

Member's Annual Report 2009

Date of preparation: 20/ 06/ 2010

Name of the editor: Saad Siddiqui

1. About the organization

(1) Name of the organization and postal address of the office

Institute of Water Modelling (IWM)
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(2) The representative of the organization

Emaduddin Ahmad, PEng.
Executive Director

(3) Purposes and roles of your organization

a) Historical background of the organization

The hydrologic and hydraulic regime of Bangladesh consists of numerous looped and cross-connected channels with extensive flood plains and depression storage areas. In the first version of the National Water Plan published in 1985 under the then Master Plan Organization (MPO), Government and its Development Partners recognized that under the complex hydrological and hydraulic regime and socio-economical dynamics, National Water Planning process requires refined analysis in the face of increased capital scarcity; it was also realized that, as development would progress and more projects are completed, the problem of interdependence and impact assessment would grow more severe and costs of remedying adverse impacts will increase.

To overcome the serious shortcomings of the tools available for planning and design analysis based on so called simplistic approach in accurately predicting and analyzing the consequences of impacts of single or multiple projects, it was recognized that powerful analytical tools like Mathematical Modelling would be essential. "The Surface Water Modelling Programme" (SWSMP) was launched by MPO in 1986 to develop analytical predictive tools like mathematical modelling for planning and design analysis and institutionalize the capability as an essential and integral part of National Water Planning Process.

The need for sophisticated analysis of water system was given added impetus following two consecutive disastrous floods in 1987 and 1988.

The Master Planning Organization (MPO), presently Water Resources Planning Organization (WARPO) under the Ministry of Water Resources launched the Surface Water Simulation Modelling Programme (SWSMP) in 1986. SWSMP was aided by UNDP and the World Bank and was to develop and institutionalize sustained high level of analytical capabilities as an essential and integral part of National Water Planning process (Pro Doc BGD/85/045/c/01/42). The capability was institutionalized by establishing the Surface Water Modelling Centre (SWMC) under DANIDA aided SWSMP-II (1989-1993) which continued its further improvement and consolidation of technology under SWSMP III (1994-1996); management of SWMC was transferred to the SWMC Trust in December 1996. It was renamed as Institute of Water Modelling (IWM) in August, 2002 in line with its function of generating learning through its studies and research. Danish Hydraulic Institute, almost all the FAP studies (particularly the Co-ordination Advisory Technical mission comprising renowned water experts around the world) all the Water Institutions of the country and BUET very much actively contributed towards adoption of appropriately technology in IWM.

All along, the main objective remained enhancement of hydraulic and hydrologic knowledge base of the country to enable better planning and design studies of the country's water management investments.

As a natural development over time, IWM developed expertise in state-of-the-art Hydrometric measurements, hydrographic and topographic surveys and monitoring programme, urban drainage, ground water hydraulics, eco-hydraulics and morphological modelling for river and coastal engineering.

As the computational methods improved with the improvement of computer capacity, demand of analysis expanded to cover the entire gamut of computational hydraulics and water modelling. At the end of SWSMP-III, SWMC developed capabilities in areas of hydrodynamic modelling of rivers, estuaries and Bay, hydrological modelling including surface water-ground water interaction modelling based on three-dimensional GW modelling, fully dynamic morphological modelling based on quasi-three Dimensional flow and sediment transport modelling, complete set of water quality modelling (salinity, BOD, COD, temperature, arsenic etc) of surface water and ground water flows. It also grew as the leading hydrographic and topographic survey institute based on the state-of-the-art technology in order to support its analytical work by strong database through real time measurement campaigns.

After a thorough Institutional Study by experts from home and abroad for the best sustainability of the local capabilities so hard earned through the ten years of TA project, by a Cabinet decision, GoB founded the SWMC Trust under the Trusts Act 1882 on the 24th December 1996 to institutionalize SWMC. It was renamed as Institute of Water Modelling (IWM) on the 1st of August, 2002 in line with its function of generating learning through its studies and research.

b) Purposes and roles of the organization

Government of Bangladesh established the IWM Trust to function with the following specific set of objectives:

- i) to form and maintain the IWM, with all its movable and immovable assets and liabilities and facilities acquired during the three phases of the Surface Water Simulation Modelling Programme, into an institution of excellence in research and learning in the field of water modelling, computational hydraulics and allied sciences and to expand the existing programme and projects and when feasible and possible, to undertake new projects at the discretion and option of the Trustees;
- ii) To run all the existing programmes and projects of the IWM;
- iii) through the IWM, to promote, establish, set up, run, maintain, assist finance, support and aid water modelling programme and projects, for remuneration or otherwise and for the said purpose do all and everything that is expedient and necessary;
- iv) To offer training to persons engaged in all kinds of computational hydraulics and water modelling activities;
- v) To undertake and assist in water modelling research and development activities;
- vi) To conduct research for the furtherance of the objectives of the Trust;
- vii) To expand the area of activity of the Trust beyond Bangladesh as may be expedient and feasible;
- viii) To undertake any other work or project in any other field or area, which may be conveniently and beneficially done through the facilities of the IWM, as the Trustees may deem fit.

(4) Outline of the organization

1) Number of staff

The number of staff in IWM is about 170, of whom more than 60% are professionals of high standard in their respective fields. Regular training programme both at home and abroad are conducted to develop their expertise in relevant fields. Some staffs are currently pursuing higher studies abroad (MS and PhD) and the Institute encourages such programme for upgrading expertise. The present staffing is as present:

Engineers/Specialists	: 98
Technical/Support staff	: 32
Admin/Accounts/General staff	: 40

The following table shows the Level of expertise of the staff resources as in 2009. The total number represents the experts having multi-disciplinary expertise; it is not the actual number of staff.

PROFESSIONAL EXPERTISE AT IWM

Discipline		Discipline	
Business Development	2	Surface Water Modelling	18
Coastal Hydraulics and Morphology	4	Bridge Hydraulics	5
Estuary and Marine System Management	4	Fluvial Hydraulics and River Morphology	10
Integrated Coastal Zone Management	4	River Engineering	9
Offshore Structure and Pipelines	2	Road Infrastructure	8
Port and Coastal Structure Management	3	Engineering Survey & Investigation	3
Climate Change	9	Hydrographic Survey	7
Disaster Management	4	Hydro-meteorological Measurements	9
Flood Management	11	Laboratory Analysis Of Sediment Samples	1
Flood Management Information System	2	Topographic Survey and Mapping	8
Human Resource Development	1	Water Quality Investigation	8
Computer System Management	2	Strategic Planning	2
Geographic Information Systems	4	Environmental Impact Assessment	4
Software Management and IT Solutions	2	Integrated Water Resources Management	10
Ground Water Management	13	Urban Water Management	6
GW & SW Modeller	3	Water Quality & Ecology	5
Hydro-Geologist	1	Water Supply and Sanitation	3
Irrigation Management	8	Wetland and lakes management	2
Drainage Management	4		
Total			210

