacity of hydrology

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departments to develop and sustain the use of the HIS for hydrological designs and decision tools thus creating/enabling environment for improved integrated water resources planning and management;

- (b) Improving the capabilities of implementing agencies at state/central level in using HIS for efficient water resource planning and management reducing vulnerability droughts and thereby meeting the country's poverty reduction objectives;
- (c) Establishing and enhancing user-friendly, demand responsive and easily accessible HIS to improve shared vision and transparency of HIS between all users; and
- (d) Improving access to the HIS by public agencies, civil society organizations and the private sector through awareness building supporting outreach services.

Greater use of an improved HIS is expected to have a broad but definite impact on the planning and design of water resources

schemes, from which the rural and urban poor will have secure and sustainable access to water for multi-purpose livelihood uses.

The total cost of the project is Rs. 631.83 crores for six year's w.e.f April, 2006 to June, 2012. All participating states have established State Level Steering Committees and State HIS Coordination Committees; identified project Coordinators/Nodal Officers, Procurement Officers and Training Officers and provided adequate budget. Most of them have also revised their respective implementation plans based on a clearer understanding of the project requirements. The World Bank has completed two Implementation Support Missions, one on 17.12.2006. TORs for key international consultancies have been prepared. Expression of Interest for key consultancies like Management and Technical Consultancy of the Ministry of Water Resources for monitoring the progress of the project, the Real-Time Decision Support System (DSS-RT) for Bhakra-Beas Management Board (BBMB) and the Planning Decision Support System (DSS-Planning) have been issued.

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## **CHAPTER 6**

# **CENTRAL WATER COMMISSION**

### ***Introduction***

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

### ***Organisational Setup***

Central Water Commission is headed by a Chairman with status of an Ex-Officio Secretary to the Government of India. The Commission has three Technical Wings, namely: Designs and Research Wing, Water Planning and Projects Wing, River Management Wing.

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

### ***Activities***

The activities of CWC may be summarized as follows:

#### ***Resources Assessment***

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

#### ***Macro Level Planning***

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

#### ***Project Planning***

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

#### ***Project Evaluation***

Techno-economic Appraisal of Water Resources projects.



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### ***Execution of Water Resources Development Projects***

- a. Project Monitoring,
- b. Advice on various Planning and Design problems encountered during construction,
- c. Revival, restoration and rehabilitation of water bodies,
- d. Advice on coastal erosion problems.

### ***Operation of Water Resources Projects***

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

### ***Research and Development***

- a. Co-ordination of R&D Activities.
- b. Application of Modern Techniques:
  - (i) Development & Application of Software for Water Resources related Problems,
  - (ii) Numerical Modelling,
  - (iii) GIS & Remote Sensing Technology,
  - (iv) Studies on Sedimentation.
- c. Performance evaluation and Benchmarking of water resources projects,
- d. Morphological studies,
- e. Regional Hydrological Studies.

### ***Standardization and Documentation***

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

### ***Guidance/Advisory Role***

- a. Organising Trainings/Workshops/ Seminars,
- b. Representation on various Committees/ Boards.

### ***Others***

- a. Mass Awareness programmes

- b. Technical Support to Ministry of Water Resources and other Departments of Government of India are provided on all matters related to water resources development and management.

### ***Major Activities***

#### ***Hydrological Observations***

Central Water Commission at present operates National Network of about 945 Hydrological Observation Stations covering gauge, discharge, silt and water quality. The basic data collected by field units are processed and validated at Sub-Divisions, Divisions and Circle level and authenticated data in the form of Water Year Book, Sediment Year Book and Water Quality Year Book is then transmitted to CWC (HQ) for storage, updating, retrieval, etc. The dissemination of data to bonafide users are processed as per the data request received in regional offices of CWC as well as at Head Quarters by P&D Unit as per norms and guidelines.

#### ***Water Quality Monitoring***

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

Ministry of Environment and Forests constituted the Water Quality Assessment Authority (WQAA) at national level vide the extraordinary notification in the Gazette of India dated 22<sup>nd</sup> June 2001 under the provision of Environmental Protection Act for co-ordinated effort in maintaining the quality of work of national water resources. The notification issued by the Ministry of Environment and

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Forests while constituting WQAA, envisaged the setting up of State Level Water Quality Review Committee (SLWQRC), a State representative body, comprising members from the Central and State Water Quality Monitoring agencies, selected educational/ research institutes and user agencies which have demonstrated interest in water quality monitoring. The size of SLWQRC in each State shall be approximately 12 members.

### ***Flood Forecasting and Inflow Forecasting***

Flood Forecasting Unit (FFU) issuing flood forecasts and warnings of floods in all major flood prone inter-State river basins of India. At present there are 147 level forecasting stations on major rivers and 28 inflow forecasting stations on major dam/barrages. It covers 9 major river systems in the country, including 70 river sub-basins pertaining to 15 States viz. Normally forecasts are issued 12 to 48 hours in advance, depending upon the river terrain, the location of the flood forecasting sites and base stations.

During the flood season 2006 (May to October) 6675 flood forecasts (5090 level forecasts and 1585 inflow forecasts) were issued, out of which 6390 (95.7%) forecasts were within the accuracy limits.

To make the flood forecasts more accurate, effective and timely, CWC is continuously updating and modernizing its flood forecasting system with a view to improve the quality and accuracy of the forecasts through (i) Automated data collection and transmission, (ii) use of Satellite based communication system through VSAT and (iii) Improvement of forecast formulation techniques using computer based catchment models. This scheme is of immense help to the project authorities to know well in advance about the quantum of water likely to be received at various dam sites and flood prone populated areas so that they can take

advance action for suitable reservoir regulation for ensuring safety of the dam as well as property and livestock. During the 10<sup>th</sup> Plan, the scheme for updating and modernizing flood forecasting system has been extended to Brahmaputra, Barak, Damodar, Krishna, Godavari, Yamuna, Ghaghra, Rapti and Sutlej river basins. The work has been completed in some sub-basins of Krishna and Godavari.

Under USAID assisted Disaster Management Project of Ministry of Home Affairs – Climate Forecasting, proposal for development of decision support system for flood forecasting and inundation forecast model for Mahanadi basin and issue of flash flood forecasting for Sutlej basin are under consideration of the Ministry. Another proposal for development of real-time flood forecasting system for Brahmaputra and Barak basin (joint project with Department of Information and Technology) is also under consideration.

### ***Survey and Investigation***

More than 200 Irrigation and Hydro-Electric Projects have been investigated by CWC and the Detailed Project Reports (DPR) have been prepared and submitted to the concerned authorities. At present 14 projects (12 in India and 2 in Nepal) are under investigation by CWC.

CWC has also carried out investigation of more than 30 projects in the neighbouring countries in Bhutan, Myanmar and Nepal. Pancheshwar Multi Purpose Project has been investigated by the Joint Project Office – Pancheshwar Investigation (JPO-PI). The Joint DPR could not be completed due to some outstanding issues still to be resolved by the Joint Group of Experts (JGE) of Nepal and India.

### ***Morphological Studies***

The study of river morphology and implementation of suitable river training works as appropriate have become imperative for our

nation as large areas of the country are affected by floods every year causing severe damage to life and property in spite of existing flood control measures taken both by Central and State Governments. Monitoring of Morphological behaviour has also been recommended in the Seminar on "Siltation of Rivers - Problems and Solutions" which was held on 12 and 13<sup>th</sup> February 2004. Considering the seriousness of the problems CWC has taken up the Morphological studies of 6 flood prone rivers viz. Brahmaputra, Kosi, Gandak, Ghaghra, Sutlej, Ganga in reach from Allahabad to Bauxar using remote sensing techniques in addition to field surveys and collection of related data during the period of 10<sup>th</sup> Five Year Plan. With a view to having a multi disciplinary approach a standing committee for morphological studies of Himalayan rivers of India was constituted by MoWR in June 2006. Morphological study of rivers contain the study of the behaviour of river, its aggradation/degradation, shifting of its course, erosion of banks, etc. and to plan remedial measures against erosion and other related problems. 18 Morphological studies of rivers of India, 8 volumes of Morphological Atlas of rivers of India and 17 other monitoring status/sedimentation/mathematical model reports of rivers of India have been done by CWC based on data collected by field survey. Among Himalayan rivers Morphological studies of rivers Ghaghra, Sutlej and Gandak using remote sensing techniques are under progress.

### **Coastal Erosion**

Realizing the need of overall planning and cost effective solution to the coastal problems, the Govt. of India constituted Beach Erosion Board in the year 1966, under the Chairman CWC. With the objective of development in the protected coastal zone, the Beach Erosion Board was reconstituted and renamed as Coastal Protection And Development Advisory Committee (CPDAC) by the Ministry of Water Resources, Govt. of India, in April 1995, under the Chairmanship of Member (RM) CWC, with

representatives of all coastal States and related Central Departments. The Beach Erosion Board held 24 meetings in all. So far CPDAC has held 9 meetings. Last meetings of CPDAC was held at Port Blair (A&N Islands) during 23<sup>rd</sup>-25<sup>th</sup> January, 2006. The 10<sup>th</sup> meeting of CPDAC was held on January, 2007 at Visakhapatnam, Andhra Pradesh.

### **Hydrological Studies**

Detailed Hydrological studies are carried out by the Central Water Commission at various stages of projects for assessment of quantities of available water and its time distribution, estimation of design flood, sediment rate and its distribution pattern in the reservoir. These details are essentially required to:

- (i) Carry out optimum planning for the available water resources;
- (ii) Design the structure from safety consideration;
- (iii) Estimate the life of reservoir.

Hydrological studies are made in connection with Detailed Project Reports prepared by CWC. 116 projects were dealt by CWC during the year 2006-07 from hydrological point of view, out of which 14 projects were dealt as consultancy work, and 55 projects were dealt for Technical Appraisal for hydrology.

CWC has come up with Indian version of regional models for rational estimation of design flood. The country has been divided into 7 zones and further 26 hydro meteorologically homogeneous sub- zones. So far 21 flood estimation reports covering 24 sub-zones have been published. Out of the two remaining sub-zones, Andaman and Nicobar Island sub-zones (No. 6) could not be taken up as the rainfall and run-off data are not available for the development of regional models.

90% work for preparation of PMP Atlas for Krishna and Indus Basins with the assistance of IITM, Pune has been completed, during the year 2006.

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Development of Hydrological Design Aids is being handled in CWC under World Bank aided Hydrology Project – II. Under this, 10 components are planned which cover all aspects. It is a 6 year project. The project was started in April, 2006.

### ***Design***

The Central Water Commission is actively associated with design of majority of the mega water resources projects in India and neighbouring countries viz. Nepal, Bhutan and Afghanistan by way of design consultancy or in the technical appraisal of the projects. Four design units are functioning to cater to specific requirements and to attend to special design related problems of different regions. These units have specialized directorates for Hydel Civil Design, Concrete & Masonry Dam Design, Embankment Design, Gates Design and Barrage & Canal Design. A number of projects in the neighbouring countries have also been designed. At present, CWC is carrying out design consultancy in respect of 121 projects out of which 74 projects are at construction stage while the remaining 47 projects are either at investigation or in DPR stage.

The design units have prepared several memoranda on the Indo-Pakistan dispute concerning Baglihar Project in J&K and submitted to the Neutral Expert appointed for determination on points of difference referred by the Govt. of Pakistan under provision of Indus Waters Treaty.

### ***Dam Safety***

There are 4050 existing large dams in the country. In addition, 475 large dams are under construction. About 60% of these dams are more than 20 years old. Appropriate measures for the maintenance of such structures are critical for their safety. Dam Safety Organization of CWC acted as Nodal agency in implementation the World Bank assisted “Dam Safety Assurance and Rehabilitation Project (DSARP)” in which 4 states i.e. Madhya

Pradesh, Rajasthan, Orissa and Tamil Nadu participated. Basic dam safety measures were provided for 182 dams, while 55 dams were taken up for rehabilitation and rectification works. The success of this project led to the framing of a fresh proposal named as “Dam Safety Assurance, Rehabilitation and Disaster Management Project (DSARDMP)” now renamed as “Dam Rehabilitation and Improvement Project (DRIP)”. This project aims to improve the safety and optimum sustainable performance of selected existing dams and associated appurtenances by setting up a Dam Rehabilitation and Improvement Fund (DRIF) with the participation of World Bank, Central/ State Governments and other institutional funding agencies.

The Govt. of India constituted the National Committee on Dam Safety (NCDS) in October, 1987. Guidelines for Preparation of Emergency Action Plan, approved in the 27<sup>th</sup> meeting of NCDS held on 27.09.2005 were circulated to dam owning States/Agencies.

### ***Environmental Management and Rehabilitation-Resettlement Issues***

A National Environmental Monitoring Committee for River Valley Projects (NEMCRVP) has been set up by the Ministry of Water Resources to monitor implementation of Environment Management Plan and observance of environmental safeguards as per environmental clearance. Environmental Management Directorate works as Secretariat for NEMCRVP and manages Constitution, coordination, linkages and persuasion for functioning of State Environmental Monitoring Committees (SEMCs) and Project Environmental Management Committees (PEMCs) at States and Projects level. It is working to establish the BIS standards regarding the Environment Management of the River Valley Projects.

### ***Project Appraisal***

The appraisal of the project ensures that the



project proposal is in tune with the overall development plan; the basic planning of the project is reliable and investigations are as per established norms. It is also ensured that international/ interstate agreements or tribunal awards for utilization of water are duly followed and the layout and design of the project are optimal. After confirmation of the techno-economic feasibility of the project, the Advisory Committee on irrigation, flood control and multipurpose projects headed by the Secretary, Water Resources, considers the project for acceptance and thereafter the Planning Commission recommends it for investment clearance. Power projects proposed by the State Electricity Boards/ PSUs are scrutinized in CWC from hydrology, civil design, interstate and cost angles, and for establishing water availability for cooling and other purposes in case of Thermal Projects. The process of Project Appraisal involves examination of the project simultaneously by different specialized units of CWC. The project authorities suitably incorporate the suggestions for improvement/modifications.

During the year 2006-07, technical examinations of 31 irrigation projects were completed. 21 irrigation and 4 flood protection projects were cleared by the Technical Advisory Committee. At present, 109 irrigation schemes (58 Major & 51 Medium) and 56 flood management schemes/ master plans are under different stages of appraisal.

### ***Project Monitoring***

Central Water Commission monitors the progress of selected ongoing irrigation projects. Each project under general monitoring is visited by the monitoring team at least once in a year and detailed monitoring report is prepared and issued to all concerned for necessary action. CWC is carrying out general monitoring of 125 ongoing major, medium and Extension Renovation and Modernization (ERM) projects.

The major, medium and selected minor surface

water irrigation projects receiving Central Loan Assistance under Accelerated Irrigation Benefits Programme (AIBP) are also monitored by CWC. The projects are inspected twice a year and monthly expenditure reports and the Management Information System Reports giving physical & financial status of AIBP projects on quarterly basis are obtained from the Project Authorities for review. The recommendations of CWC form the basis for release of funds by the Ministry of Water Resources/ Ministry of Finance. CWC is monitoring 126 major and medium projects under AIBP.

### ***Monitoring of Reservoir Level and Live Storage Capacity***

During the water year 2006-2007 Central Water Commission monitored water storages of 76 important reservoirs of the country having total live storage capacity of 133.021 BCM. 49 more projects (each having storage capacity of 0.250 BCM or more) have been identified for inclusion in the monitoring system. Inclusion of 49 reservoirs will raise the number of projects under monitoring to 125 and storage capacity from 133.021 BCM to 156.69 BCM i.e. about 74 % of the total capacity of 213 BCM created so far.

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

A study on “Assessment of waterlogged and Salinity and/ or Alkalinity affected areas in irrigated commands of all major and medium projects throughout India using Remote Sensing Technique” has been taken up by Central Water Commission in collaboration with “Regional Remote Sensing Service Centre” (RRSSC), Jodhpur. In the first phase of the study, six reports in respect of Rajasthan, Karnataka, Goa, Bihar, Jharkhand and Haryana have been prepared. These reports have been circulated to the concerned State Govts. for taking up remedial measures for reclaiming waterlogged and/or saline / alkaline affected areas of various irrigation commands. In the second phase of



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the study, five reports in respect of Chhattisgarh, Madhya Pradesh, Maharashtra, Gujarat and Punjab have been completed and are in the process of circulation. All the 23 reports in this regard are expected to be completed by December, 2007.

A study with the objective to assess the irrigation potential created up to March 2005 using high-resolution data by identification and mapping of the irrigation network in two selected AIBP irrigation projects namely Upper Krishna and Teesta Command taken up as per the request of Planning Commission has been completed.

### ***Benchmarking of Irrigation Projects***

Benchmarking in Water Industry is in use in developed countries for quite some time. This concept is now being acknowledged as a potent management tool in irrigation sector in India as well. Accordingly, a Core Group is playing an active role as a coordinator as well as a facilitator in benchmarking of irrigation projects by way of providing technical support to the State Governments. National/ regional/ project level workshops are being organized by CWC in various states to facilitate concerned State Govts. to take up Benchmarking of Irrigation Projects in their respective States. First National Workshop on Benchmarking of Irrigation Projects was organized in February 2002 at Hyderabad and since then 7 regional workshops and four project level workshops have been organized till October, 2006 in various parts of the country.

### ***Guidelines for Water Audit***

Water Audit is an important aspect of water management. In view of this “General Guidelines for Water Audit and Water Conservation” have been formulated by CWC. These have been placed in the website of CWC (<http://cwc.gov.in>). CWC is also associated with the research scheme entitled “Industrial Water Auditing- A case study of Ghaziabad district,

U.P.” under R&D Scheme of MOWR and assists FICCI (Consultant) in carrying out the study to ensure its implementation as per the programme of work.

### ***Study of Water Use Efficiency in Irrigation systems***

Water use efficiencies are generally low and it is felt that there is a need to improve the same. .

The objective of the study is to cover:

- i) Reservoir filling efficiencies (Inflow and release pattern)
- ii) Delivery system/ conveyance efficiency.
- iii) On farm application efficiency
- iv) Drainage efficiency
- v) Irrigation potential created and utilised.

It is proposed to carry out aforesaid studies of some selected irrigation projects initially and to gradually cover all the major & medium projects in the country through consultants mainly Water and Land Management Institutes/Irrigation Management & Training Institutes and other private consultants. So far, 43 Major and Medium Irrigation Projects across the country have been taken up for aforesaid studies.

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

The Central Water Commission has taken up the performance evaluation studies of completed irrigation projects as a pilot project, covering various aspects such as system performance, socio-economic, agro-economic and environmental aspects.

Performance Evaluation Studies of Irrigation Projects were taken up in the country for the first time in early seventies. Performance Evaluation Studies of 25 major and medium irrigation projects located across the country have been accomplished by CWC and 19 projects are under progress.

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## ***Hydrographic Survey of Important Reservoirs***

Capacity Survey of reservoirs is a continuing scheme. An SFC Memo for covering 15 more reservoirs under Capacity Survey during X Plan at an estimated cost of Rs. 329.00 lakhs has been sanctioned in February 2003. Till date, survey of 3 reservoirs has been completed in all respects and survey of another 4 reservoirs is in progress. Proposal for 3 new reservoirs for taking up survey before the end of X Plan has been initiated.

## ***Policy and Planning***

Basin Planning & Management Organization under Water Planning & Projects Wing of CWC is acting as the Nodal agency in providing technical inputs related to water policy and planning aspects to the Ministry and functions as technical Secretariat for National Water Board.

## ***Integrated River Basin Planning***

A case study on “Integrated River Basin Planning & Management of Sabarmati River Basin” (Gujarat portion) using the RIBASIM model has been completed. The final report of the study was printed and circulated. Comprehensive System Study for Damodar River Basin was carried out. A training course on Integrated River Basin Planning & Management organized by BPMO in CWC at New Delhi was attended by participants from states and Central Government.

## ***Reservoir Operation***

The Reservoir Operation Guidelines of Bansagar Project were prepared and circulated to the co-basin States of Madhya Pradesh, Bihar, and Uttar Pradesh. Reservoir Operation Manual of Tehri Project has been prepared and circulated to THDC.

Comprehensive System Studies of Damodar Barakar basin have been completed and circulated to the co-basin States and DVC through Member Secretary (DVRRC).

## ***Others***

An Engineering Museum fully devoted to water resources development in the country is maintained in Delhi. Various aspects of the development in the field of water resources in India are illustrated through self-explanatory working models. Central Water Commission Library has an extensive collection of more than 1,04,000 books and journals which are widely referred by water resources engineers/organisations. A new Library-cum-Auditorium Building is under construction.

## ***National Water Academy and Other Training Activities***

National Water Academy at Pune is functioning as a Centre of Excellence for in-service training of Water Resources Engineering Personnel of State Government, Central Water Commission and other Central organizations. During the year 2006-07, 38 courses were conducted at NWA in which 862 officers were trained. So far, the Academy has conducted 225 courses, in which 5153 officers have been trained since its inception in 1988. To accommodate more trainee officers and make their stay comfortable, a newly constructed hostel (Krishna Hostel) was inaugurated by Prof. Saifuddin Soz, Hon'ble Minister of Water Resources, Govt. of India on 4<sup>th</sup> September 2006.

In addition, the Training Directorate at Headquarters organized 37 courses for about 600 officers during the year 2006-07 at CWC Headquarters, New Delhi. So far Training Directorate has conducted 421 courses on various topics related to Water Resources Development. About 11,600 officials have undergone training through these courses.

## ***Interaction with the Ministry of Agriculture***

Central Water Commission is represented in the Crop Weather Watch Group meetings of Ministry of Agriculture in which the storage status of 76 important reservoirs being monitored by CWC is appraised.

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## CHAPTER 7

# REDRESSAL OF INTER STATE RIVER ISSUES

### **INTER-STATE WATER DISPUTES (AMENDMENT) ACT, 2002**

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

### **INTER-STATE WATER DISPUTES TRIBUNALS**

#### ***Cauvery Water Dispute***

#### ***Progress in Adjudication of the Dispute before the CWDT***

The Cauvery Water Disputes Tribunal (CWDT) was constituted by the Government of India on 2 June 1990 to adjudicate the water dispute regarding inter-state river Cauvery and the river valley thereof. Since its constitution, the Tribunal disposed off about 138 Civil

Miscellaneous petitions (CMPs) out of 149 filed by party States framed issued for adjudication, completed cross examination of expert witnesses and completed arguments on the issues covered under Group 1- relating to Agreement 1892-1924-Legal issues and Group-2 relating to availability of water – surface flows, additional/ alternative resources. The Tribunal had also passed an Interim Order in June, 1991 and further Clarificatory Orders on the Interim Order in April, 1992 and December, 1995.

The report and decision of CWDT under Section 5(2) of Inter-State River Water Disputes Act, 1956 are reserved as per orders passed by CWDT on July 27, 2006. The Cauvery Water Dispute Tribunal has submitted its reports and decision under section 5 (2) of Inter State River Water Dispute Act, 1956 to Government on 5<sup>th</sup> February, 2007.

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

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

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Engineers of the basin States as Members and Chairman, Central Water Commission as Member. The Authority is required to give effect to the implementation of the Interim Order dated 25<sup>th</sup> June 1991 of the Tribunal and its related subsequent orders.

During the Water Year 2006-07, starting from June, 2006 193 TMC of inflow was required at Mettur upto December, 2006 as per the Interim Order. Against this 226 TMC has been received at Mettur upto December, 2006.

### ***Mahadayi/Mandovi River Water Dispute***

In July, 2002, the State of Goa made a request under Section 3 of the Inter-State River Water Disputes Act, 1956 (as amended) for constitution of the Tribunal under the said Act and refer the matter for adjudication and decision of dispute relating to Mandovi river. The issues mentioned in the request included the assessment of available utilisable water resources in the basin at various points and allocation of this water to the 3 basin States keeping in view priority of the use of water within basin as also to decide the machinery to implement the decision of the tribunal etc. The Hon'ble Union Minister for Water Resources convened an inter-State meeting on 4.4.2006 at the level of Chief Ministers of the States of Goa, Karnataka and Maharashtra. The Government of Goa wants constitution of tribunal and reference of the dispute to the Tribunal. Accordingly, the Central Government in the MOWR concluded that the dispute contained in the request of State of Goa of July, 2002 cannot be resolved by negotiation and initiated further action in the matter as per the provisions of Inter-State River Water Disputes Act, 1956 and rules made there under. As per the provisions of Act Government of Goa was requested to send a revised requested since its request of July, 2002 does not confirm to provision of Act. Government of Goa on January 10, 2007 has modified its request of July, 2002 so that same conform to the provisions of the Act.

### ***Krishna River Water Dispute***

The Krishna Water Disputes Tribunal (KWDT) was constituted on 2<sup>nd</sup> April, 2004 for adjudication of the dispute relating to sharing of waters of Inter-State River Krishna and river valleys thereof.

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

### ***Vansadhara Water Dispute***

The State of Orissa has sent a complaint to the Central Government under Section 3 of the Inter-State River Water Disputes (ISRWD) Act, 1956 regarding water disputes between the Government of Orissa and Government of Andhra Pradesh pertaining to Inter-State River Vansadhara for constitution of a Inter-State Water Disputes Tribunal for adjudication. The main grievance of the State of Orissa in the complaint sent to the Central Government is basically adverse effect of the executive action of Govt. of Andhra Pradesh in undertaking the construction of the aforesaid flood flow canal at Katragada and failure of Govt. of Andhra Pradesh to implement the terms of inter-State agreement understanding etc. relating to use, distribution and control of waters of inter-State river Vansadhara and its valley. It has also



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raised the issue of scientific assessment of available water in Vansadhara at Katragada and Gotta Barrage and the basis for sharing the available water.

Accordingly, Secretary(WR) convened an inter-State meeting on 24.4.2006 at New Delhi to explore the possibility of finding out negotiated settlement of the dispute. In the meeting, both the States agreed that yield of the river is to be shared between Orissa and Andhra Pradesh on 50 – 50 basis. Both States also agreed that CWC will reassess the yield of the Vansadhara basin by utilizing the yield series upto 2005 for which necessary utilization data shall be furnished by the concerned State Government expeditiously. Based on the conclusions reached in the meeting, Central Government is hopeful of finding the negotiated settlement of the dispute. In continuation of this process, another inter-State meeting at the level of Addl.Secretary(WR) was convened on 5<sup>th</sup> -6<sup>th</sup> December, 2006 in which the follow-up action taken on the decision of the previous Inter-State meeting was reviewed. In the meeting, both States agreed to resume the dialogue process among themselves.

### ***Ravi & Beas Waters Tribunal***

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

The period for forwarding of further report by the Tribunal has been extended upto 5<sup>th</sup> February, 2007.

## ***BOARD/AUTHORITY/COMMITTEES***

### ***NARMADA CONTROL AUTHORITY***

#### ***Introduction***

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

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

#### ***Organisation***

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

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





*The Hon'ble Minister of Water Resources Prof. Saifuddin Soz with Hon'ble Chief Minister of Tamil Nadu, Dr. M. Karunanidhi and Hon'ble Chief Minister of Kerala Shri V.S. Achuthanandan, at a meeting on Mullaperiar Dam issues on November 29, 2006*



*View of Switchyard, Collection Pool and Sardar Sarovar Dam under Narmada River Valley Irrigation Project*

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Gujarat as members, can suo-moto or on the application of any party State or Secretary to the Government of India, Ministry of Environment & Forests, review any decision of the Authority. The expenditure of NCA is borne by the party States.

### ***Meeting of Narmada Control Authority***

The Narmada Control Authority held one meeting during the period under report till December, 2006 in which issues relating to Resettlement and Rehabilitation, Administrative matters and other project related matters were discussed.

### ***Important decisions taken by the Authority:***

1. The Authority ratified the detailed T.O.R. of Sardar Sarovar Resettlement & Rehabilitation Committee (SSRRC) which was finalized by the SSRRC in its 5<sup>th</sup> meeting and empowered the SSRRC to incorporate any need based modifications in the approved formats from time to time.
2. The Authority accorded its approval to the Revised Estimate (2006-07) and Budget Estimate (2007-08).
3. The Authority received the progress of R&R in the light of the report of the Relief and Rehabilitation Oversight Group (OSG) concerning Sardar Sarovar Project. The Authority decided to closely monitor the progress of work by deputing teams to be constituted by the NCA Secretariat. It was decided to do both concurrent as well as final monitoring of the works. It was also decided that independent experts/institutions would be associated with the monitoring process. NCA Secretariat would strengthen the R&R unit through temporary re-deployment of staff.
4. The Authority agreed with the revised scope

of the Power Sub-Committee which was recommended by the Power Sub-Committee in its 38<sup>th</sup> meeting held on 3-2-2006.

5. The Authority accorded its approval for uniform upper age limit of 56 years for all categories of staff of NCA Secretariat in accordance with the GOI rules for filling-up the posts on deputation basis.

### ***Monitoring of Projects***

As per Sub-Clause 8(3)(ii) of Clause-XIV of NWDT award, the Authority shall decide the phasing and shall coordinate construction Programme of Indira Sagar Project & Unit-II (Canals) of Sardar Sarovar Project with a view to obtain expeditiously optimum benefits during and after the completion of the construction of the project, having due regard to availability of funds. In compliance of these directions, the NCA has been monitoring the progress of construction works of the Indira Sagar Project and Unit-II (Canals) of Sardar Sarovar Project and bringing out half yearly status reports for the period ending September and March of each year. The works of dam (Unit-I) and Power House (Unit-III) of Indira Sagar Project have been completed, however, the filling of reservoir has been permitted by Hon'ble High Court of M.P. upto El. 260.0 m. against FRL at El. 262.13 m. The works of Narmada Main Canal (Unit-II) of Sardar Sarovar Project has been completed up to 357.196 Km. out of total length of 458.318 Km. in Gujarat. Govt. of Gujarat have planned, as an interim arrangement, to deliver about 500 cusecs of Narmada water to Rajasthan by the end of March'2007. The reports for the period ending 31<sup>st</sup> March 2006 in respect of these two projects were brought out by NCA.

### ***Environmental Monitoring Activities***

NCA is to monitor Environmental Safeguard Measures in respect of Sardar Sarovar Project and Indira Sagar Project as per terms of clearance from environmental angle issued by

Ministry of Environment & Forest, Govt. of India. Accordingly, following activities are being monitored:

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

### **Resettlement and Rehabilitation Activities**

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

The Resettlement and Rehabilitation policy for the affected persons of Sardar Sarovar Project (SSP) is based on the decisions and final orders of the Narmada Water Disputes Tribunal

(NWDT) Award and directions received from Hon'ble Supreme Court from time to time. Considering the socio-economic and cultural background of the population being displaced and with a view to improve the living conditions of these people, all the three participating States have formulated their own policies, which contain more liberal provisions than those envisaged in the Narmada Water Disputes Tribunal (NWDT) Award.

The R&R progress is being monitored effectively by the monitoring machinery, i.e., Resettlement and Rehabilitation (R&R) Sub-Group of the Narmada Control Authority chaired by the Secretary to the Government of India, Ministry of Social Justice and Empowerment and also by a Task Force constituted by the NCA in its 72<sup>nd</sup> Meeting. In addition, Chairman/ Chairperson of R&R Sub-Group and NCA's R&R officials make field visits required for the submergence of villages and R&R sites. The table given below indicates overall cumulative progress of R&R of Project Affected Families (PAFs).

### **Progress of Resettlement & Rehabilitation (R&R)**

<b>STATE</b>	<b>Total Project Affected Families (PAFs)</b>	<b>Total PAFs resettled</b>	<b>Balance Families to be resettled</b>
<b>GUJARAT</b>	4726	4726	0
<b>MAHARASHTRA</b>			
(a) In Gujarat	882	804	78
(b) In Maharashtra	3113	3008	105
<b>Total (i)</b>	<b>3995<sup>\$</sup></b>	<b>3812</b>	<b>183</b>
<b>MADHYA PRADESH</b>			
(a) In Gujarat	14124 <sup>*</sup>	6034	8090 <sup>\$\$</sup>
(b) In Madhya Pradesh	25245 <sup>*</sup>	18965	6280 <sup>\$\$</sup>
<b>Total (ii)</b>	<b>39369<sup>**</sup></b>	<b>24999</b>	<b>14370</b>
<b>Total (i + ii)</b>	<b>48090</b>	<b>33537</b>	<b>14553</b>

\$ This number may change after declaration of any additional genuine PAFs by GRA/State Government.

\$\$ The figures are tentative & allocation of PAFs for R&R in Gujarat is yet to be ascertained.

\* This number may change after taking option of PAFs for R&R & declaration of genuine PAFs by GRA/State Government.

\*\* The figures are based on the progress report submitted by GOMP in the R&R Sub-group meeting.

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### **(A) Indira Sagar Project (ISP)**

The Narmada Control Authority R&R Sub-Group was directed by the Hon'ble High Court vide an interim order dated 17.8.2005 to involve itself in the monitoring of the R&R measures by Narmada Hydroelectric Development Corporation Ltd to the PAFs/oustees of the 91 villages.

While disposing the said Writ Petition, the Hon'ble High Court of M.P. ordered on 8.9.2006, *inter alia*, that "the R&R Group of Narmada Control Authority would do the field study and apprise the Grievance Redressal Authority with regard to the grievance of the affected persons".

Accordingly, the R&R Sub-Group of NCA in its 67<sup>th</sup> Meeting held on 12.10.2006 has reviewed the R&R status concerning ISP. The Sub-Group desired the progress of R&R concerning dam height EL 260.0 m. as the permission to raise the water level upto this height has been granted by the court and also the status upto the dam height FRL 262.13 m to enable NCA Secretariat to undertake field study and apprise GRA.

### **Energy Management Centre (EMC) of NCA**

EMC is coordinating various activities of power generation of SSP complex in consultation with CEA WRPC, WRLDC and beneficiary States & concerned State Electricity Boards for generation planning, daily scheduling, monitoring of generation, transmission and energy accounting etc. During the year 2006-07 (April, 2005 to October, 2006) the total energy generation of SSP complex was 2289.42 MU, which was shared among the party States in the ratio prescribed by provisions of NWDT Award.

### **Annual Water Account of Narmada Basin**

Pursuant to the directives contained in the Sub-Clause-8 under Clause-XIV of the NWDT

award, NCA has been preparing Annual Water Account for the Narmada Basin after collecting the water utilization data from the party States on actual withdrawal at canal head for major & medium projects and actual area irrigated in each season for minor projects, as well as actual withdrawals for domestic, municipal and industrial uses. The authority has also been mandated by the award to determine the volume of water flowing in the river Narmada and its tributaries in a water year (1st July to 30<sup>th</sup> June) and apportionment among the party states. Annual Water Account upto the year 2004-05 has already been published by the Authority while draft report for the water year 2005-06 is under preparation for circulation among the party State governments.

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

#### **Composition and Functions**

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

#### **Progress of Main Dam Works**

The construction of the main spillway portion



of the dam had been held up for over five years due to the writ petition filed by Narmada Bachao Andolan in the Supreme Court of India. The Supreme court in its final judgment on 18th October 2000 gave directions for the immediate raising of the dam upto EL 90.0 m with direction to the Narmada Control Authority (NCA) to give permission for further raising of the dam on pari-pasu completion of the R&R and Environmental measures. The NCA, which is monitoring the Resettlement and Rehabilitation

(R&R) Programme of SSP, in its 61<sup>st</sup> meeting held on 17th November 2000 has finalized an action plan for completion of R&R works. The Action Plan finalised by NCA was also accepted by the Review Committee of Narmada Control Authority (RCNCA) in its 8th meeting held on 10th January 2001. The R&R time frame as per above action plan and the corresponding tentative schedule for completion of dam works is given below:

Dam Height (EL)	Time Frame	
	Completion of R&R	Completion of Dam
100.0m	December 2001	June 2002
110.0m	December 2002	June 2003
121.92m	December 2003	June 2004
138.68m	December 2004	June 2005

Permission for raising the spillway blocks to EL 100m was given by the NCA in its 66<sup>th</sup> (Emergency). This work was completed by the end of June 2003. Subsequently the NCA granted permission for raising the blocks no.30 to 46 to EL 110.64m level. Besides these blocks, blocks numbering 29,47,48,49 and 50 - which were at EL 105m level - were also required to be raised to the EL 110.64m level for achieving the effective dam height of 110.64m. The work was completed on 30<sup>th</sup> June 2004. In the 76<sup>th</sup> emergency meeting of NCA held on 8<sup>th</sup> March 2006, after deliberation on the R&R works in the States of Madhya Pradesh, Gujarat and Maharashtra and after recommendations of Environmental and R&R Sub-groups, permission was granted for raising the block nos. 30 to 46 to EL 121.92 m level. It attained height of 121.92 m in January, 2007.

#### **Progress of Canal Head Power House (CHPH)**

The Civil and Electrical works of Canal Head Power House were completed in all respect in January 1998. After the height of the dam reached Minimum Draw Down Level (MDDL) of 110.64 m, the CHPH units started generating

partial power with the commencement of monsoon of 2004 (16<sup>th</sup> August 2004).