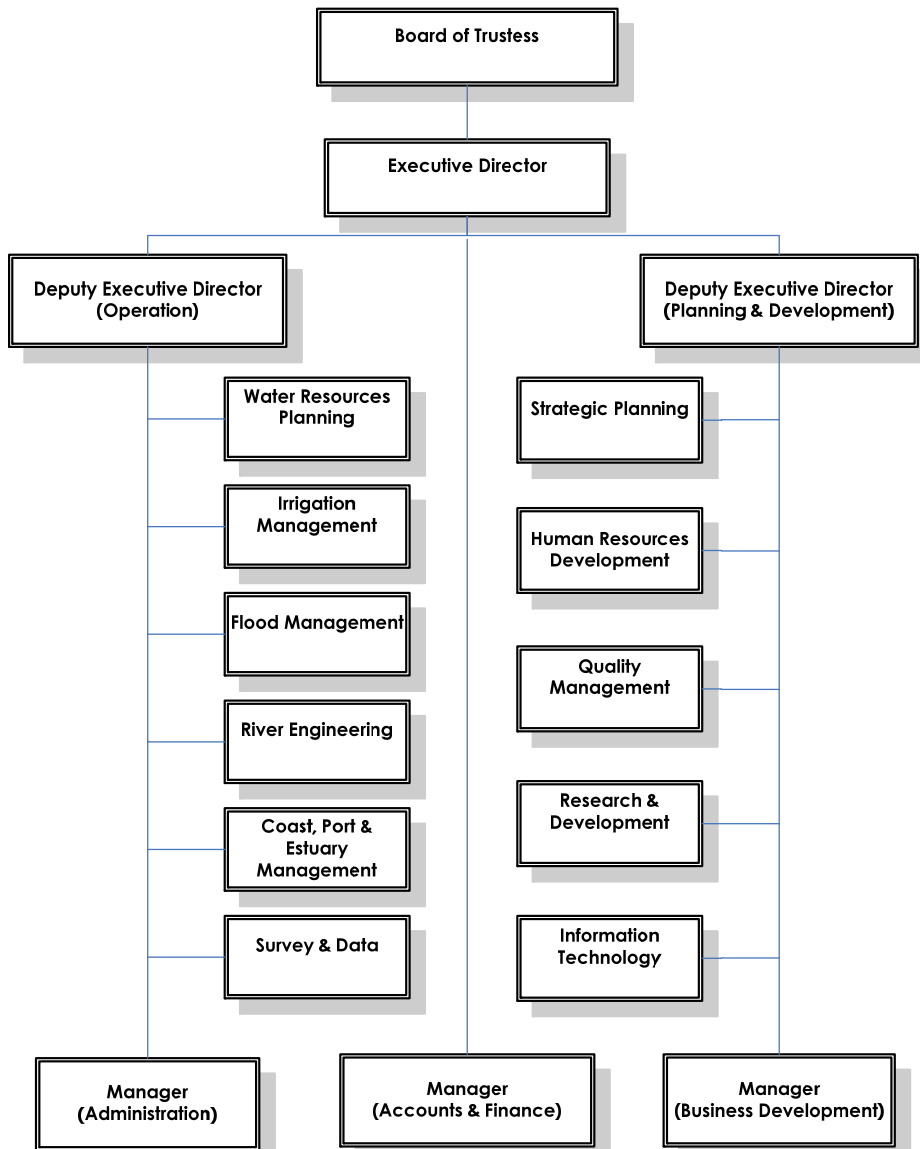
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2) Amount of the annual budget in 2009

Annual Budget (2009-10): Tk 220.39 million (1USD = Tk 68.50)

3) Organizational chart

ORGANOGRAM OF INSTITUTE OF WATER MODELLING



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4) On-going projects

IWM has a number of on-going projects which are being carried out by its 6 working divisions. Most of these projects are in Bangladesh but some are also outside Bangladesh. At present there are 33 on-going projects which have been listed below:

SI No	Name of project	Type of project	Location	Remarks
1	Climate Change Impact Assessment of Nepal	Climate change	Nepal	External Contract
2	Development of flood forecasting model for Bagmati Basin, Nepal	Flood forecasting	Nepal	External Contract
3	Uttaran to prepare "Peoples Plan of Action for management of Rivers in Southwest Bangladesh	River management	Bangladesh	In-country contract
4	Impact of Climate Change and Sea Level Rise on Sungai Langat Estuary, Malaysia	Climate change	Malaysia	External Contract
5	Monthly Hydrodynamic Prediction for Chevron to Assist Seismic Survey	Water management	Bangladesh	In-country contract
6	Padma Bridge Design Modelling	Bridge hydraulics	Bangladesh	In-country contract
7	Hydrological and Morphological Study for the proposed Baniachong-Azmiriganj Road to connect Baniachong and Azmiriganj Upazilla under Habiganj District	Road Feasibility	Bangladesh	In-country contract
8	Hydrological and Morphological Study of Bangshi River and Dewali River	River management	Bangladesh	In-country contract
9	Hydrological and Morphological Study for the Proposed Road Bridge on Karatoya River at Ullahpara Upazilla under Sirajganj District	Bridge hydraulics	Bangladesh	In-country contract
10	River Management Dredging (Pilot Capital)	River management	Bangladesh	In-country contract
11	Hydrological and Morphological Study for the Proposed Re-excavation of Old/Mora Madhumati River under Gopalganj District	River management	Bangladesh	In-country contract
12	Hydrological and Morphological Study for the Proposed Road Bridge on Bangshi River	Bridge Hydraulics	Bangladesh	In-country contract
13	Hydrological and Morphological Study for the Proposed Road Bridge on Karua Natunbazar Road over Someswari River at Sreebardi Upazilla in Sherpur District	Bridge Hydraulics	Bangladesh	In-country contract
14	Hydrological and Morphological Study for the Proposed Road Bridge on Gorai River at Kushtia Sadar Upazilla under Kushtia District	Bridge Hydraulics	Bangladesh	In-country contract
15	Dhaka Water Supply ADB Technical Assistance (TA) Project.	Urban water management	Bangladesh	In-country contract
16	Ganges River Basin Modeling	Basin management	Bangladesh	In-country contract