#### **Progress of River Bed Power House (RBPH)**

The work of the River Bed Power House was held up due to development of stress zone in the powerhouse cavern and non-receipt of embedded parts for the Turbine Generator (TG) Sets owing to some contractual problems. The issue of supply of T.G. Sets was resolved with the signing up of a fresh agreement with M/s. Sumitomo Corporation of Japan. The works of further excavation in the River Bed Power House cavern and concreting have also commenced.

The first unit of RBPH was commissioned in the year 2004, unit no.2, 3 & 4 were commissioned in the year 2005 and remaining two units no. 5 & 6 were commissioned during the current year 2006. Total 2448.676 million units of energy were generated from both powerhouses since July, 2004 to June, 2006.

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

The irrigation Bye-Pass Tunnels (IBPT)



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

The work of IBPT is almost completed except installation of service gates & hydraulic hoist. Excavation, rock covering concreting, installation of steel liner, concreting around steel liner and service gate hoist chamber etc are completed. Fabrication, supply and installation of service gate is scheduled to be completed by March, 2007.

## **BANSAGAR CONTROL BOARD**

### **Organisation & Composition**

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

“In consultation with the Governments of Madhya Pradesh, Bihar and Uttar Pradesh, it has been decided to set up the Bansagar Control Board with a view to ensuring the efficient, economical and early execution of Bansagar dam including all connected works in Madhya Pradesh, but excluding the canal systems which will be executed by respective States namely, Madhya Pradesh, Uttar Pradesh and Bihar. The Control Board will be in overall charge of the

project including its technical and financial aspects.

The Union Minister of Water Resources is the Chairman of the Board and the Minister of State for Water Resources, Union Minister of Power, Chief Ministers, Minister-in-Charge of Irrigation and Finance of the three States and Minister-in-Charge of Electricity of Madhya Pradesh are its members.

### **Bansagar Dam Project**

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

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

### **Components of Bansagar Dam**

The Bansagar dam envisages construction of –

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

## **Benefits from the Project**

### **Irrigation Benefits-**

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

### **Power Benefits-**

(i) Power generation in Madhya Pradesh	425 MW
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### **Completion Schedule**

As per construction programme approved by the Executive Committee, the dam has been completed as per the following schedule:

Dam up to Crest level : Completed in June 2000.

Dam up to Top Bund : Completed in June 2006.

(Full height)

### **Progress of Works:**

The left and right rock fill dam have been completed up to top level i.e. R.L. 347 M. All masonry non-overflow blocks and both the key block on either side have been completed up to top elevation at R.L. 347 M. Spillway blocks have been raised up to crest level (R.L. 326.4 M.) and spillway Piers & Bridge have been completed. Fabrication and erection of 18 Nos.

Radial Crest Gates and Stop-Log Gates have also been fully completed by June, 2006. All construction sluices have been plugged and gates lowered. Works on installation of Irrigation Sluice Gates have been fully completed. Work on all the six Saddles have also been fully completed.

Works on some of the residual works of the dam viz. improvement to the approach roads to the dam, construction of high level bridge on Chottee Mahanadi river in the submergence area etc. are in progress, and likely to be completed by June, 2007.

### **Budget & State Shares:**

The Budget provision made for the project; sub-head wise expenditure during the financial year 2006-07 and cumulative expenditure up to October 2006 is as under:

<b>(Rupees in Crores)</b>				
Sl.No.	Sub-head	Budget Provision	Expenditure during 2006-07 up to 10/2006	Cumulative expenditure up to 10/2006
1	2	3	4	5
1.	Establishment	12.99	6.14	142.74
2.	Tools & Plants	0.01	0.00	2.06
3.	Suspense (debit)	0.15	0.11	148.55
4.	Works	87.00	37.29	1142.91
Gross Total		100.15	43.54	1436.26
5.	Suspense (Credit)	0.15	0.11	141.07
Net total		100.00	43.43	1295.19

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## **BETWA RIVER BOARD**

### ***Organisation and its Composition***

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

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

### ***Rajghat Dam Project***

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

## **Land Acquisition**

The dam submerges 38 villages in U.P and 31 villages in M.P State. Compensation in M.P area is almost completed. In U.P. the District Administration, Lalitpur had paid the land compensation of 25 villages and for balance 13 villages the land property are being acquired through mutual negotiation by the Betwa River Board.

The filling of reservoir up to FRL of RL 371.00 M may not be possible till the acquisition of land and property of balance 13 submergence villages is completed. .

### ***Planning and present status of Rajghat Power House Work***

The estimate of Rajghat Hydro electric Project at 1997 price level was Rs. 131.26 crores which included Rs. 58.41 crores for the civil works. The revised cost of the civil works of Power House is Rs. 66.89 crores at December 1999 price level and same has been furnished by BRB to MPEB. MPEB have contributed Rs, 59.51 crores The total expenditure incurred in civil works of Rajghat Power House till June 2006 is 62.81 crores.

The three units of Power House have been tested and commissioned during 1999-2000. The power generation was 1431, 1328 & 893 lakh units during the year, 2004-05, 2005-06 & 2006-07 up to 05.11.2006 respectively.

### ***Utilization of present storage***

The Phase-I of the construction of Dam up to Spillway crest level was completed in 1992 and since then the reservoir storage is being utilized downstream in Betwa Canal system (U.P.) and Bhandar Canal System (U.P.). The impounding of water above Crest level has been started since 1999-2000. The Reservoir (FRL 371.00m) filled up to the following level during the last five years

is given below:

<b>Sl.No.</b>	<b>Year</b>	<b>Filling level</b>
1.	2002-2003	367.00 m
2.	2003-2004	370.00 m
3.	2004-2005	370.20 m
4.	2005-2006	369.65 m
5.	2006-2007	370.20 m

### **Financial Position of BRB**

The financial position of Rajghat Dam and Rajghat Power House Project are given below Tables. respectively.

#### **Rajghat Dam**

**(Rs. In Crores)**

<b>Sl.No.</b>	<b>Item</b>	<b>U.P.</b>	<b>M.P.</b>	<b>Total</b>
1.	Apportioned cost as per revised cost estimate	150.300	150.300	300.600
2.	Contribution received upto 10.9.06	150.300	150.305	300.605
3.	Net expenditure as on 30.6.06	-	-	284.43
4.	Balance available with BRB as on 30.6.06			16.17

#### **Rajghat Power House**

<b>Detail</b>	<b>Civil works by BRB(Rs.in Crores)</b>	<b>E/M works by MPEB(Rs.in Crores)</b>
Revised cost estimate of work component	66.89	72.85 .
Contribution received up to 30.6.06	59.51	Expenditure has been made by MPSEB directly
Balance to be contributed	7.38	
Net expenditure incurred upto 30.6.06	62.81	
Balance available with BRB as on 30.6.06	(-) 3.30	

### **TUNGABHADRA BOARD**

#### **Introduction**

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

#### **Organization**

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

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## **Status of Activities**

### **Irrigation**

The Tungabhadra Reservoir filled up to its full reservoir level this year. The inflow into the reservoir from June to October, 2006 was 8451.80 Million Cumec (Mcum) (298.473 Thousand Million Cubic feet (TMCft)).

The utilization of water by the States of Karnataka and Andhra Pradesh till end of October, 2006 was 1,436.426 Mcum (50.727 TMCft) and 676.756 Mcum (23.903 TMCft) respectively as against the likely abstraction of 4,219.203 Mcum (149.000 TMCft) for the water year 2006-2007. Evaporation losses from June to October, 2006 were 169.419 Mcum (5,983 TMCft) to be shared by Karnataka and Andhra Pradesh in the ratio of 12.5 :5.5. A total quantity of 3140.786 Mcum (110.916 TMCft) of water has out flowed over spillway.

### **Hydro Power**

Two Power Houses are maintained by the Tungabhadra Board, with a total installed capacity of 72 MW, and a target of 202.50 million units of power generation is envisaged during the water year 2006-2007. Against this the power generated till end of October, 2006 was 105.665 million units. The power generated is shared between the States of Karnataka and Andhra Pradesh in the ratio of 20:80.

### **Mini Hydel Power Plant**

A Mini Hydel Plant at the head of Right Bank High Level Canal of the Tungabhadra Project under Build, Operate, Own and Transfer (BOOT) system through an Independent Power Producer viz., M/s NCL Energy Ltd., Hyderabad has been commissioned on 27-10-2004. The mini Hydel plant comprised 3 units of 2.75 MW each and generated 17.616 million units upto October, 2006. The Power generated are purchased by the Transmission Corporations

of Karnataka and Andhra Pradesh in the agreed ratio of 20:80.

### **Fisheries**

The Tungabhadra Reservoir has a water spread area of 378 sq km at full reservoir level affording tremendous scope for development of fisheries. Quality fish seeds are reared in the Board's Fish Farm to meet the demand of the public and for stocking in the Reservoir to increase the biomass. The fishing rights of the Reservoir was auctioned for the year 2006-07 to a local Fisheries Society for Rs. 36,76,181/-. In order to facilitate preservation of fish catch, the Board is running an Ice-cum-Cold Storage Plant. Quality fishnets are also manufactured in the Fish Net Making Plant run by the Board.

### **Board Meeting**

During the year, the Tungabhadra Board held two meetings till the end of October, 2006.

## **UPPER YAMUNA RIVER BOARD**

### **Introduction**

"Upper Yamuna" refers to the reach of river Yamuna from its origin at Yamunotri to Okhla barrage at Delhi. An MoU was signed on 12<sup>th</sup> May, 1994 amongst the basin states of Himachal Pradesh, Uttar Pradesh, Haryana, Rajasthan and Delhi, for sharing the utilisable surface flows of river Yamuna upto Okhla. The MoU also provided for creation of a "Upper Yamuna River Board" to implement the said agreement.

Accordingly, vide Resolution No. 10(66)/74-IT dated 11.3.95, the Central Government constituted the Upper Yamuna River Board as a subordinate office under the Ministry of Water Resources. After creation of Uttaranchal state in 2000, the resolution was modified to include Uttaranchal also in the Board.

The resolution also provided for creation of a



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Review Committee, to be known as the Upper Yamuna Review Committee, comprising of the Chief Ministers (Governor in case of President's Rule) of the co-basin states as members and Union Minister/Minister of State for Water Resources as Chairman, to supervise the working of the Upper Yamuna River Board.

### **Organisation**

The Board comprises of Member (WP&P), Central Water Commission as its Chairman; a representative from each of the six basin states, Central Electricity Authority, Central Ground Water Board and Central Pollution Control Board as part-time member and a full time Member-Secretary. The activities of the Board are funded entirely from the contributions by the six basin States. The Board has a sanctioned staff strength of 58, including the full time Member-Secretary.

### **Functions**

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

While the operation and maintenance of the control structures (dams, barrages) will continue to remain with the concerned states, the MoU provides that if there is any dispute regarding regulation of flows at any of the structures, the Board shall, with the approval of the Review Committee, take over the operation and control of that structure till the dispute is resolved.

### **Activities**

The Board has been making tentative seasonal

distribution of water to basin states at various distribution points and expediting the progress of Renuka, Kishau and Lakhwar Vyasi projects in upper reaches of Yamuna. The Board has also been engaged in the Inter-State issues amongst the basin states related to water distribution and other issues related to benefits and cost sharing from the proposed storage projects in Yamuna Basin.

Further an 'Empowered Committee' comprising of Irrigation/ Water Resources Secretaries from the states of Rajasthan, Haryana, Delhi and Uttar Pradesh has been setup to have a fresh look at the issue of providing water to Rajasthan from Tajewala. The work of analyzing the inflow data at Tajewala for a period of about 20 years has been entrusted to UYRB.

The 1<sup>st</sup> Meeting of the Steering Committee to expedite construction of three storage projects i.e. Renuka, Kishau and Lakhwar Vyasi in the upper reaches of River Yamuna. was convened on 29.9.2006. The meeting was chaired by the Chairman, Central Water Commission and was attended by the officers of Ministry of Water Resources, Central Water Commission, Central Electricity Authority, Central Pollution Control Board and the six Upper Yamuna Basin States.

The Hon'ble Minister of Water Resources took a meeting on 20<sup>th</sup> December 2006 of the Irrigation/ Water Resources Ministers of Upper Yamuna Basin States i.e. Haryana, Uttar Pradesh, Himachal Pradesh, Delhi and Rajasthan alongwith senior officers from the states to expedite the three projects Viz Renuka, Kishau and Lakhwar Vyasi. The meeting was also attended by officers of Ministries of Water Resources, Power, Environment & Forest, Planning Commission, Central Electricity Authority, Central Water Commission Upper Yamuna River Board, National Hydroelectric Corporation and Tehri Hydro Development Corporation. The meeting was held after a gap of about 9 years.

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## CHAPTER 8

# INTERNATIONAL COOPERATION WITH NEIGHBOURING COUNTRIES

### **Introduction**

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

### **India-Bangladesh Cooperation**

An Indo-Bangladesh Joint Rivers Commission (JRC) is functioning since 1972 with a view to maintain liaison in order to ensure the most effective joint effort in maximizing the benefits from common river systems which is headed by Water Resources Ministers of both the countries. A Treaty was signed by the Prime Ministers of India and Bangladesh on 12<sup>th</sup> December 1996 for the sharing of Ganga/Ganges waters. The Treaty shall remain in force for a period of thirty years to be renewable by mutual consent. For monitoring the implementation of the Treaty, a Joint Committee has been set up. During the current year, the Committee met three times and observed that Joint measurements on Ganga at Farakka (India) and Ganges at Hardinge Bridge (Bangladesh) during lean season (Jan-May 2006) had been held to the satisfaction of both the countries.

As per the decisions taken during the 36<sup>th</sup>

meeting of Indo Bangladesh Joint Rivers Commission (JRC), Hon'ble Ministers of Water Resources of India and Bangladesh along with their delegations jointly visited some of the sites of river bank protection/lift irrigation schemes/drinking water supply schemes along the concerned common/ border rivers including river Ichhamati to assess the situation on the ground. Final discussions were held at Dhaka on 20<sup>th</sup> September, 2006. During the field visit and discussions, a good understanding on the issues was reached between both the sides and differences narrowed down substantially. However, as some more technical details were required, agreement could not be reached and no minutes were signed. It was decided that further discussions would be held to arrive at a consensus in the next meeting of JRC which is proposed to be held in India in due course.

Indian side had earlier offered to provide free Arsenic testing kits and Arsenic removal plants to Bangladesh as good will gesture. In this connection Bangladeshi scientists have inspected these equipment at Central Glass and Ceramic Research Institute at Kolkata as per decision taken in above meeting. The decisions taken during the above visit have informed to Ministry of External Affairs for further decision in this regard.

The existing system of transmission of flood forecasting data on major rivers like Ganga, Teesta, Brahmaputra and Barak during the monsoon season from India to Bangladesh was continued.



*The Hon'ble Minister of Water Resources Prof. Saifuddin Soz and his counterpart from Bangladesh Shri Hafizuddin Ahmed, inspecting the constructed fencings on the India – Bangladesh Border at Sabroom sub-division, Tripura, on September 15, 2006*

### **India – Nepal Cooperation**

With a view to discussing important issues pertaining to cooperation in the field of Water Resources, including implementation of existing agreements and understanding, a Nepal – India Joint Committee on Water Resources (JCWR) headed by Water Resources Secretaries of both countries has been functioning with the mandate to act as an Umbrella Committee of all committees and groups.

A Treaty on Integrated Development of Mahakali (Sharda) River including Sharda Barrage, Tanakpur Barrage and Pancheshwar Multipurpose Project was signed between Government of India and Government of Nepal in February 1996, which came into force in June, 1997 (Mahakali Treaty). The Treaty is valid for a period of 75 years from the date of its entry.

### **Pancheshwar Multipurpose Project**

Pancheshwar Multipurpose Project is the Central piece of Mahakali Treaty. Required field investigations for the Pancheshwar

Multipurpose Project having an installed capacity of 5600 MW at Pancheshwar with irrigation and incidental flood control benefits and a re-regulating structure to primarily meet irrigation requirements downstream in Uttar Pradesh, have been completed. The Detailed Project Report (DPR) is to be finalised after mutually resolving the pending issues. Joint Group of Experts (JGE) which is monitoring the work, had decided in October 2004 to form a small Joint Group to look into pending issues to facilitate the finalisation of DPR.

In order to undertake the Joint Investigations of Sapta Kosi High Dam Multipurpose Project and Sun Kosi Storage cum Diversion Scheme; a Joint Project Office (JPO) was set up in Nepal in August, 2004 to take up field investigations and preparation of Joint DPR. A proposal costing Rs. 29.34 crore for taking up field investigations and preparation of joint DPR including setting up of JPO in Nepal has already been sanctioned by Government of India for this purpose. The preparation of joint DPR is scheduled to be completed in a period of 30 months from the date of setting up of JPO. In addition to irrigation and power benefits, the

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above project will also have major flood control benefits particularly in North Bihar. As decided in the 2<sup>nd</sup> meeting of Joint Committee on Water Resources (October 2004) the Joint Project Office has been asked to carry out feasibility study of the Kamla and preliminary study of Bagmati Multipurpose Projects to ascertain the likely constraints in implementation of these projects so that these could be appropriately addressed. Joint Team of Experts (JTE) reviewed the progress of preparation of DPR in its 7<sup>th</sup> meeting held in Biratnagar, Nepal in March, 2006.

In order to prevent spilling of flood waters from Lalbakeya, Bagmati, Khando and Kamla rivers from Nepal side into Bihar, India and Nepal have agreed to extend the embankments along these rivers in Indian Territory to Nepal and tie to high ground in Nepal with corresponding strengthening of embankments on Indian side. Financing of works in Nepal is done through MEA and on the Indian side, through MoWR. The DPR of Kamala River Embankment and Protection works costing NRs. 210.6 crore was approved in the meeting.

### ***India-Bhutan Cooperation***

A scheme titled “Comprehensive Scheme for Establishment of Hydro-meteorological and Flood Forecasting Network on rivers common to India and Bhutan” is in operation. The network consists of 35 hydro-meteorological/meteorological stations located in Bhutan and maintained by the Royal Government of Bhutan with funding from India. The data received from these stations are utilized in India by the Central Water Commission for formulating flood forecasts. A Joint Expert Team (JET) consisting of officials from the Government of India and Royal Government of Bhutan continuously reviews the progress and other requirements of the scheme. 22<sup>nd</sup> meeting of the JET was held in August, 2006 at Darjeeling in India.

Hon’ble Minister of Water Resources Shri

Saifuddin Soz visited Bhutan between 11-15<sup>th</sup> October 2006. During his visit he met His Majesty, The King of Bhutan and Hon’ble Minister of Agriculture, Royal Government of Bhutan. During the meeting, issues of mutual co-operation were discussed and His Majesty, The King of Bhutan expressed gratitude for co-operation of Government of India in development of Bhutan. Hon’ble Minister of Water Resources Shri Saifuddin Soz also inspected the Tala Hydro-electric Project and Chukha Power House during his stay in Bhutan.

The matter relating to problems of flood created by the rivers originating from Bhutan India was taken up with the Royal Government of Bhutan. A Joint Group of Experts (JGE) on Flood Management has been constituted between India and Bhutan to discuss and assess the probable causes and effects of the recurring floods and erosion in the southern foothills of Bhutan and adjoining plains in India and recommend to both Governments appropriate and mutually acceptable remedial measures. The JGE had series of discussions and also made field visits to some of the affected areas which included the sites prone to landslides and dolomite mining areas. Based on the discussions, the JGE felt that a more detailed technical examination is required and accordingly a Joint Technical Team (JTT) under the Chairmanship of Member (PID), North Bengal Flood Control Commission has been constituted which held its first meeting in April, 2005. The JTT studied some sources of sediment load, nature of slides and suggested further studies and preparation of maps to be taken up for deciding remedial measures to be recommended by the JTT.

### ***India-China Cooperation***

In 2002, the Government of India had entered into an MOU with China for provision of hydrological information on Yaluzangbu/Brahmaputra river in flood season by China to



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India. In accordance with the provisions contained in the MOU, the Chinese side is providing hydrological information (Water level, discharge and rainfall) in respect of three stations, namely Nugesha, Yangcun and Nuxia located on river Yaluzangbu/ Brahmaputra from 1<sup>st</sup> June to 15<sup>th</sup>, October every year, which is utilized in the formulation of flood forecasts by the Central Water Commission.

An artificial lake was formed in (June/July, 2004) on Pare-chu in Tibet (China) as a result of landslide. The bursting of the lake would have caused havoc downstream on the Indian side in Himachal Pradesh to the people and the infrastructure including the Naptha Jhakri H.E. Project. The Government of India kept a close watch on the day to day development in this regard. In order to discuss the situation in Pare-chu, an inter – ministerial team led by Shri R.K. Singh, Joint Secretary and Central Relief Commissioner, Ministry of Home Affairs held discussions with the Chinese authorities at Lhasa on 19<sup>th</sup> and 20<sup>th</sup> September, 2004. The team discussed various possible measures to address the situation and agreed to take up further action through diplomatic channels.

Subsequent to the visit to Lhasa, a technical team visited Beijing (China) from 26<sup>th</sup> to 29<sup>th</sup> December 2004 to hold in depth discussion regarding blockade on river Pare-chu and establishment of additional hydrological stations on Langquin Zangbu (Sutlej) and Parlun Zangbo (tributary of Yaluzangbu i.e. Brahmaputra) and Zayu Qu (Lohit). In March, 2005 a Secretary level delegation visited Beijing to discuss the measures to be taken on Pare-chu issue. China agreed for exploring possibility of controlled release of artificial lake water. It was also agreed that the Indian side would build a hydrological station on Parechu river on the upstream of the landslide dam on the Indian side before the coming flood season and share the hydrological information with the Chinese side. Accordingly, CWC had

established two monitoring stations on river Parechu in Indian territory, one is at Chumar (J&K), upstream of landslide dam, where river Parechu enters in Chinese territory and another at Sumdo (HP), where river Parechu re-enters in India. Both the stations are working satisfactorily. Matter has been taken up with MEA for signing of Implementation Plan regarding exchange of hydrological data of river Parechu.

The landslide lake breached in last week of June, 2005 and as per information provided by the Chinese side, height of dam was reduced and major quantity of water had flowed down and the lake dam might not pose any potential threat to downstream areas. However, it has been decided to share hydrological information on river Parechu at least upto flood season of 2007. As decided, monitoring of the situation based on satellite imageries is being done by CWC on monthly basis during the monsoon and on bi-monthly basis during the remaining period.

Another Memorandum of Understanding has been signed during the visit of the Chinese Premier to India in April, 2005 for supply of hydrological information In respect of Sutlej (Langquin zangbu), in flood season. A draft implementation plan to be signed by India and China in this regard is under finalization.

### ***Indo-Pakistan Co-Operation***

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



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During 2006- 07, the Commission held its 98th meeting in Pakistan in June, 2006.

Besides, one Secretary level talk on Tulbul Navigation Lock as part of Composite Dialogue was held in Pakistan in June 2006.

On Pakistan's request, World Bank appointed a Neutral Expert in May, 2005 for Expert Determination of Differences raised by Pakistan on the design of Baglihar HEP. During 2006-07 the Neutral Expert held three meetings, one in London in May 06, second in Paris in Oct'06 and the last in Washington in Nov'06. The Neutral Expert has submitted

his report on 12th February 2007.

In fulfillment of the requirements of Indus Water Treaty, the daily data of 280 hydrological sites on six basins, The Indus, The Jhelum, The Chenab, The Ravi, The Beas and The Sutlej of Indus system were sent to Pakistan every month.

Flood warning communications were made by India to Pakistan for their benefit through priority Telegrams, Telephones and Radio Broadcasts during the period from 1st July to 10th October, 2006, for Indus system of rivers.

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## **CHAPTER 9**

# **RESEARCH AND DEVELOPMENT**

Ministry of Water Resources (MoWR) provides financial assistance to promote research work in the field of Water Resources Sector. The assistance is provided by way of grants to academicians/experts in the Universities, IITs, recognised R&D laboratories/ institutes, Water Resources/Irrigation departments of the Central and State Governments in the country and NGOs for carrying out research and studies related to water resources sector. Research proposals of applied nature as well as basic research are considered for MoWR support. The Ministry also provides grants to various academic institutions/ research organisations to take up research schemes on specific problems related to Thrust Areas and identified regional problems. The Ministry also supports Seminar/ Symposium etc. on important water related issues and other mass awareness programmes.

The coordination of the Programme for providing financial assistance for R&D is done by Research & Development Division under the Policy & Planning Wing of the Ministry. Considering wide range of topics covered under Water Resources Engineering, five Indian National Committees (INCs) namely INCH (Hydraulics), INCOH (Hydrology), INCID (Irrigation & Drainage), INCGE (Geo-Technical Engineering) and INCCMS (Construction Materials & Structures) have been constituted to provide necessary technical and advisory support for the implementation of R&D programme. The members of these committees are drawn from various central and state government agencies as well as experts from

academic and research organisations. These committees have also been charged with the responsibility of constituting expert panels, conducting workshops and disseminating knowledge so as to advance the state-of-the art and technology in the respective subject areas.

### ***Indian National Committee on Hydraulic Research***

The Indian National Committee on Hydraulic Research (INCH) was constituted by the Ministry of Water Resources in the year 1990, with the responsibility of coordinating various research activities in the field of management of floods, hydraulic structures, river and estuarine hydraulics, river morphology, ground water hydraulics, instrumentation for seismic and geophysical measurements, open channel flow, pipe flow, hydraulic machinery, city water supply and ports and harbours. At present, 22 research schemes are being implemented under the supervision of INCH.

### ***Indian National Committee on Hydrology***

The Indian National Committee on Hydrology (INCOH) was constituted by the Ministry of Water Resources in the year 1982. It is the apex body in Hydrology, both surface and ground water, with the responsibility of coordinating various research activities in the field of meteorology, surface water hydrology, evaporation control, ground water hydrology and management, instrumentation, real time systems, application of GIS and remote sensing.

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The secretariat of INCOH is located at National Institute of Hydrology, Roorkee. At present, 33 research schemes are being implemented under the supervision of INCOH. In pursuance of its objectives, the Committee has brought out 26 state-of-art Reports in hydrology in the country. The Committee has also financial support to seminars, conferences etc. for dissemination of knowledge and promoting education and training in hydrology. The Committee is participating in the activities of International Hydrological Programme (IHP) of United Nation Educational, Scientific and Cultural Organisation (UNESCO) by organizing regional courses and workshops.

### ***Indian National Committee on Irrigation & Drainage***

The Indian National Committee on Irrigation & Drainage (INCID) was constituted by the Ministry of Water Resources in the year 1990. It is the apex body in Irrigation and Drainage with the responsibility of coordinating various research activities in the field of irrigation, drainage, agronomy, water management, environmental impact and socio-economic aspect of water resources projects, plasticulture development, geo-textiles. At present, 46 research schemes are being implemented under the supervision of INCID. INCID is working as National Committee for India for the International Commission on Irrigation & Drainage (ICID). INCID contributes to various ICID meetings/ workshops/ conferences and to other international conferences. INCID is also involved in bringing out technical publications in the form of manuals, reports, bulletins and seminar proceedings etc.

### ***Indian National Committee on Geotechnical Engineering***

The Indian National Committee on Geotechnical Engineering (INCGE) was constituted by the Ministry of Water Resources in the year 1991. It is the apex body in Geotechnical Engineering with the responsibility

of coordinating various research activities in the field of rock mechanics and tunneling technology; soil mechanics and foundation engineering; and instrumentation and measurement techniques. At present, 21 research schemes are being implemented under the supervision of INCGE. In pursuance of its objectives, the Committee has published 3 state-of-art Reports in Geotechnical Engineering in the country.

### ***Indian National Committee on Construction Materials & Structures***

The Indian National Committee on Construction Materials & Structures (INCCMS) was constituted by the Ministry of Water Resources in the year 1992. It is the apex body in Construction Materials and Structures with the responsibility of coordinating various research activities in the field of management of construction materials, concrete technology and structures. At present, 11 research schemes are being implemented under the supervision of INCCMS.

### ***Status of R&D Schemes***

Since 1992, MoWR has sanctioned 274 research schemes from various academic and research institutions spread all over India. Out of 274 schemes, 135 schemes have been successfully completed. Six schemes were foreclosed due to various reasons. At present 133 schemes are under progress in various academic and research institutions.

About 10 new research proposals are under consideration of the Ministry for funding under the R&D programme.

In the Tenth Plan, various R&D activities of Ministry of Water Resources are integrated through a common programme encompassing those relating to major and medium irrigation; ground water development; command area development and management in addition to a wide spectrum of mass awareness/publicity programmes and related capacity building.

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During the first four years of the Tenth Plan an amount of Rs. 7.81 crore was released to various institutions in the country for carrying out research schemes.

During the financial year 2006-07, Ministry has earmarked a provision of Rs. 16.06 crore for implementation of the plan scheme 'Research and Development for Water Resources Management'. The programme envisages funding R&D schemes and mass awareness activities; carrying out evaluation studies of irrigation projects for socio-economic and environmental impacts, efficiency studies and benchmark studies of irrigation projects.

### ***Meeting of Standing Advisory Committee***

The Standing Advisory Committee (SAC) of the Ministry for Water Resources for research and development considers and approves the research schemes for funding under the R&D Programme of the Ministry. The Committee also considers various other issues related to the R&D programme. A meeting of the committee was held August 2006, wherein 12 new research proposals were approved for funding under the R&D programme.

### ***Study for Evaluation of Completed Schemes***

Based on the decision of the Standing Advisory Committee of the Ministry for research and development, a study was awarded to Indian Institute of Technology Roorkee for evaluation of completed research schemes completed under the R&D Programme of Ministry.

## ***CENTRAL SOIL AND MATERIALS RESEARCH STATION***

Website : [www.csmrs.gov.in](http://www.csmrs.gov.in)

### ***Introduction***

The Central Soil and Materials Research Station (CSMRS), an attached office of the Ministry of Water Resources, is a premier Institute in the country located at New Delhi which deals with

field and laboratory investigations for river valley projects, basic and applied research on problems in geomechanics, concrete technology, construction materials and associated environmental issues, having direct bearing on the development of irrigation and power in the country and functions as an adviser and consultant in the above fields to various projects and organizations in India and abroad.

Broadly, the sphere of activities encompasses the following disciplines:

- Soil Mechanics and Foundation Engineering including Soil Dynamics, Rockfill Technology, Geosynthetics and Soil Chemistry
- Concrete Technology and Construction Materials
- Rock Mechanics including Instrumentation, Engineering Geophysics, Drilling Technology for Sub-Surface Characterisation
- Concrete Chemistry, Electronics and Information Technology.

### ***Research Activities during the Year***

#### ***Investigation for Projects***

Investigation for as many as 39 River Valley Projects and other civil engineering structures have been handled successfully with particular reference to foundation and burrow areas materials characterization for which a large number of laboratory tests have been conducted and detailed technical reports finalized.

#### ***Research Schemes***

CSMRS has established Geosynthetics Laboratory and upgraded the Rock Mechanics Laboratory. An Instrumentation Development Centre for training of Engineers in instrumentation of hydraulic structures has been established in CSMRS. Studies in the following research schemes were carried out during the year 2006-07.

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### ***Plan Schemes***

- (a) Geo-technical Investigations for River Valley Projects
- (b) Applied Basic Research in Structures
- (c) Advance Research and Consultancy
- (d) Upgradation of Laboratory and Field Testing Facilities
- (e) Structural Testing
- (f) Dynamic Characterization of Mass Concrete for Dams

### ***Self Sponsored Research Schemes***

- Potential Reactivity of Coal from a Project in Releasing Acidity.
- Prediction of Consolidation Characteristics of Fine Grained Soils.
- Improvement of Expansive Soil Using Fly ash.
- Evaluation of Fujibeton as a Soil hardener.
- Constitutive Modeling of Rockfill Materials and Analysis of Rockfill Dams.
- Use of Polymers for Soil Stabilization.
- Influence of Specimen Size on Tensile Strength of Geotextile.
- Evaluation of Strength Properties of Geotextile by Direct and Indirect Methods
- Evaluation of Coatings for Concrete Under Acidic Condition.

### ***Consultancy Works***

The Research Station primarily functions as an Adviser and Consultant to the various Departments of Government of India, State Governments and Government of India Undertakings/Enterprises.

Besides contribution to almost all the major river valley projects spread all over the country, CSMRS has also rendered consultancy to

projects in countries like Myanmar, Sri Lanka, Bangladesh, Iraq, Algeria, Afghanistan, Mauritius etc. At present CSMRS is handling a few projects in Bhutan, Nepal and Afghanistan. CSMRS has also imparted training to personnel from within the country/foreign countries in the fields of Geomechanics and Construction Materials Characterization for Civil Engineering Structures connected with river valley projects.

A large number of consultancy works pertaining to river valley projects and connected civil engineering structures were handled in 2006-2007.

CSMRS is carrying out the dam safety and performance studies with the help of Instrumentation at Sardar Sarovar Project, Gujarat, Rihand Dam Project, U.P., Lower Jhelum H.E. Project, J&K and Tehri Dam Project, Uttaranchal. CSMRS is also involved in establishment of Instrumentation Demonstration Centre (IDC) at CWC, New Delhi.

CSMRS was entrusted with the responsibility of Quality Assurance work of Construction of Tehri Dam which has been completed successfully. Now CSMRS is involved in Quality Control/Assurance works of Kol Dam Project, H.P., Myntdu Leshka Project, Meghalaya and Salma Dam Project, Afghanistan.

Construction of 107.5 meters high earth and rockfill Salma dam on river Hari Rud in Herat province of Afghanistan is going to start. CSMRS has carried soil, rock, rockfill and aggregates investigations earlier for this project. Now, CSMRS will be involved in Quality control works for this project for 2 years and a senior officer for 6 months has already been deputed for the work. Quality Control Laboratory of Tala Project (Bhutan) is also manned by Officers of CSMRS.

### ***Training Programmes***

A total of nine training programmes on the following subjects were organized at CSMRS during the year 2006-2007.



- Durability of Concrete in Water Resources Sector
- Water Quality and its Management (Jointly organized by CSMRS and National Institute of Hydrology)
- Special Concretes for Hydraulic Structures
- Ground Improvement Techniques (Jointly organized by CSMRS and Indian Geotechnical Society, Delhi Chapter)
- Application of Rock Engineering in Hydro Power Projects
- Advanced Training Course on Concrete Technologies for Hydraulic Structures (Jointly organized by CSMRS and Meghalaya State Electricity Board)
- Drilling Technology for Geotechnical Investigations for Water Resources Projects.
- Preparation of DPR for Water Resources Projects
- Numerical Modelling in Geotechnical Engineering

A total of 371 officers from various Central Government, State Government Organizations, Public Sector Enterprises, Autonomous Organizations and Private Organizations attended these training programmes.

### ***River Links***

Geotechnical investigations and construction material survey for the Ken-Betwa Link Canal Project, U.P, Parbati-Kalisindh-Chambal Link Project, Krishna (Almatti)- Pennar Link Canal Project, Mahanadi-Godavari Link Canal Project, Manas-Sankosh-Teesta-Ganga Link Canal Project are in progress for National Water Development Agency (NWDA).

### ***CSMRS-NGI Institutional Co-operation Programme***

Central Soil and Materials Research Station has successfully completed the third Institutional

Co-operation Programme on “Investigation of Geological Hazards in Dam Reservoirs for Safety of Downstream Structures” (2002-2006) in April, 2006. The objective of the project was to get acquainted with the state-of-art methods for investigation and mitigation of hazards in dam reservoirs and the structural safety of the existing dams. The objectives of these projects were fully met and the concerned authorities have appreciated the successful implementation of this project.

CSMRS and NGI, Oslo have once again decided to enter into collaboration agreement in the field of Safety Evaluation and Risk Assessment for Ageing Dams in India. The project shall be implemented starting January 1, 2007.

## ***CENTRAL WATER & POWER RESEARCH STATION, PUNE***

### ***Introduction***

Central Water and Power Research Station (CWPRS), established in 1916, is the premier hydraulic research institute offering comprehensive R&D support and consultancy services to a variety of projects dealing with water, energy resources development and water-borne transport; disseminating expertise and research findings amongst hydraulic research fraternity; and aiding and promoting research activities at various institutions besides training of research manpower. CWPRS is recognized as the Regional Laboratory for Economic and Social Committee for Asia and Pacific since 1971.

For providing solutions to complex problems referred to CWPRS, the methodologies adopted include investigations using physical and mathematical models, field investigations, desk studies and/ or a combination of these. CWPRS also undertakes allied works such as collection of field data, site investigation using seismic reflection/refraction surveys, evaluation of site-specific seismic parameters and testing

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of civil engineering materials and water samples. Another area of activity is calibration of flow meters/ current meters. CWPRS has made significant strides in the application of remote sensing techniques for providing solutions to river and coastal engineering problems. The requirements of accurate and reliable instrumentation for data acquisition and control systems for physical model studies/ prototype measurements are met by in-house developments. CWPRS, with an interdisciplinary approach in its activities, thus makes available unique services to the country and the ESCAP region.

### **Organisation**

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

Technical activities of CWPRS are carried out through the following ten major laboratories.