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17	Detail WQ Investigation for FS of Khulna Water Supply Project of JICA	Urban water management	Bangladesh	In-country contract
18	Kalyanpur Retention Pond Study	Drainage management	Bangladesh	In-country contract
19	Water Supply, Drainage & Sanitation in 148 Pourashava	Urban water management	Bangladesh	In-country contract
20	Dhaka Artificial Recharge, DWASA	Urban water management	Bangladesh	In-country contract
21	Ashulia Reservoir Study DWASA	Urban water management	Bangladesh	In-country contract
22	DWASA WQ Monitoring & FS	Water quality monitoring	Bangladesh	In-country contract
23	Collaborative Research on Flood Resilience in Urban Area (CORFU)-EU	Urban water management	Bangladesh	In-country contract
24	ADCP & Bathymetry Survey for Padma Bridge Project	Survey project	Bangladesh	In-country contract
25	Cross section survey of the Kushiara River at near Bibiyana Gas Field, Sylhet	Survey project	Bangladesh	In-country contract
26	Training of BWDB & EDP staffs on Hydrographic Survey under Estuary Development Programme	Capacity building	Bangladesh	In-country contract
27	Hydrological and Morphological Study for the Proposed Road Bridge on Bangshi River at Dhamrai Upazilla under Dhaka District	Bridge hydraulics	Bangladesh	In-country contract
28	Desk study on the transportation of heavy cargo from Chittagong port to Fenchuganj	River management	Bangladesh	In-country contract
29	Survey for Char Mainka Cross-dam Project under Estuary Development Program (EDP)	Survey project	Bangladesh	In-country contract
30	Hydrographic Survey in the Tetulia at Char Kazal	Survey project	Bangladesh	In-country contract
31	Dry Season Topographic & Bathymetric Survey, South Bank for River Training Work of Padma Multipurpose Bridge Project	Survey project	Bangladesh	In-country contract
32	National Water Resources Database (NWRD)	Database project	Bangladesh	In-country contract
33	Monitoring of Hydraulic Performance of Causeways in Khaliajuri FCD	Flood management	Bangladesh	In-country contract
34	Support to FFWC for CCA and DRR-Danida	Flood forecasting	Bangladesh	In-country contract
35	Khatlon Province Flood Risk Management Project	Flood management	Tazhikistan	External Contract
36	Chevron: Coastal Hydraulic Study and Survey to Support Seismic Survey	Coastal management	Bangladesh	In-country contract
37	Economics of Adaptation to Climate Change- Bangladesh Case Study	Climate change	Bangladesh	In-country contract
38	Malaysia: Coastal hydraulic and morphological	Coastal management	Malaysia	External

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	study for Labuan Island			Contract
39	Survey and Modelling of Sandwip - Urir Char-Noakhali Cross dam	Coastal management	Bangladesh	In-country contract
40	Feasibility Study and Detailed Engineering Design for Long Term Solution of Drainage Problem in Bhabadaha water logged area	Drainage management	Bangladesh	In-country contract
41	Kobadak River Basin Drainage Management	Drainage management	Bangladesh	In-country contract
42	Planning and Design of Beel Kapalia Tidal Basin for Tidal River Management (TRM) and Sustainable Drainage Improvement	Water management	Bangladesh	In-country contract
43	BADC: Flow assessment for Survey and Investigation of Minor Irrigation Improvement project Phase -2	Irrigation management	Bangladesh	In-country contract
44	Conjunctive Use Potential of SW-GW for Malaysia	Groundwater management	Malaysia	External Contract
45	Math Modelling for Eng Design of Kurigram Irrigation Project (KIP) -North	Irrigation management	Bangladesh	In-country contract
46	Groundwater Model Study for Rajshahi Barind Phase-III	Groundwater management	Bangladesh	In-country contract
47	Installation of DTW Project Barind II	Groundwater management	Bangladesh	In-country contract
48	Sailabari Jamuna River Erosion Protection at Sirajganj	River management	Bangladesh	In-country contract
49	Monitoring of Hydraulic & Morphological Conditions for the safety of the Jamuna Multipurpose Bridge (JMB) during 2008-09	Survey project	Bangladesh	In-country contract
50	Gaffargaon Bridge: Hydro-Morphological Study	Bridge hydraulics	Bangladesh	In-country contract
51	Scheme Information Management System for Water Management Improvement Project (WMIP)	Database management	Bangladesh	In-country contract
52	ADB: Strengthening the Resilience of the Water Sector in Khulna to Climate Change	Climate Change	Bangladesh	In-country contract
53	HYSAWA Project, Phase-II for Noakhali Region		Bangladesh	In-country contract
54	Mathematical Modelling for the Ganges Barrage Project	River management	Bangladesh	In-country contract
55	Study on Well Field Construction for Immediate Supplement to City Water Supply From Nearby Ground water Sources	Urban water management	Bangladesh	In-country contract
56	Support to Pacific Marine Service in dredging of Outer bar area of Chittagong Port	Ports management	Bangladesh	In-country contract
57	River Bank Protection Monitoring at Kurigram	River management	Bangladesh	In-country contract
58	Survey of the Ganges Barrage Project.	Survey project	Bangladesh	In-country