- Hydrology and Water Resources Analysis
- River Engineering
- Reservoir and Appurtenant Structures
- Coastal and Offshore Engineering
- Ship Hydrodynamics
- Hydraulic Machinery
- Earth Sciences
- Mathematical Modelling
- Foundations and Structures
- Instrumentation and Control Engineering

### **Research Activities**

CWPRS carries out basic, applied and field-oriented research through the ten major laboratories mentioned above under one umbrella at Khadakwasla, Pune to provide safe, economic and rational technical solutions. During January – November 2006, more than 100 technical reports based on applied research studies have been submitted to various project authorities.

CWPRS undertakes assignments on a “no-loss no-profit” basis. During the current year, 182 new studies, pertaining to the three major sectors of water resources, energy and water borne transport, were awarded by various project authorities to the Research Station.

Some of the important studies carried out by CWPRS during the year are :

#### **Model studies for**

- Desilting chamber of Chamera Hydro Electric (HE) project Stage III, HP
- Pump intake structure of Nathpa Jhakri Hydroelectric Power Project - Bhaba Tail Race Division Arrangement
- Spillway of Parbati HE project, Stage III, Himachal Pradesh
- Water conductor system of right bank underground power house, Sardar Sarovar Project, Gujarat
- Spillway and stilling basin for Teesta low dam project stage IV, West Bengal
- Myntdu (Leshka) dam spillway, Meghalaya
- Irrigation bye-pass Tunnel and stilling Basin, Sardar Sarovar Project, Gujarat
- Salma Dam Spillway, Afghanistan
- Dahisar, Poiser and Oshiwara river in North Mumbai
- Analysis of Prototype Wave Data in the Vicinity Off shore tanker terminal to assess the characteristics of Wave Transmission Through South Breakwater at Visakhapatnam Port
- Hydraulic Model Studies for the extension of Eastern Breakwater of Existing Fisheries Harbour at Chennai
- Desk studies for assessing siltation pattern in Sogal channel in the approaches to Kandla Port.
- Alignment of 11<sup>th</sup> & 10<sup>th</sup> general cargo berth

- 
- on the west bank of Kandla creek
  - Wave tranquility studies for deep draft multipurpose berths at New Mangalore Port.
  - Improving navigational conditions at Mandarmani tidal inlet, Purba-Medinipur, West Bengal
  - Investigating the behaviour of moored vessels at the proposed container & chemical berths at Jawaharlal Nehru Port, Mumbai
  - Predicting impact of extension of breakwater on hydrodynamics - Muldwarka Port, Gujarat
  - Tidal Hydrodynamics and sedimentation for development of port for M/s Essar Steel Ltd; Hazira, Gujarat
  - Mathematical model studies for predicting flow in Tapi River for the reach Kakrapar-Hajira/ Surat for design of embankment of SIC- Gujarat.
- Non - destructive studies for**
- Assessment of the quality of in-situ concrete of 250 MW T.G. foundation of unit No.1 Paras Thermal Power Station Expansion project, MSPGCL, Paras, Maharashtra
  - Assessment of the quality of in-situ concrete of 15 MW steam turbine and generator at Bhilai Steel Plant, SAIL, Bhilai, Chattisgarh
  - Assessment of sedimentation in Khadakwasla, Jayakwadi and Shriramsagar reservoirs using satellite Imageries
  - Estimation of site specific design seismic parameters for Punatsangchhu Hydroelectric Project, Bhutan; Seli and Raoli Hydroelectric projects, Himachal Pradesh and Dibang Multipurpose Project, Arunachal Pradesh
  - Desk studies for river protection works at Paro Airport Bhutan
  - Studies for consumptive water for Feroz Gandhi Unchahar Thermal Power Project, Uttar Pradesh
  - Mathematical model and desk studies for mitigating floods in Mithi river, Mumbai
  - Studies for intake well in Brahmani river for the integrated steel plant of M/s Tata Steel, Orissa
  - Seismic refraction survey at Vishnugad Pipalkoti HE Project, Uttarakhand
  - Electrical resistivity survey for the proposed Vishnugad Pipalkoti HE Project, Uttarakhand
  - Salinity variation in Chilka lake due to discharge from Naraj barrage
  - In-situ shrinkage measurement in concrete mixes for strengthening of spillway, Koyna dam, Maharashtra
  - Cross hole seismic studies for Vishnugad Pipalkoti HE Project, Uttarakhand
  - Physical/ mathematical/ desk studies for intake/ outfall/ protection works for 500 MW PFBR
  - 2-D Stability Analysis of Srisailem Dam (spillway Block No.9) due to impounding of water (upto RL.170m) at downstream side, A.P.
  - Studies for internal drainage of ash dyke for Simhadri project, NTPC, Vishakhapatnam, A.P.
  - Seismological studies for Sankosh H.E. project, Bhutan
  - Reservoir sedimentation studies for Tapovan Vishnugad Hydroelectric project, Uttarakhand
  - Morphological and desk studies to evolve hydraulic design parameters and river training measures for the proposed inland water terminal on river Ganga at Allahabad, U.P.
  - Precooling of the concrete constituents for

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mass concrete mixes of Omkareshwar dam, Omkareshwar HE project, MP

- Vibration studies for assessing the safety of road cum rail bridge and the piers of the Farakka barrage, West Bengal
- Analysis and Interprediction of Dam Instrumentation Data; Non-overflow Block 25, Indira Sagar Dam, MP
- Setting up of seismological network for Sapta Kosi and Sun Kosi projects, Nepal
- Developments of site-specific design seismic parameters for six sites for Saptkosi dam and Sun Kosi scheme

For different agencies, a total number of 743 current meters and 212 flow/ water meters were calibrated at CWPRS during the period.

### **Plan Schemes**

Following Plan Schemes were under implementation.

- Development and Application of Remote Sensing Technique/ Upgradation of Coastal Offshore Data Collection Capabilities/ Modernisation of Earth Sciences Laboratory
- Upgradation and Modernisation of Research Facilities at CWPRS
- Improvement of Canal Control through Modern Techniques and Technology
- Hydrology Project (Phase II)

## **NATIONAL INSTITUTE OF HYDROLOGY**

### **Introduction**

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

### **Main Objectives**

- To undertake, aid, promote and coordinate systematic and scientific work on all aspects of hydrology;
- To cooperate and collaborate with other national and international organisations in the field of hydrology;
- To establish and maintain a research and reference library in pursuance of the objectives of the society and equip the same with books, reviews, magazines and other relevant publications; and
- To carry out activities that the Society may consider necessary, incidental or conducive to the attainment of the objectives for which the Institute has been established.

### **Organisation**

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

The Institute has set up six regional centers in order to deal with the area specific hydrological problems of different regions in the country and for providing effective interaction with the States in the region. The Centres are: Hard Rock regional Centre, Belgaum; Centre for Flood Management Studies for Brahmaputra,

Guwahati; Western Himalayan Regional Centre, Jammu; Centre for Flood Management Studies for Ganga, Patna; Deltaic and East Coast Regional Centre, Kakinada; and Ganga Plains (South) Regional Centre, Sagar. The studies and research in the Institute are carried out under six scientific themes at the Headquarters, two centers for flood management studies at Guwahati and Patna and four regional centers at Belgaum, Jammu, Kakinada and Sagar. The scientific themes are: (1) Surface Water Hydrology ii) Ground Water Hydrology iii) Environmental Hydrology iv) Agricultural Hydrology v) Water Resources Systems and vi) Hydrological Investigations.

The 27<sup>th</sup> Annual General meeting of National Institute of Hydrology Society was held under the chairmanship of Hon'ble Minister (WR) on 10<sup>th</sup> January, 2007 at Roorkee after a long time. The meeting was attended inter alia by Hon'ble Minister of State (WR), State Ministers of Irrigation/ Water Resources of Andhra Pradesh, Jammu & Kashmir and Gujarat.

### **Studies and Research**

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

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

The research output of the Institute is published in the form of reports and peer reviewed scientific papers. During the year 2006-07, the Institute has published 55 papers in reputed international and national journals and 110 papers in the proceedings of international and national conferences and symposia. About 45 reports based on studies and research in

hydrology have been prepared during the year.

### **Sponsored and Consultancy Research Activities**

The Institute has been undertaking research studies for providing solutions to the real life hydrological problems in the field using advanced techniques. During the year 2006-07, the Institute has completed studies for seven sponsored and consultancy projects that were taken up earlier. In addition six new projects were taken up during the year. The titles and sponsors of the completed and ongoing projects are given below:

1. Streamflow Modelling of Bhagirathi River: Hydrograph Separation using Isotope and Geochemical techniques.
2. Assessment of Groundwater quality in 24 metropolitan cities of India.
3. Morphological studies of Ghaghra and Satluj River using remote sensing.
4. Seasonal Characterization of Ablation, Storage and Drainage of Melt Runoff and Simulation of Streamflow for Gangotri Glacier.
5. Directory of organizations working in the area of watershed management.
6. Integrated Hydrological Study for sustainable development of two Hilly watersheds in Uttarakhand.
7. Design flood Estimation for Bichom and Tenga Dams [Kameng Hydro-Electric Project (600MW), Arunachal Pradesh].
8. Land-use Change, Watershed Services and Socio-Economic impact in the Western Ghats Region.
9. Estimation of probable maximum flood for Pulichintala Dam, District: Krishna, Andhra Pradesh.
10. Development of Drought Vulnerability Indices for Preparedness and Mitigation.
11. Development of non-linear data driven model for flood forecasting for Indian Rivers.



12. Hydrological studies and multi-reservoir simulation studies for Detailed Project Report of Ken-Betwa Link.
13. Irrigation efficiency of Saran and Upper Morhan irrigation schemes.

### **Laboratories**

The Institute has well equipped laboratories with state-of-art instruments to provide the necessary support to field studies of Nuclear Hydrology, Remote Sensing & GIS, Soil Water, Snow & Glacier, Water Quality.

### **Technology Transfer**

One of the main objectives of the Institute is to transfer the developed technology to the target users. Besides, wide circulation of the published reports and research papers, organization of workshops, training courses, seminars, symposia, conferences, brain storming sessions, etc. have been major activities under the Technology Transfer Programme. During the year 2006-07, the Institute has organized following activities:

1. Joint Workshop with CSMRS on Water Quality and its Management at New Delhi, May 22-26, 2006.
2. Training Course on Estimation of Probable Maximum Flood at Roorkee, May 29-June 2, 2006.
3. Training Course on Watershed Management in Semi-Arid Region at Sagar, June 16-17, 2006.
4. Training Course on System Approach for Water Resources Management at Roorkee, June 26-July 7, 2006.
5. Workshop on Preparedness Review for DSS (Planning) at Roorkee, July 12-13, 2006.
6. Training Course on Application of Surface

Water Data Processing Software with emphasis on SWDES at Roorkee, August 28-30, 2006.

7. Training Course on Application of Modern Techniques in Practicing Hydrology at Roorkee, October 9-13, 2006.
8. Interactive Workshop for Prioritization of Structure, Inputs and Outputs of DSS ( Planning), November 22-24, 2006.
9. Five days Training Workshop on Watershed Hydrology and Management at Roorkee during December 11-15, 2006.

### **12<sup>th</sup> National Symposium on Hydrology**

The 12<sup>th</sup> National Symposium on Hydrology with focal theme on 'Groundwater Governance: Ownership of Groundwater and its Pricing', was jointly organized by the National Institute of Hydrology and Central Ground Water Board during 14-15 November 2006 at New Delhi under the aegis of the Indian National Committee on Hydrology (INCOH). In all, 315 participants from Central Government Departments, State Groundwater Departments, Research Organizations, Academic Institutions, Industries, Social sciences and NGO attended the Symposium.

The Symposium addressed the following five focal themes: (i) Groundwater management: emerging challenges, (ii) Groundwater governance: Institutional and legal framework, (iii) Groundwater ownership and water rights-legal aspects, (iv) Sectoral allocation of groundwater and its pricing, and (v) Stakeholders participation in groundwater governance, along with a plenary session.

### **Technical Publications**

During the year 2006-07, 45 Technical Reports and 55 Research Papers have been published in national and international journals. 110 papers have been presented in Seminars and Symposia during the year.

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## **CHAPTER 10**

# **UNDERTAKINGS OF THE MINISTRY**

### **WATER AND POWER CONSULTANCY SERVICES (INDIA) LTD (WAPCOS)**

#### ***Introduction***

Water and Power Consultancy Services (India) Ltd. – WAPCOS is a “MINI RATNA” and “ISO 9001 : 2000” is an accredited Public Sector Enterprise under the aegis of the Union Ministry of Water Resources. Incorporated on June 26<sup>th</sup>, 1969 under the Companies Act. 1956, WAPCOS has been providing consultancy services in all facets of Water Resources, Power and Infrastructure Sectors in India and Abroad.

#### ***Recognition***

WAPCOS has received ‘Merit Certificate’ for “Excellent” performance during 2003-2004 from Hon’ble Vice President of India. WAPCOS has received EEPC Awards on a number of occasions for highest export earnings amongst Consultancy Organisations.

#### ***Fields of Specialisation***

Main fields of specialisation of the Company cover Irrigation and Drainage, Flood Control and Land Reclamation, River Management, Dams, Reservoir Engineering and Barrages, Integrated Agriculture Development, Watershed Management, Hydropower and Thermal Power Generation, Power Transmission and Distribution, Rural Electrification, Ground Water Exploration, Minor Irrigation, Water Supply and Sanitation (Rural and Urban), Environmental Engineering including

Environmental Impact Assessments and Environmental Audit, Ports and Harbours and Inland Waterways, Rain Water Harvesting; Surveys & Investigations, Human Resource Management, System Studies and Information Technology. WAPCOS has also been venturing into newer fields such as Software Development, Financial Management System, Technical Education, Quality Control and Construction Supervision, Roads & Bridges, apart from turnkey assignments in Hydro-Power Projects and Water Harvesting Structures.

#### ***Spectrum of Services***

WAPCOS’ spectrum of services cover a wide range of activities e.g. pre-feasibility studies, feasibility studies, simulation studies, diagnostic studies, socio-economic studies, master plans and regional development plans, field investigations, detailed engineering including designs, detailed specifications, tendering process, contract and construction management, commissioning and testing, operation & maintenance, quality assurance & management, software development and human resource development.

#### ***Business Development***

During the current financial year 2006-2007 the Company is slated to achieve new milestones. Through strategic business development efforts, projects have been procured for Preparation of City Development Plans, Improvement of Urban Local Bodies, Water Harvesting, Tribal Areas Development, Lift Irrigation etc. in Maharashtra,

Andhra Pradesh, Andaman and Nicobar Islands, Haryana, Karnataka and the Ministry of Tribal Areas. The projects are closely linked to the developmental initiatives of the Govt. of India like the Jawaharlal Nehru National Urban Renewal Mission, Bharat Nirman, Sarva Shiksha Abhiyan etc.

Efforts are also being made for taking up surface water supply schemes in the arsenic affected areas of West Bengal. On the directive of Hon'ble Chief Minister of West Bengal a meeting was held with the Chief Secretary of West Bengal to present WAPCOS credentials.

A Major thrust is expected in the Roads and Bridges Sector. A vision document for development of Road Sector in Haryana was prepared and now WAPCOS has been formally empanelled in category-1 by the Government of Haryana for consultancy assignments for Field Surveys, Soil Investigations, Preparation of Detailed Projects Reports, etc. for Roads and Bridges. We have already secured projects for preparation of DPR for high altitude roads in Indo- China border areas of Uttaranchal district for CPWD.

Abroad, the Company has already secured the Punatsangchhu H.E. Project, Bhutan. The company has taken major initiatives by preparing pre-feasibility report for Champassack Irrigation Project in Laos and the Tasal Stung Reservoir Project in Cambodia at the request of Govt. of Laos and Royal Govt. of Cambodia, respectively. These projects are under active consideration of Ministry of External Affairs, Govt. of India and formal approvals are expected shortly.

WAPCOS proposals on Rural Electrification Expanded Programme, Ghana and Buri Gandaki H.E. Project, Nepal are also being pursued with MEA for early decision.

It is understood that other projects for which the initiative has been taken by WAPCOS i.e. 3 Mini Hydel Projects, one transmission line

and Development of master plan for Siem Reap River Basin in Cambodia are also under active consideration of MEA.

Efforts were also made to procure projects in East Africa ie Sudan, Kenya and Ethiopia. Feasibility studies for Tana Delta Sugar Integrated consultancy project for Tana and Athi Rivers Development Authority is one of the important projects under active persuasion.

### ***Achievements/Awards/Recognitions***

WAPCOS has been upgraded from Schedule "C" to Schedule "B", approval for which has been conveyed by the Ministry of Water Resources vide letter No. 14/2/2000-P.II(Vol.II)(PSU)/312 dated 5.5.2006.

Some of the major highlights of WAPCOS performance during the last 3 years include:-

- The Company has posted 'Excellent' results in terms of MOU for the year 2005-2006 for the third year in succession. WAPCOS has also been selected amongst the top ten Central Public Sector Enterprises for the Memorandum of Understanding excellence Award for the year 2005-06.
- Gross Margin in the year 2005-06 has increased by 1098% as compared to the year 2002-03
- Net Profit (after Tax) / Net Worth in the year 2005-06 has increased by 559% as compared to the year 2002-03
- Turnover during the year 2005-06 has increased by 169% as compared to the year 2002-03
- The growth in new business secured during the year 2005-06 is 154% as compared to the year 2002-03
- The initiative taken by the company led to reduction in Administration and Gen. expenses / Project Expenses from 34.75% in the year 2002-03 to 12.50% in the year 2005-2006.

### **Strategic Plan 2005-2009**

The Strategic Plan 2005-09, which was a requirement under the MOU for the year 2004-05, was prepared by M/s Deloitte Touche Tohmatsu. The management has agreed with the analysis made by M/s Deloitte Touche Tohmatsu in the Strategic Plan with regard to Financial Status, Human Resources, Strategic Improvements, Operations Performance, Market Structure, SWOT Analysis, Business Strategy, Productivity Bench Marks etc. It will be the endeavor of the management to use the analysis for improving the performance, it will be monitored with reference to bench marks given in the plan. The implementation will be done in a phased manner.

### **Personnel and Human Resources Management**

Technical know how possessed by the

Consultants has been utilized in diversified fields such as dam safety, computer based data decision support system, inland waterways, socio-economic survey, ports & harbours, renewal and new source of energy, management training projects, environmental engineering etc. The dependency on the deputationists and consultants has been reduced to some extent by getting the technology transferred to the company's regular incumbents. Company's own engineers working in various levels are independently handling the projects in various areas and services of Consultants are being utilized only for the higher technical know-how and guidance in very crucial works and stages.