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				contract
59	Fixation of alignment for new road construction from Madani Avenue to Eastern By-Pass	Survey project	Bangladesh	In-country contract
60	Development of a Data Management System for Hardware and Water Quality (HAWQ) for UNICEF	Database management	Bangladesh	In-country contract
61	Resource Mapping in Teknaf and Ukhiya Upazilla	Database management	Bangladesh	In-country contract

(5) Main events in 2009

Sl.	Topic	Organizer	Participants	Date	Remarks
1	Coastal Inundation Forecasting Demonstration Project Kick-off Meeting	World Meteorological Organization	Deputy Executive Director	29 Jun-01 Jul 2009	Held in Switzerland
2	Application of Isotope Techniques to solve hydrological Problems	Bangladesh Atomic Energy Commission	A-WRP Professional	24 Jun 2009	Held in Dhaka, Bangladesh
3	Fourth South Asia Water Research Conference		2 IWM Professionals	04-06 May 2009	Held in Nepal
4	AEA/RCA Executive Meeting on Application of Isotope Techniques to Solve Hydrological Problems	IAEA	A-WRP Professional	19-25 Apr 2009	Held in Malaysia
5	Conference of the Dialogue on Climate Change Adaptation for Land and Water Management		Deputy Executive Director	16-17 April 2009	Held in Kenya
6	Workshop on Feasibility Study of a Deep Sea Port in Bangladesh	Ministry of Shipping	A CPE professional	12 Apr 2009	Held at Dhaka
7	5th World Water Forum at Istanbul	World Meteorological Organization	Deputy Executive Director	19-22 March 2009	Held in Turkey
8	International Conference on Water and Flood Management	IWFM, BUET	10 IWM professionals	15-17 Mar 2009	Held at Dhaka, Bangladesh
9	Advances in Arsenic Research in the sub-continent	Organized by CERM, BUET	A WRP Professional	22 Feb 2009	Held at BUET, Dhaka, Bangladesh
10	Feasibility study for supply of SW from U/S of Teesta Barrage for supplementary irrigation of Lalmonirhat dist	Irrigation Management	BADC, Ministry of Agriculture, Planning Commission	19 Feb 2009	Held at BADC, Dhaka, Bangladesh