### **Financial Performance**

The Financial Performance of the Company for the year 2005-2006, alongwith the comparative figures for 2004-2005, is indicated below:-

**(Rupees in Lakhs)**

<b>PARTICULARS</b>	<b>2005-06</b>	<b>2004-05</b>
<b>INCOME</b>		
(i) Consultancy Income	5837.89	5364.92
(ii) Contract Income	5280.85	3292.67
Total Project Income (i) + (ii)	11118.74	8657.59
Other Misc. Income	72.23	54.28
<b>Total Income</b>	<b>11190.97</b>	<b>8711.87</b>
<b>EXPENDITURE</b>		
(i) Consultancy Expenses	3648.02	3517.48
(ii) Contract Expenses	4833.52	3159.39
Total Project Expenses (i) + (ii)	8481.54	6676.87
Administrative & General expenses	924.60	873.43
Depreciation	60.16	53.31
Provisions	145.09	325.06
Donation	0.00	20.00
Total Expenditure	9611.39	7948.67
<b>Profit before Tax</b>	<b>1579.58</b>	<b>763.20</b>
Prior period adjustments	(4.28)	58.51
<b>Profit Before Tax</b>	<b>1575.30</b>	<b>821.71</b>

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The company has done exceedingly well during the financial year 2005-06. For the first time in project income for the year 2005-06 has been Rs.111.18 crore against Rs.86.57 crores last year, which is an increase of about 28%. Also, the company has achieved an all-time-high profit before tax of Rs. 15.75 crore, which is an increase of 92% over last year. Due to stringent cost control measures adopted by the company, the percentage of Administrative and General expenses to project expenses has been brought down to 12.50% as against 14% last year.

### **NATIONAL PROJECTS CONSTRUCTION CORPORATION LIMITED**

#### **Introduction**

National Projects Construction Corporation Limited (NPCC) an ISO 9001-2000 Certified, the first and foremost Engineering Construction Company which came into existence on the 9<sup>th</sup> January, 1957 to undertake the responsibility of development of key infrastructural sectors like Canal Systems, Irrigation and River valley Projects, Dams and Barrages, Hydel and Thermal Power Projects, Industrial Structures, Road and Bridges, Buildings and Townships, Airfields etc.

At present the Corporation is having 84 working units / 273 sites of National importance. NPCC is one of the few construction Companies in the Government Sector having expertise and equipment for construction of Tunnels, which form a major component for any Hydro-Electric Project.

During this Golden Jubilee year, NPCC has been able to reverse the loss making trend of the previous 18 years and has successfully posted a modest profit of Rs.2.26 crores as against a loss of Rs.71 crores in the previous

year. It has achieved a turnover growth of 90% which is indeed commendable.

To commemorate the momentous occasion of Golden Jubilee and also to bring awareness of the Engineering & Management feat of NPCC's glorious existence for more than five decades as the Pioneer Construction and Project Management Company in the Public Sector, a function was organized at Air Force Auditorium, Subroto Park, New Delhi on 8th January, 2007. The programme was graced by the Hon'ble Minister of Water Resources, Secretary, Ministry of Water Resources, Chairman, BRPSE, Chief Post Master General and other high profile dignitaries.

During the year, up to February 2007 the Corporation has bagged new project works valued at Rs.1173.00 crores as against Rs.854.00 crores in the previous year showing an increase of 37.35%. The order book position as on 28<sup>th</sup> Feb'07 touched Rs.2958.00 crores as against Rs.1667.00 crores in the previous year showing an increase of 77.45%. To utilize and augment the experience in Industrial Projects, NPCC has ventured into such works with HAL like building of Housing Quarters & Allied Services, LCA production facility, HAWK production facility, Finished Goods Hanger facility etc. to the tune of Rs.68.56 crores. In the field of infrastructure, NPCC has been allotted further road works for Rs.450.00 crores under Bharat Nirman Yojana in Bihar. Ministry of Home Affair has also enlisted NPCC for their Indo-Tibetan Border Road in Laddakh in J&K State.

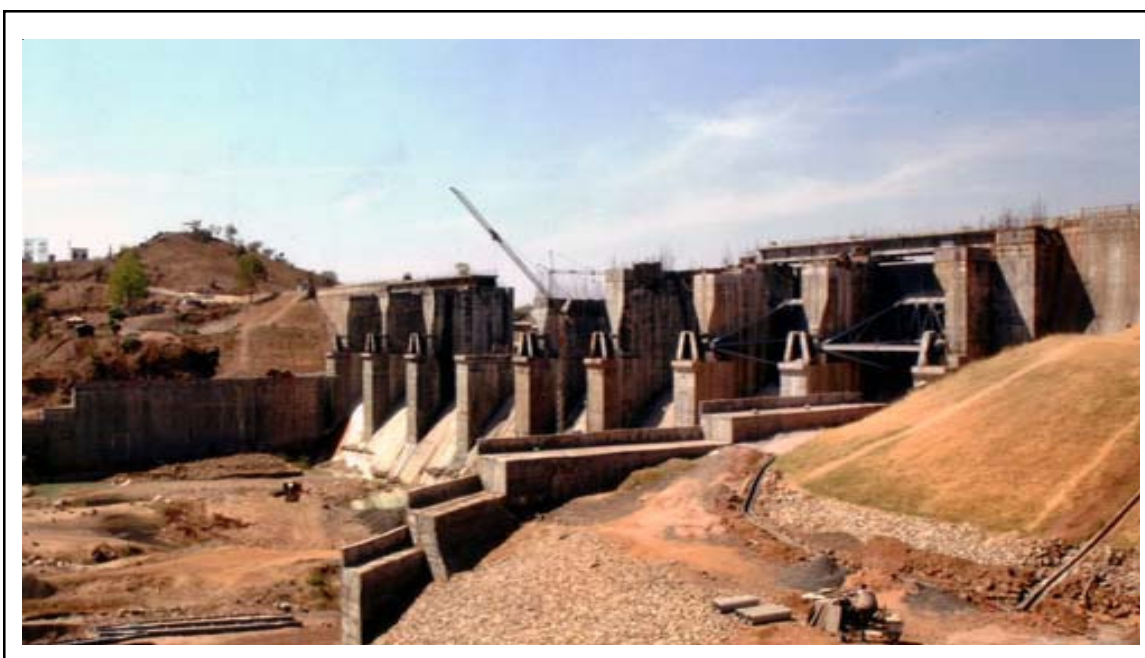
#### **Turnover**

The authorized capital of the company is Rs 30 crores and its Paid up Capital is Rs 29.84 crores.





*The Hon'ble Minister of Water Resources Prof. Saifuddin Soz lighting the lamp on the Golden Jubilee celebration of NPCC alongwith Smt Gauri Chatterji Secretary (Water Resources) and Shri S. Manoharan Addl Secretary (Water Resources)*



*Shaheed Chandra Shekhar Azad Masonry Dam (Jobat Dam Project)*

The turnover of the Corporation during last five years and the achievement for the current year 2006-07 is given below:

(Rs. in Crores)

Year	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
Turn-over	137.60	227.62	302.88	305.64	577.66	558.43 up to Feb'07

### **Works under Execution**

At present, the corporation is working at 84 units / 273 sites spread all over the country. These include Irrigation & River Valley Projects, Hydroelectric Projects, Thermal Projects, Industrial Structures & other miscellaneous projects. Some of the major projects in hand are as follows.

#### **Irrigation and River Valley Projects**

- Dolaithabi Barrage in Manipur.
- Construction of Masonry dam & Allied Civil Works in Jobat Dam(MP), Diversion Channel, Afflux & Left Marginal Bund at Ganga Barrage Kanpur (UP). Meza Link Channel, Bansagar Poshak Canal in Mirzapur (UP), Kalsi Barrage Project. (Tripura), Galudih canal in Jharkhand.

#### **(a) Hydroelectric Projects**

- Maneri Bhali Project (Head Race Tunnel, Surge Shaft, Pen Stocks) (Uttanchal)

#### **(b) Thermal Projects**

- Construction of New Ash Pond area of NTPC at Talcher Super Thermal Power Project in Orissa.
- Ash Dyke works (Stage I & II), off site civil

works, Raw Water Reservoir at Sipat STPP in Chattisgarh.

- Off site civil works for Kahalgoan STPP in Bihar.
- Foundation & Super Structure of New Parli Project & Paras Project for Maharashtra State Power Gen. Co. Ltd in Maharashtra.
- Civil, Structural & Architectural work for Birsinghpur Thermal Power Project in M.P.

### **Miscellaneous Projects**

The Corporation has undertaken several construction assignments relating to Buildings, Roads, Hospitals, Bridges, Flyovers etc. These include :

- Two Nos. Tunnel work for Jammu – Baramulla Rail Link Project for Konkan Railway in J&K State.
- Department of Telecommunication Building at Guwahati in Assam,
- RCC Bridge at Kawamara , Nutan Bazar, in Tripura, Fisheries College and New Legislative Assembly Building at Agartala
- Housing Quarters for Assam Rifles at different locations in the state of Nagaland, Arunanchal Pradesh, Manipur, Mizoram, Meghalaya, Tripura, Sikkim & Assam.

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- Water treatment Plant & River Over Bridge (ROB) works at Bagalkoat and Storm water drains at Bangalore in (Karnataka).
  - Minor Bridges between Khurda – Bolangir, Lanjigarh railway works high level bridge over IB River in Orissa.
  - Pradhan Mantri Gram Sadak Yojana (PMGSY) Roads works at different locations in Bihar.
  - Indo Bangla Border Fencing/Roads works in Tripura, Meghalaya, Assam and Mizoram.
  - Building works at five new locations in North East Region valued at Rs.17.14 crores
  - Border fencing Phase III in Assam covering 50 km. at the cost of Rs. 30.00 crores
  - Border fencing Phase III in Meghalaya covering 78 km. valued at Rs. 46.80 crores
  - Construction of 172 number residential accommodation of Type I, II, III, IV & V at Patherkandi, Silchar, Assam for 45 Bn BSF valued at Rs. 11.20 crores

### ***New Works Secured***

NPCC has secured works valued Rs.2449.00 crores as detailed below:-

- (A) Year 2005-06 Rs. 1536.00 crores against target of Rs. 1000.00 crores.
- (B) Year 2006-07 Rs. 893.00 crores against total target of Rs. 1750.00 crores.
- (C) The present order book position of NPCC ending November 2006 is Rs. 2850.00 crores.

- Road works under Bharat Nirman Yojana in Bihar valued at Rs. 450.00 crores
- Indo Tibetan Border Roads in Laddakh in J&K State valued at Rs. 200.00 crores
- Construction of Annicut for different districts in the state of Chattisgarh at value Rs. 17.51 crores
- Construction of different types of Quarters and Barracks for Assam Rifles valued at Rs. 26.38 crores

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## **CHAPTER 11**

# **ROLE OF WOMEN IN WATER RESOURCES MANAGEMENT**

Nearly 74 percent of Indians live in villages of which fifty four percent are engaged in the agricultural workforce. Women in particular, contribute significantly to agricultural production. In pursuance of the provisions in National Water Policy 1987 (and also 2002) farmers are to be involved progressively in various aspects of management of irrigation systems, particularly in water distribution and collection of water charges. Ministry of Water Resources, while issuing guidelines in April 1987, specifically emphasized upon the States to consider representation of women in the Water Users' Association (WUAs) at all levels. Many States have

amended their Irrigation Acts or come out with specific Acts on the Participatory Irrigation Management and some of them have made specific provisions for women's participation.

The marginal representation of women, however, is not adequate in view of the magnitude of the problem. Considering the importance of women in terms of their numerical strength and the significant contribution they make to the agricultural labour force, there is a need to encourage participation of more women in Water Users' Associations by bringing in a new culture among the water users.

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## **CHAPTER 12**

### **PROGRESSIVE USE OF HINDI**

During the year, effective measures were taken in the Ministry of Water Resources for the Progressive use of Hindi for Official purposes. Efforts were made to ensure compliance of various orders/ instructions issued by the Department of Official Language. Along with translation of important documents, the Hindi Section of the Ministry implements the Official Language Policy of the Union Government in the Ministry and all the organisations under administrative control of the Ministry.

Two meetings of Hindi Advisory Committee were held under the chairmanship of Minister of Water Resources and Minister of State for Water Resources. The progress of Rajbhasha Hindi was extensively discussed in the meetings.

The sub-Committee of the Parliamentary Committee on Official Language inspected various offices of Central Ground Water Board, Vishakapatnam; Central Water Commission, Mangalore and Kochi; Water and Power Consultancy Services(I) Ltd. and National Water Development Agency, Gwalior and Betwa River Board, Jhansi under the Ministry of Water Resources and suggested measures for the progressive use of Hindi.

The Official Language Implementation Committee of the Ministry under the Chairmanship of Joint Secretary (Admn.)

has been meeting regularly. The Committee has discussed the difficulties being faced in the use of Hindi in the Ministry and its organizations. Timely action was taken on the decisions taken in these meetings. Sufficient progress has been made in the implementation of the Rajbhasha Hindi in the Ministry.

Annual noting and drafting competition continued this year also to encourage staff and officers to do their work in Hindi.

To encourage healthy competition among the organizations under the Ministry for doing maximum work in Hindi, the Rajbhasha Vijayanti Shield for the year 2005-06 was awarded to Narmada Control Authority, Brahmaputra Board and WAPCOS for 1st, 2nd & consolation prize respectively.

Hindi Fortnight was organized in the Ministry during September, 2006. During the fortnight competitions for Rajbhasha Quiz, Hindi Noting & Drafting, Hindi Essay, Typing and Stenography and Sulekh were organized. Employees and Officers of the Ministry enthusiastically participated in these competitions.

To encourage the staff to do their work in Hindi annual noting and drafting competition continued during the year. Hindi Workshops were also organized with



a view to promote Hindi in official work. Information regarding Official Language Act/Regulations was provided and participants were trained to do official work in Hindi during these workshops.

Joint Director (OL) inspected some of the offices of the Ministry of Water Resources situated outside Delhi. Dy. Director (O.L) and Assistant Director (O.L) inspected sections of the MOWR and oversaw the



*Shri Jai Prakash Narayan Yadav, Minister of State, Ministry of Water Resources alongwith Shri S. Manoharan, Addl Secretary (left) and Shri S. Ramasubban Joint Secretary (Right) at the Hindi Salahkar Samiti meeting in New Delhi on November 16, 2006*

compliance of Official Language Policy. Instructions were given for rectification of the deficiencies during such inspections. Regular monitoring of the work being done in Hindi in the Ministry and its attached/ subordinate offices was done through

quarterly reports. Joint Director (OL) and Assistant Director (OL) delivered lectures in the workshops organized by attached/ subordinate offices of the Ministry and apprised the participants about the O.L. policy of the Govt. of India.

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## **CHAPTER 13**

# **ADMINISTRATION AND WELFARE**

### **ADMINISTRATION WING**

The total personnel in the various organizations of the Ministry in Group A, B, C and D is 14134. The policies of the Government with regard to welfare, personnel and e-governance are being implemented in the Ministry. A detailed Organisational Chart is given as Annexure II.

The Administration Section of the Ministry is primarily responsible for the establishment, personnel and administrative matters of the officers and staff of the Ministry (proper) besides being the cadre controlling authority of posts borne on CSS/ CSSS/ CSCS sanctioned in the Ministry (proper) and those in Central Water Commission & Central Soil & Materials Research Station. Other aspects of the administration like filling up of posts by direct recruitment/ deputation/ promotion, termination of probation, confirmation, grant of financial upgradation under Assured Career Progression Scheme, release of annual increments, pay fixation, maintenance of Confidential Reports, sanction of TA/LTC advance, House Building Advance, Motor Car/ Scooter/ Cycle advances, GPF advances/ withdrawals, framing/ amendment of recruitment rules, finalisation of pension/family pension cases, leave of all kinds, forwarding of applications etc., are also dealt with.

As part of developing the human resources,

16 officials of the Ministry were sent on training to various institutes to enhance their skills. The Schedule Caste/ Schedule Tribe/ Other Backward Class Cell also forms part of the Administration Section. It provides secretariat assistance to the Liaison Officer for the Schedule Caste/ Schedule Tribe, and Liaison Officer for Other Backward Classes in discharging their functions on various matters relating to reservation for Schedule Caste/ Schedule Tribe/ Other Backward Class in Government services and carrying out inspections of reservation rosters and on allied matters in respect of various organisations of the Ministry.

### **Minority Welfare**

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

### **Monitoring of Reservation for SC/ ST/ OBC**

The Scheduled Caste/ Scheduled Tribe and Other Backward Classes (SC/ ST/ OBC) Cell also forms part of the Administration Section. It renders secretariat assistance to Liaison Officers for SC/ ST and for OBC

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in discharging their functions on various matters relating to reservation for SC/ ST/ OBC in Government services and carrying out inspections of reservation rosters. It also advises on allied matters to various organisations of the Ministry.

### ***The Right to Information Act, 2005***

The Right to Information Act, 2005 came into effect from 12.10.2005. As provided under Section 4(1) (b) of the Act all the 17 manuals in respect of Ministry (proper) and its organisations were prepared and have been placed in the Ministry's website. Appointment of Central Public Information Officers and Central Assistant Information Officers in respect of Ministry and its organisations have also been made in terms of section 5 (1) and (2) of the said Act. These have been hosted in the website of the Ministry and concerned organisations. The particulars of Central Public Information Officers in respect of Ministry proper are as Annexure VII.

### ***Redressal of Staff Grievances***

A Grievances Redress Cell is in existence in the Ministry of Water Resources, which entertains the grievances of staff of all the organizations under the Ministry. Joint Secretary (Admn.) and Deputy Secretary (Coordination & PPP) have been designated as Director of Public

Grievances and Director of Staff Grievances respectively. Due attention is paid for disposal of grievances within a reasonable period. Most of the grievances received are related to service matters, payment of pensionary benefits etc.

### ***Committee for Complaints on Sexual Harassment of Women Employees***

In accordance with the guidelines laid down by the Hon'ble Supreme Court of India to prevent sexual harassment of women employees, a Committee is already functioning to look into the complaints of the women working in the main secretariat of the Ministry. The composition of the committee is as under:-

1. Ms. Meeta Singh, DS(C&PPP)  
- Chairperson
2. Ms. Mahalaxmi Ramakrishnan, US(F)  
- Member
3. Shri N.K. Gupta, US(Admn.)  
- Member

The Committee submits its finding to the Joint Secretary (Admn.) for necessary action. During the year 2005-06, no complaint was received by the Committee from the women employees of the main Ministry.

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## CHAPTER 14

# INITIATIVES IN THE NORTH - EAST

### **Introduction**

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

### **Brahmaputra Board (BB)**

**A) Pagladiya Dam Project:** The preliminary works of Pagladiya Dam Project was initiated as approved by Govt. of India at Rs. 542.85 crores (2000 price level).

The project envisages assured irrigation to a gross command area of 54,160 ha. flood benefit to 40,000 ha & incidental Hydro Power generation of 3 MW (I.C). In addition 956 ha of land was acquired against 3238 ha for rehabilitation & resettlement purposes.

The construction activities were held up due to non completion of Zirat (property) Survey by Govt. of Assam. However, after formation of the new administrative authority i.e. Bodoland Territorial Council(BTC) in the project area the stalemate situation of Zirat survey as well as

construction activities of Pagladiya Dam Project has been removed and the BTC has informed the Brahmaputra Board to take up necessary action for starting Zirat Survey for construction of the project. Due to change of design, cost escalation and revised R&R package the cost of the project has been revised to Rs. 1069.40 crores.

### **B) Harang Drainage Development**

**Scheme:** The Scheme was cleared during 9<sup>th</sup> Plan and revised to Rs. 30.49 crores during 10<sup>th</sup> plan. On completion this will benefit 11850 ha of chronically drainage congested area in Barak Valley, Assam. The present progress is 96% and the balance works will be completed within March,2007.

### **C) Anti-Erosion Work at Dhola-Hatighuli:**

An avulsion of River Dibang & Lohit jointly with Noa-Dehing had taken place near Dhola-Hatighuli area of Assam and resulted in large scale erosion on the left bank. The work of diversion of the river Dibang to its original course was taken up at a cost of Rs. 10.47 crores. (Phase-I) and also diversion of Lohit (combined with Noa-Dehing) at a cost of Rs, 5.22 crores. (Phase-II). The works are planned in phased manner as per morphological studies. The Phase-I&II have already been completed & Phase III works are to be taken up by Brahmaputra Board for execution under the EFC “Critical Flood Control and anti-erosion works in Brahmaputra and Barak Valley”.

### **D) Protection of Majuli Island, Assam:**

Majuli island is a chronically flood and erosion





*Construction of Khuga Dam at Churachandpur (Manipur) under the development of North Eastern Sector of India.*



*The Hon'ble Minister of Water Resources Prof. Saifuddin Soz chairing the meeting of "High Level Group on North-East Water Resources Authority (NEWRA)" on Dec 27, 2006. Other members present are Shri Montek Singh Ahluwalia, Deputy Chairman, Planning Commission, Chief Minister of Assam and Arunachal Pradesh, Smt. Gauri Chatterji, Secretary (WR) and Dr. Kirit S. Parikh, Member, Planning Commission*



affected island in river Brahmaputra. The protection works of the island was taken up by the Board as approved by the Govt. of India on the request of Government of Assam as under:

(i) **Immediate Measures:** To give immediate relief, work on flood and erosion control at an estimated cost Rs. 6.22 Crore. was taken up during 2003-04. This work was completed during 2004-05.

(ii) Board had prepared a scheme which was technically cleared by the CWC at an estimated cost of Rs. 86.56 crore. The Expenditure Finance Committee has approved the Phase-I of the scheme costing Rs. 41.28 crore in December, 2004 and the works of Phase-I are presently under execution. The progress of work upto 30-11-2006 is 55% . It is proposed to take up additional works as per recommendation of the Expert Committee which visited the site. Physical model studies for firming up the long-term measures and its design parameters are being carried out at NEHARI, North Guwahati and laying of the model has been completed. The expenditure against this scheme up to November 2006 is Rs.18.62 crores. The Phase-I of the scheme is likely to be completed during 2006-07.

**E) Amjur Drainage Development Scheme:** Investment clearance for Phase-I works amounting to Rs. 4.80 crores. was received during the 10<sup>th</sup> Plan. Out of the total estimated cost of Rs. 14.15 crores. work order for an amount of Rs. 3.11 crores. has already been issued. The scheme is proposed to be completed in 2008-09 and will benefit an area of 72 sq.km. of drainage congested area.

In addition, the following schemes have also been taken up by the Brahmaputra Board during 2006-07:-

1) Joysagar Drainage Development Scheme:  
( Rs. 2.13 crores)

2) Kailasahar Drainage Development Scheme:  
(Rs.4.18 crores.)

3) East of Barpeta Drainage Development Scheme:  
(Rs. 1.34 crores.)

4) Singla Drainage Development Scheme:  
(Rs. 3.54 crores.)

5) Jengrai Drainage Development Scheme:  
( Rs. 1.49 crores.)

6) Jakaichuk Drainage Development Scheme:  
( Rs. 2.96 crores.)

### **Central Water Commission (CWC)**

At present, there are 10 projects in the construction stage for which design consultancy is being provided by CWC. In addition, there are 13 projects for which Detailed Project Reports (DPR) are under preparation. Detailed hydrological studies and design works in respect of these projects are also in progress.

CWC has a large network of hydrological observation sites for collection of hydrological data and for issue of flood forecasts in North East region. At present CWC has 151 hydrological observation sites in the North East region and issues flood forecasts for 26 sites in the NE Region including Sikkim. CWC is also monitoring the progress of 14 major/medium irrigation projects and about 800 minor irrigation schemes funded under AIBP.

57 Minor Irrigation Schemes were under investigation by CWC in Mizoram. DPR for 34 schemes have been submitted and investigation work/ preparation of reports in respect of balance 23 schemes is under process. In addition 14 Hydro-Electric projects are under investigation by CWC in Arunachal Pradesh.

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### ***Central Soil and Materials Research Station (CSMRS)***

The works underway by CSMRS are as follows;

- Myntdu Leshka H.E. Project, Meghalaya- CSMRS has been appointed as Quality Assurance Consultant for the Construction of the Project.
- Field and Laboratory investigations for construction materials were carried out for Rangit H.E. Project, Stage- IV, Sikkim.
- Training was imparted to the officers and staff of North Eastern Hydraulic and Allied Research Institute (NEHARI), Brahmaputra Board, Guwahati and Engineers of Public Health Engg. Deptt. Meghalaya and Meghalaya State Electricity Board in Laboratory Testing of Cement, Coarse and Fine Aggregates, Admixtures, Additives, including concrete mix design, analysis of data, report writing, etc.
- Laboratory investigation of rock and sand samples for their suitability as construction materials for use in concrete for Subansiri Middle Project, Arunachal Pradesh has been carried out.

### ***Central Water and Power Research Station (CWPRS)***

The works underway by CWPRS are as follows;

- Hydraulic model studies for revised design of spillway of Lower Subansiri HE Project, located in Arunachal Pradesh/ Assam
- Two dimensional and three dimensional hydraulic model studies for Dolaithabi barrage across Iril river, Imphal, Manipur
- Hydraulic model studies for Myntdu (Leshka) dam spillway, Meghalaya.

### ***National Institute Of Hydrology (NIH)***

In consonance with the National Policy of

disaster mitigation and management, a need was felt to give more emphasis on studies and research in areas related to natural calamities like floods and droughts. The major flood affected areas in the country lie in the Ganga, Brahmaputra & Barak basins. In this connection, the earlier existing North Eastern Regional Centre of the Institute at Guwahati has been rededicated to serve as Flood Management Centre for the Brahmaputra Basin.

The Centre has taken up a number of studies in consultation with States of the Region as well as Brahmaputra Board, CWC, CGWB, etc., so as to evolve preventive action. Important among them are: Representative basin studies in basins of Meghalaya and Assam, Ground water quality studies in Assam; Surface runoff studies in the Brahmaputra River and flood risk mapping in lower Assam. The infiltration studies, hydro-meteorological studies and geomorphological studies of Dhudhnai basin have been completed.

The Centre is involved in the following projects/ studies during the year 2006-07:

- Studies on shifting of Gabharu river of the North-East using remote sensing.
- Flood inundation mapping and flood risk zoning for a reach of the Barak River.
- Assessment of ground water quality of Agartala and Tezpur cities.
- Flood estimation of Jadukata Basin with the SCS method.

### ***Central Ground Water Board***

The Central Ground Water Board is conducting scientific and technical studies for ground water assessment, development and management in the North Eastern Region and has its annual

programme to carry out the work. The major achievements of the North Eastern Region in

the year 2006-2007 upto 1<sup>ST</sup> December 2006 are given below:

Sl. No.	Activities	Achievements
1.	Ground Water Management studies	18000 sq. km (Pre-monsoon) 4200 Sq.Km. (Post-monsoon)
2	Ground Water Exploration	18 wells drilled in North Eastern Region
4.	Water Quality Analysis	205 samples analyzed for basic constituents and 604 samples have been analyzed for heavy metals such as Cu, Zn, Fe, Mn, CO, Cd, Cr, Ni, Pb etc.
5.	Short Term Water Supply Investigations	37 investigations
6.	Geophysical Studies	VES (Vertical Electrical Sounding) – 13 Bore Hole Logging - Nil
7.	Reports	Ground Water Year Book was issued Whereas the District Report, District Hydrogeological Maps, State Report are under completion.
8.	Central Ground Water Authority	Mass Awareness Programme – 1 Organized Mass Awareness Programme on Ground Water conservation and protection on 24 <sup>th</sup> November 2006 at Diphupar, Dhimapur district, Nagaland. Water Management Training Programme- 1 Two days Training Programme on Ground Water Management with reference to Rain Water Harvesting and Artificial Recharge to Ground Water on 23 <sup>rd</sup> - 24 <sup>th</sup> November 2006 at Dhimapur, Nagaland.
9.	Estimation of Ground Water Resource of the entire Region based on GEC - 1997 Methodology	Completed

### **National Projects Construction Corporation Ltd.**

The presence of NPCC in NE Region dates back to almost 30 years in all the eight States of NE Region. The major works taken up are in the fields of Irrigation, Building, Hydro power, Tourism, Roads, Bridges etc.

The major Projects being executed by NPCC are:-

1. Assam Rifle Works consisting mainly of

residential & non- residential buildings in all the 8 States. NPCC executes projects worth Rs. 50-60 crores every year for Assam Rifles.

2. Execution of more than Rs. 1200 crores worth of Indo Bangla Border Fencing works in Tripura Mizoram, Meghalaya and Assam.

Construction of river valley multi purpose projects at Loktak, Singda, Khuga, Gumti, Dholaitabi, Maharani, Khowai, Manu etc.

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## CHAPTER 15

# VIGILANCE

### **Vigilance Activities**

The Vigilance Division functions under the overall supervision and control of Chief Vigilance Officer and vigilance/disciplinary matters pertaining to this Ministry and its organizations are handled by it. The Vigilance Division of this Ministry looks after various aspects of Vigilance and Disciplinary matters of all the employees of the Ministry (proper) including all Group A and B officers / officials of CSS, CSCS and CSSS cadre and Group-A officers of the Organizations under the administrative control of this Ministry. The Vigilance Division provides a link between the Ministry, the Central Vigilance Commission and other Authorities relating to disciplinary / vigilance matters. It also tenders advice on vigilance matters to the Attached and Subordinate Offices, PSUs, Statutory Bodies, Registered Societies etc under the administrative control of this Ministry, in

consultation with CVC and other agencies/ departments viz. UPSC, Department of Legal Affairs, DoPT, DoP&PW and CBI etc., wherever necessary.

With a view to proper monitoring, this Division calls for various returns regarding vigilance/disciplinary matters for their timely finalization and submission to CVC, DOP&T, PMO, Cabinet Secretariat, etc. The information pertaining to various cases is kept updated in Internet software DCMMIS (Disciplinary Cases Monitoring and Management Information System) as far as possible. The Vigilance Division also prepares and maintains the “List of Officers of Doubtful Integrity” and the “Agreed List” in consultation with the CBI. The approximate numerical status (as on 1.4.2006 to 30.11.2006), in brief, of Vigilance Division`s various activities, is as under:

i..	Complaints under investigations	12
ii.	Vigilance /Disciplinary Cases of Major Penalty	11
iii.	Vigilance /Disciplinary Cases of Minor Penalty	04
iv.	Penalty imposed	02
v.	Officials presently under suspension	12
vi	Appeal/Revision/review petition disposed off	07
vii.	No of periodical returns sent to CVC/DOP&T/ PMO	169
viii.	Examination of the intimation of the transition of the Properties (movable & Immovable)	56

“Vigilance Inspection” of various offices of the organizations are also being conducted by the Vigilance Division of the Ministry since November, 1999. The Division has conducted as many

as 27 Inspections. As per the directions of CVC, the “Vigilance Awareness Week” was observed from 6<sup>th</sup> November 2006 to 10<sup>th</sup> November 2006 by the Vigilance Division.

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## **CHAPTER 16**

### **APPOINTMENT OF DISABLED PERSONS**

#### ***Monitoring of Reservation for Physically Handicapped***

Monitoring of the recruitment of physically handicapped is being done to ensure fulfillment of three per cent quota for the category by the Ministry as well as various organisations under it. Periodic reports on the progress made are being sent regularly to the Ministry of Social Justice & Empowerment.. Accordingly, 3% of posts/vacancies (1% for each Orthopaed, Blind & Hearing Handicapped) are reserved to be filled up from Physically Handicapped

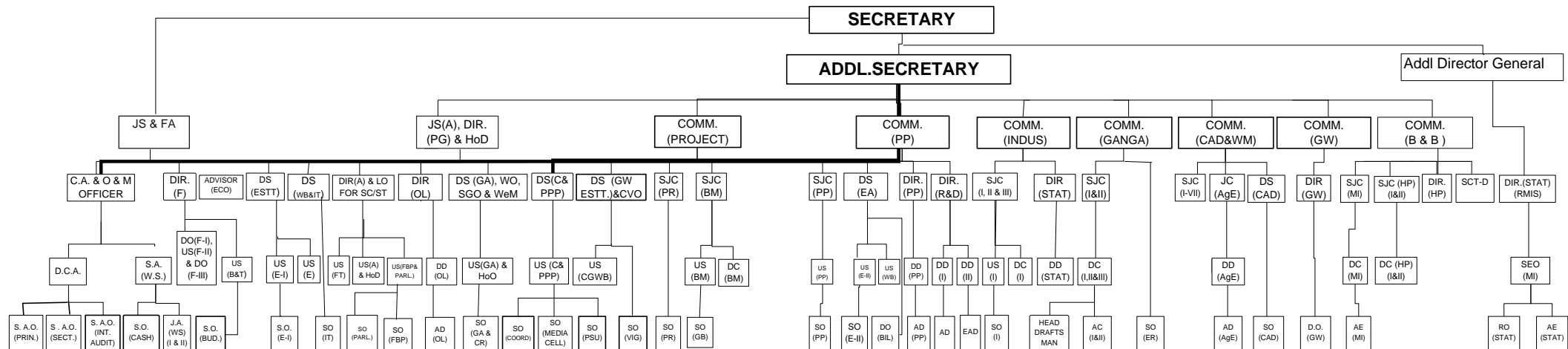
persons. The Physically Handicapped persons are given facilities, concession and relaxation at the time of test/interview as per rules on the subject matter. The posts identified to be filled up by the disabled persons in Groups A, C & D (group-B, being all promotional posts) categories as per revised list of posts notified by the Ministry of Social Justice and Empowerment, are filled up as per requirement of the different offices under this Ministry. The relevant Rosters as prescribed by the Government are also maintained for plotting the reservation of disabled persons.



95

<b>Total</b>	2210	215	37	03	48	1064	128	21	04	08	1196	158	24	02	18	8332	1173	354	51	315	4360	1021	316	36	376	17162	2695	752	96	765
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### ORGANIZATIONAL CHART OF MINISTRY OF WATER RESOURCES (AS ON 31.03.2007)



**Legends:**

A	Administration	DD	Deputy Director	JA	Junior Analyst	SCT	Scientist
AC	Assistant Commissioner	DIR	Director	JC	Joint Commissioner	SECT	Secretariat
AD	Assistant Director	DO	Desk Officer	JS	Joint Secretary	SGO	Staff Grievances Officer
ADDL	Additional	DS	Deputy Secretary	LO	Liaison Officer	SJC	Senior Joint Commissioner
AE	Assistant Engineer	E	Establishment	MI	Minor Irrigation	SO	Section Officer
AEA	Additional Economic Advisor	EA	External Assistance	O&M	Organisation and Methods	ST	Scheduled Tribe
AgE	Agricultural Engineering	EAD	Extra Assistant Director	OL	Official Language	STAT	Statistics
BIL	Bilateral Aid	ER	Eastern Rivers	P	Projects	T	Technical
BM	Basin Management	ESTT	Establishment	Parl	Parliament	US	Under Secretary
BUD	Budget	F	Finance	PG	Public Grievances	VIG	Vigilance
C&E	Coordination & Evaluation	FA	Financial Advisor	PP	Policy & Planning	WB	World Bank
C	Coordination	FT	Foreign Training	PPP	Public Private Partnership	WeM	Web Master
CA	Controller of Accounts	GA	General Administration	PR	Projects	WM	Water Management
CAD	Command Area Development	GB-FBP	Ganga Basin-Farakka Barrage Project	PRIN	Principal	WO	Welfare Officer
CGWB	Central Ground water Board	GW	Ground Water	R&D	Research & Development	WS	Work Study
COMM	Commissioner	HoD	Head of Department	RMIS	Rationalisation of Minor Irrigation Statistics	WB	Water Bodies
CVO	Chief Vigilance Officer	HoO	Head of Office	RO	Research Officer	IT	Information Technology
DC	Deputy Commissioner	HP	Hydrology Project	SA	Senior Analyst	Coord	Coordination
DCA	Deputy Controller of Accounts	I	Indus	SAO	Senior Accounts Officer	PSU	Public Sector Undertaking
		INT AUDIT	Internal Audit	SC	Scheduled caste		

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**ANNEXURE-III****LIST OF POSTAL ADDRESSES OF HEADS OF ORGANISATIONS UNDER THE  
MINISTRY OF WATER RESOURCES**

S. No.	Name of the Organisation	Head of the Organisation
	Government of India Ministry of Water Resources, Room No. 412, IV Floor, Shram Shakti Bhavan, Rafi Marg, New Delhi-110 001.	Smt. Gauri Chatterji, Secretary Tel No. 23710305, 23715919 Fax. 23731553
	<b>Attached Offices</b>	
1.	Central Water Commission, Room No. 326, Sewa Bhawan, R.K. Puram, New Delhi	Shri S.K. Das, Chairman Tel. No.26108855 Fax: 26108614
2.	Central Soil and Materials Research Station, Room No. 309, Hauz Khas, New Delhi-110016	Dr. A. K. Dhawan, Director Tel. No. 26961894 Fax: 26853108
	<b>Subordinate Offices</b>	
3.	Farakka Barrage Project, P.O. Farakka Barrage, Distt. Murshidabad-742212 (W.B.)	Shri M.U. Ghani, General Manager Tel. No. 03485-253644
4.	Ganga Flood Control Commission, Sinchai Bhawan, III floor, Patna-800015	Shri V.R. Sastry, Chairman Tel. No. 0612-2222294
5.	Central Water and Power Research Station, P.O. Khadakwasla, Pune-411024	Smt. V. M. Bendre, Director Tel. No. 020-24380511/ 24380652 Fax: 020-24381004
6.	Central Ground Water Board, Jamnagar House, New Delhi	K.S. Ramasubban, Chairman Tel. No. 23386743 & 95129-2419075 Fax: 23382051 & 95129-2412524
7.	Bansagar Control Board, Samab Colony, Rewa (Madhya Pradesh)	Shri S. K. Haldar, Secretary Tel. No. 07662-226318
8.	Sardar Sarovar Construction Advisory Committee, Narmada Bhawan, A Block, IV Floor, Vadodara-390001	Shri K.R. Joshi, Secretary Tel. No. 0265-2421438