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Sl.	Topic	Organizer	Participants	Date	Remarks
11	Climate Change Impacts and Adaptation Strategies for Bangladesh	Organized by ITN-BUET	Two IWM professionals	18-20 Feb 2009	Held at BUET, Dhaka, Bangladesh
12	Demonstration on AMR System metering in DWASA Pilot Area at Nikunja II	Water Resource Planning Division	Minister, ICT, DWASA decision makers attended	12 Feb 2009	At the project site, Nikunja, Dhaka, Bangladesh
13	Aquaterra World Forum on Delta & Coastal Development		A CPE professional	10-12 Feb 2009	Held at Amsterdam RAI, in the Netherlands
14	International Workshop on Tsunami and Storm Surge Hazard Assessment and Management for Bangladesh	Coast, Port and Estuary Management Division	International workshop	21-22 Jan 2009	Organized by MoFDM & CDMP. IWM professionals
15	Regional Workshop on Climate Change Adaptation for Land and Water Management		Deputy Executive Director	18-22 Jan 2009	Held in Vietnam
16	World Water Assessment Programme : Bangladesh Case Study'	World Bank Coordinated by Mr. Sharifuzzaman Choudhury	Royal Danish Embassy, local government and institutions like BWDB, WARPO, BUET, RHD	7 Jan 2009	Held at CIRDAP Auditorium, Dhaka, Bangladesh
17	Inception Report presentation on "Assistance to Climate Change adaptation and disaster risk reduction in BD	Flood Management Division	BWDB, Danish Embassy and NGOs	21 Dec 2008	Held at a local hotel, Dhaka, Bangladesh
18	Inception Report Presentation for Danida Project	FMG Division, IWM	Danish Embassy, IWM professionals	22 Dec 2008	Held at a local hotel (Ananda), Dhaka, Bangladesh
19	Seminar on Bridge Manual	REN division, IWM	BUET, RHD, IWM	5 Nov 2008	BUET Auditorium, Dhaka, Bangladesh
20	Sustainable Urban Environmental Practices		A WRP professional	28-31 Oct 2008	Held in Thailand
21	Discussions and Meetings at ADPC	ADPC	DED	14-20 Sept 2008	Held in Thailand
22	Intl. Seminar on Long lead flood forecast technology for disaster management	MOWR	IWM Professionals, ADPC, BWDB, MOWR	3-4 Sept, 2008	Sheraton Hotel, Dhaka, Bangladesh
23	Presentation on SIDR Rehabilitation using IWM Model	IWM	Planning Commission, IWM	21 Jul 2008	Planning Commission, Dhaka, Bangladesh

About NARBO activity

(1) The contact person and organization's web-site

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1) The name, position, phone & fax number, e-mail address of contact person

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2) The organization's website URL (English and local language respectively)

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(2) Activities your organization implemented in 2009 as the member

IWM carried out number of clientele projects and research & development activities as member of NARBO. As it is widely recognized throughout the world Bangladesh is a riverine country and most of the development activities carried out is related to rivers, and innumerable water bodies that crisscrosses it while flowing to the Bay of Bengal. The country faces many natural calamities through out the year from time immemorial such as floods, storm surges, tornadoes, droughts etc. Recently the unpredictable phenomenon of Climate Change effects has added a new dimension to these natural calamities with increase in magnitudes, frequencies and unpredictability. Rise in Mean Sea Level is a major concern as most of the country has a flat topography. As predicted by the end of the century with an increase of 1 meter MSL rise, a significant are of the country will be submerged. Apart for this the country has an agro-based economy which mostly depends on agricultural production for the huge population that dwells within its territorial boundary. Application of irrigation practices, both from surface & groundwater is therefore a major concern since weather has a great influence on it. Recently industrialization and urbanization has begun rapidly which has created great concern for need of dependable safe water supply and threats from pollution. As a consequence urban water management has become a major concern.

IWM has been using the General Model along with the Regional Models for carrying out planning and impact studies of all issues that have been described above. Climate Change model study is getting a wide recognition for preparing the nation for adaptation due to MSL rise. Use of irrigation models are widely utilized in agriculture practice by all agencies involved in the activities whether from surface or groundwater source. The recent activities for any infrastructural development on the rivers and water bodies are being tested for environmental and social impacts through model studies. Infrastructural

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interventions for facilitating navigation, ports & coastal protection are also tested through model studies for planning purpose. The recent phenomenon of unpredicted natural calamities are being predicted through use of flood forecasting and warning for the river system and storm surge modelling for coastal surges from the Bay of Bengal. The urban water management issues are also being addressed through identification of suitable surface / groundwater sources and drainage studies by using the model suite appropriate for planning purposes.

In a nutshell, IWM as a NARBO member has been involved in all aspects of river basin development through application of modelling technology. It utilizes GIS, RS & IT technology to supplement the river basin management for application of modelling technology. IWM imparts capacity building initiatives for all related stakeholders involved in these sectors through training programs. It also supports and sponsors in carrying out research based studies with local and foreign institutions in river basin studies. Under the circumstances it may be stated that in the year 2009, IWM has been involved in numerous river basin development projects of the nature described above. The name of some of the projects has been described above in the table showing on-going projects.