9.	Upper Yamuna River Board 202, "S", Sewa Bhawan, R.K. Puram, New Delhi	Shri B. S. Ahuja, Chairman Tel. No. 26108590 Fax: 26195289
	<b>Public Sector Undertakings</b>	
10.	Water and Power Consultancy Services (India) Limited, 5 <sup>th</sup> Floor, 'Kailash', 26, Kasturba Gandhi Marg, New Delhi-110001	Shri D. Datta , Chairman & Managing Director Tel. No. 23313881/23313502 Fax: 23313134
11.	National Projects Construction Corporation Limited, Plot No. 67-68, Sector-25, Faridabad (Haryana)	Shri Arbind Kumar, Chairman & Managing Director, Tel. No. 95129-2231269
	<b>Registered Societies</b>	
12.	National Institute of Hydrology, Jal Vigyan Bhawan, Roorkee-247667 (Uttaranchal)	Dr. K.D, Sharma, Director Tel. No. 01332-272106 Fax: 01332-272123/ 273976
13.	National Water Development Agency, 18-20, Community Centre, Saket, New Delhi-110017	Shri A.D. Bhardwaj, Director General Tel. No. 26519164
	<b>Statutory Bodies</b>	
14.	Narmada Control Authority, BG-113, Scheme No. 74-C, Vijay Nagar, Indore-452010	Shri V.K. Jyothi, Executive Member Tel. No. 0731-557276
15.	Brahmaputra Board, Basistha, Guwahati	Dr. T.G. Antony Balan, Chairman Tel. No. 0361-2301099/ 2302527 Fax: 0361-2301099/ 2307454/ 2308588
16.	Betwa River Board, Nandanpura, Jhansi-284003	Shri M.L. Goyal, Chief Engg. & Secretary Tel. No. 0517-2480183
17.	Tungabhadra Board, Tungabhadra Dam, Taluk: Hospet, Distt: Bellary, Karnataka State, PIN: 583225	Shri V.K. Jyothi, Chairman Tel. No. 08394-439113 Fax: 08394-439112

## ANNEXURE IV

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

S. No.	Name of the Organisation	Address	Name & Designation of P.G./ S.G. Officer
1.	Ministry of Water Resources	Room No. 403, 4 <sup>th</sup> Floor, Shram Shakti Bhavan, New Delhi-110001 (Tele Fax No. 23710343)	Shri K.S. Ramasubban, Joint Secretary (Admn.) & Director (PG)
		Room No.627, Shram Shakti Bhavan, New Delhi-110001 (Tele No. 23710170) (Fax No. 23710253)	Ms. Meeta Singh, Deputy Secretary (C&PPP) & Director (SG)
2.	Narmada Control Authority	BG - 113, Scheme No. 74-C, Vijay Nagar, Indore – 452010(MP) (Tele No. 0731-551144) (Fax No. 559888)	Shri Major Singh, Grievance Officer & Member (Power)
3.	Bansagar Control Board	Bansagar Control Board, Samab Colony, Rewa (MP) (Tele No. 07662-226318), 0755-2762059 (Fax No. 07662-242433 –Fax No. 0755-2558264)	Shri Soumitre Haldar, Secretary & Director (Staff Grievances)
4.	Betwa River Board	Betwa River Board, Nandanpura, Jhansi-284003 (Tele No. 0517-2480183) (Fax No. 0517-2480237)	Shri A.C. Vohra, Supdt. Engg. & Director (Staff Grievances)
5.	Central Ground Water Board	CGWB, CHQ, Faridabad (Tele No. 95129- 2413050) Fax No.95129-2419059	Dr. B.C. Mehta, Scientist 'B' & Staff Grievances Officer
		CGWB, CHQ, Faridabad (Tele No.95129-2415024 & (Fax No. 95129-2412524)	Shri Sunil Kumar, Scientist 'D', Public Grievances officer
6.	Central Soil and Materials Research Station	Room No. 309, CSMRS, Hauz Khas, New Delhi – 110 016 (Tel No. 26850025) (Fax No. 26853108)	Shri S.K. Babbar, Chief Research Officer & Director (Staff & Public Grievances)
7.	Central Water Commission	Room No. 326, Sewa Bhawan, R.K. Puram, New Delhi-110066 (Tele No. 26187232) (Fax No. 26195516)	Shri O.P. Khanda, Secretary & Grievances officer
8.	Central Water & Power Research Station	Central Water & Power Research Station, P.O. Khadakwasla Research Station, Pune – 411024 (Tele No. 020-4380825) (Fax No. 020-4381004)	Shri A.K. Basu, Joint Director & Chairman (Grievance Cell)



9.	Farakka Barrage Project	P.O. Farakka Barrage, Distt. Murshidabad, West Bengal-742212 (Tele No. 03485 – 253285) (Fax No. 03485-253608)	Shri M.M.N. Saxena, Superintending Engineer (Coord.) & Director (Staff Grievances)
10.	Ganga Flood Control Commission	Ganga Flood Control Commission, Sinchai Bhawan, IIIrd Floor, Patna-800015 (Tele No. 0612-2233591) (Fax No. 0612-2222294)	Shri Bibhas Kumar, Director (MP-II) (Adm) & Director (Staff Grievances & Public Grievances)
11.	National Institute of Hydrology	Jal Vigyan Bhawan, Roorkee-247667 (Uttaranchal) (Tele No. 01332-272906, 272909 & 272718 (Fax No. 01332-272123)	Dr. S.V.N.Rao, Scientist F & Chairman, Grievance Cell
12.	National Projects Construction Corporation Limited	NPCC Ltd., Plot No. 67-68, Sector 25, Faridabad (HNA) (Tele No. 95129 -2231272) (Fax No. 95129-2231269)	Shri S. Basak, GM (M &P) Chairman (Grievance Committee)(Staff Grievances) Shri Anup Kumar AGM(C) Director (Public Grievances)
13.	National Water Development Agency	18-20, Community Centre, Saket, New Delhi-110017 (Tele No. 26852735) (Fax No. 26960841)	Shri N.K. Bhandari, Chief Engineer (HQ) & Director (Staff Grievances)
14.	Sardar Sarovar Construction Advisory Committee	Sardar Sarovar Construction Advisory Committee, Narmada Bhavan, “A” Block 4 <sup>th</sup> Floor, Vadodara – 390001 (Tele No. 0265-2421272) Fax No. 0265-2437262 (Telefax)	Shri Janardhana Babu, Deputy Secretary & Director (Grievances) & Director (Public Grievances)
15.	Water & Power Consultancy Services (India) Ltd.	76-C, Institutional Area, Sector-18, Gurgaon-122015 (Tele No. 95124-2397394) (Fax No. 95124 – 2397392)	Shri D.S. Pahwa, General Manager (P&A) & Director (Staff Grievances)
16.	Brahmaputra Board	Basistha, Guwahati – 29 (Tele No.0361-2307453 & 2307453) (Fax No. 0361-2308588)	Dr. T.G. Antony Balan, Secretary & Director (Grievances)
17.	Upper Yamuna River Board	Upper Yamuna River Board Wing No. 4, Ground Floor R.K. Puram, New Delhi(Tel .No. 26177916)	Shri S.K.Sinha, Member Secretary & Director of Grievances
18.	Tungabhadra Board	Tungabhadra Board, Tungabhadra Dam, Taluk: Hospet, Distt: Bellary, Karnataka State, PIN: 583225	Shri L.A.V. Nathan, Secretary & Director of Grievances

## Annexure V

## BUDGET AT A GLANCE (SECTOR-WISE)

SI No.	Sector/ Organisation/ Scheme	Actuals 2005-06		BE 2006-07		RE 2006-07	
		Plan	Non- Plan	Plan	Non-Plan	Plan	Non-Plan
1.	2.	3.	4.	5.	6.	7.	8.
I	Secretariat-Economic Services	1.20	17.02	12.13	15.42	2.23	20.84
II	Major & Medium Irrigation						
1.	Central Water Commission	20.27	79.82	28.68	71.12	25.34	73.78
2.	Central Soil and Materials Research Station	5.17	4.12	8.34	4.23	7.72	4.24
3.	Central Water & Power Research Station	2.74	15.92	5.45	14.88	4.10	16.20
4.	National Water Development Agency	17.03	0.00	41.00	0.00	21.00	0.00
5.	National Institute of Hydrology	2.44	4.70	17.48	4.62	3.96	4.50
6.	Research and Development Programme	5.61	0.00	13.06	0.00	8.00	0.00
7.	National Projects Construction Corporation Limited	0.00	15.80	0.00	15.80	0.00	15.80
8.	Sutlej Yamuna LinkCanal Project	0.00	0.00	0.00	25.00	0.00	10.37
9.	Boards & Committees	0.00	1.14	0.00	1.73	0.00	1.73
	Total: Major & Medium Irrigation	54.26	121.50	114.01	137.38	70.12	126.62
III	Minor Irrigation						
1.	Central Ground Water Board	59.16	54.50	79.34	51.16	70.90	56.00
2.	Surface Water Schemes	3.65	0.00	9.10	0.00	9.00	0.00
3.	R. & D. Programme	0.42	0.00	0.50	0.00	0.40	0.00
	Total: Minor Irrigation	63.23	54.50	88.94	51.16	80.30	56.00
IV.	Command Area Development						
1.	Command Area Development Programme	198.32	0.00	204.30	0.00	189.38	0.00
2.	R. & D. Programme	1.58	0.00	1.40	0.00	1.70	0.00
	Total: Command Area Development	199.90	0.00	205.70	0.00	191.08	0.00
V.	Flood Control						
1.	Central Water Commission	21.12	35.41	31.68	32.09	19.68	32.94
2.	Ganga Flood Control Commission	2.40	0.00	2.75	0.00	2.71	0.00
3.	Emergent Flood Protection Measures in Eastern and Western Sectors	0.00	1.61	0.00	3.00	0.00	3.00

SI No.	Sector/ Organisation/ Scheme	Actuals 2005-06		BE 2006-07		RE 2006-07	
		Plan	Non- Plan	Plan	Non-Plan	Plan	Non-Plan
1.	2.	3.	4.	5.	6.	7.	8.
5.	Survey & Investigation of Kosi High Dam Project	5.34	0.00	13.90	0.00	8.50	0.00
6.	Maintenance of flood protection works of Kosi and Gandak Projects	3.74	0.00	5.24	0.00	3.24	0.00
7.	Pancheshwar Multipurpose Project	1.53	0.00	2.13	0.00	2.12	0.00
8.	Joint Observation on common Rivers with Bangladesh and neighbouring countries	0.26	0.00	1.50	0.00	1.50	0.00
9.	Critical anti-erosion works in Ganga Basin States	83.00	0.00	111.20	0.00	80.25	0.00
10.	Extension of embankments on Lalbakeya, Kamla, Bagmati and Khando rivers	13.53	0.00	32.25	0.00	25.00	0.00
11.	Schemes for the benefit of North Eastern States & Sikkim						
	-Brahmaputra Board	18.79	0.00	28.12	0.00	16.76	0.00
	-Pagladia Dam Project	1.50	0.00	5.00	0.00	3.00	0.00
	-New schemes for Majuli island in Assam, Dihang Project, etc.	11.00	0.00	14.45	0.00	12.51	0.00
	Sub Total (S.No.13)						
	Total: Flood Control	162.21	37.02	248.22	35.09	175.27	35.94
VI.	Transport Sector						
1.	Farakka Barrage Project	29.59	20.63	31.00	22.46	31.00	22.11
	TOTAL (I to VI)	510.39	250.67	700.00	261.51	550.00	261.51
VII	A.I.S.P."			2098.38	0.00		
	<b>GRAND TOTAL</b>			<b>2798.38</b>	<b>261.51</b>		

**Source of financing:** Demand No. 103 - Ministry of Water Resources for 2006-2007 (exc/uding A/SP)

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## **ANNEXURE-VI**

### **Audit Observations pertaining to Ministry of Water Resources**

#### **Utilisation Certificates**

Consequent on the departmentalisation of accounts in 1976, certificates of utilisation of grants were required to be furnished by the Ministries/Departments concerned to the Controllers of Accounts in respect of grants released to statutory bodies, non-government organisations etc to ensure that these had been properly utilised for the purpose for which these were sanctioned. The Ministry of Water Resources details indicating the position of outstanding utilisation certificates due by March 2005 in respect of grants released upto March 2004 are given below.

#### **No. of UCs pending are as under:**

<b>S.No</b>	<b>Year</b>	<b>No.of UCs</b>	<b>Amount</b>
1.	1986-87	3	12.50
2.	1987-88	1	5.29
3.	1988-89	3	8.80
4.	1989-90	2	2.85
5.	1990-91	3	7.17
6.	1991-92	4	8.91
7.	1992-93	9	49.053
8.	1993-94	0	0
9.	1994-95	7	24.816
10.	1995-96	4	17.34
11.	1996-97	3	35.611
12.	1997 -98	2	1.36
13.	1998-99	1	2.00
14.	1999-00	0	0
15.	2000-01	2	6.19
16.	2001-02	4	46.46
17.	2002-03	7	6.25
18.	2003-04	7	4.23
19.	2004-05	2	1.95
<b>Total</b>		<b>64</b>	<b>240.78</b>

#### **Unspent Provision of Rs. 100 crore or more**

**7.4** Unspent provisions of more than Rs 100 crore, need a detailed explanatory note to the Public Accounts Committee, The unspent provisions were attributed by the ministries/departments to some of the schemes failing to take off. Details of the unspent provisions are given below.

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(Refers to Paragraph 7.4)

**Details of unspent provision exceeding Rs 100 crore under a grant/appropriation**

*(Rupees in crore)*

<b>Sl. No.</b>	<b>Grant No. and Controlling Ministry</b>	<b>Amount of Unspent provision</b>
<b>Civil Revenue -Voted</b>		
29.	104-Ministry of Water Resources	179.59



## ANNEXURE VII

### WING WISE INFORMATION OF PIOS IN MINISTRY PROPER

Sl. No.	Name, address & other particulars of PIO	Name of the Wing
1	Shri Satpal, Director (Admn.) Room No. 421, Shram Shakti Bhavan, Rafi Marg, New Delhi. Tel : 011-23711988 Fax : 011-23710253 Email: <a href="mailto:diradmn-mowr@nic.in">diradmn-mowr@nic.in</a>	Administration
2	Shri Vinay Kumar, Sr. Joint Commissioner (PP) Room No. 629, Shram Shakti Bhavan, Rafi Marg, New Delhi Tel : 011-23719503 Email: <a href="mailto:sjcphp-mowr@nic.in">sjcphp-mowr@nic.in</a>	Policy & Planning (PP)
3	Shri D.P. Bankhwal, Director (B&B) Lok Nayak Bhavan, Khan Market, New Delhi. Tel : 011-24690828 Email: <a href="mailto:dirhp-mowr@nic.in">dirhp-mowr@nic.in</a>	Brahmaputra & Barak (B&B)
4	Shri Chhotey Lal, Sr. Joint Commissioner (Ganga), Room No. 804, Block No. 11, CGO Complex, New Delhi. Tel : 011-24360611 Email: <a href="mailto:sjcer2-mowr@nic.in">sjcer2-mowr@nic.in</a>	Ganga
5	Shri Inderjit Singh, Deputy Secretary (CADWM) Room No. 199F, Krishi Bhavan, New Delhi. Tel : 011-23382481 Email: <a href="mailto:cadwmds-mowr@nic.in">cadwmds-mowr@nic.in</a>	Command Area Development and Water Management (CADWM)
6	Shri P.K.Berwah, Controller of Accounts Room No. 241, 'A' Wing, Shastri Bhavan, New Delhi. Tel : 011-23386644 Email: <a href="mailto:ca-mowr@nic.in">ca-mowr@nic.in</a>	Finance
7	Shri K.Vohra, Sr. Joint Commissioner (BM) Room No. 431, Shram Shakti Bhavan, Rafi Marg, New Delhi. Tel : 011-23714129 Email: <a href="mailto:sjcbm-mowr@nic.in">sjcbm-mowr@nic.in</a>	Projects (PR) – BM Division

8	Shri Ramesh Kumar, Director (GW) Room No. 621, Shram Shakti Bhavan, Rafi Marg, New Delhi. Tel : 011-23716683 Email: <a href="mailto:dirgw-mowr@nic.in">dirgw-mowr@nic.in</a>	Ground Water (GW)
9	Shri Vijay Kumar, Director (I) Room No. 830, Block No. 11, CGO Complex, New Delhi. Tel : 011-24361467 Email: <a href="mailto:dirindus-mowr@nic.in">dirindus-mowr@nic.in</a>	Indus (I)
10	Shri V.K. Nagpure, Sr. Joint Commissioner (PR) Room No. 631, Shram Shakti Bhavan, Rafi Marg, New Delhi. Tel : 011-23710131 Email: <a href="mailto:sjcpr-mowr@nic.in">sjcpr-mowr@nic.in</a>	Projects (PR) – Projects Division
11	Dr. A.K. Saxena, Deputy Secretary (GW Estt.) & CVO, Room No. 423, Shram Shakti Bhavan, Rafi Marg, New Delhi. Tel : 011-23711875 Email : <a href="mailto:cvo-mowr@nic.in">cvo-mowr@nic.in</a>	Estt. matters of CGWB and Vigilance Section in the Ministry.
12	Smt. Meeta Singh, Deputy Secretary (C & PPP), Room No. 627, Shram Shakti Bhavan, Rafi Marg, New Delhi. Tel : 011-23710170 Email : <a href="mailto:dscoord-mowr@nic.in">dscoord-mowr@nic.in</a>	Coordination/ PPP/ Media Cell/ PSU
13	Shri M.J. John, Deputy Secretary (Estt.), Room No. 222B, Shram Shakti Bhavan, Rafi Marg, New Delhi. Tel : 011-23730719 Email : <a href="mailto:dsest-mowr@nic.in">dsest-mowr@nic.in</a>	Estt. matters of CWC.