



**Rivers of Bangladesh (57 Transboundary)**



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#### PUBLISHED BY:

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## Senior Secretary, Ministry of Water Resources visited WARPO

Mr. Shaikh Altaf Ali, Sr. Secretary, Ministry of Water Resources, Government of the People's Republic of Bangladesh visited Water Resources Planning Organization (WARPO) on 24 November' 2011. Mr. Md. Shahjahan, Director General (CC) welcomed Secretary at WARPO with a bunch of flowers. Director General, briefed Sr. Secretary on activities of WARPO. Other professionals of the organization were also present at that time.



*Senior Secretary, Ministry of Water Resources with DG and all other Professional of WARPO*

While interacting with WARPO professionals, Sr. Secretary expressed his deep appreciation of the organization's valuable contribution to water resources management of Bangladesh. During his briefing, Director General mentioned some important remarkable achievements of WARPO such as National Water Management Plan (NWMP), National Water Resources Database (NWRD), National Water Policy (NWPo), Coastal Zone Policy (CZPo), Coastal Development Strategy (CDS), Draft Bangladesh Water Act-2011 etc. He also mentioned some limitations of WARPO and urged Secretary to give a special emphasis from Ministry of Water Resources (MoWR) in overcoming such limitations. Secretary assured WARPO officials that MoWR would play an active role in this regard. Lastly he advised WARPO scientists to conduct more research works on recent water issues so that the country would successfully face any problems related to water sector.

To encourage WARPO Activities Mr. Shaikh Altaf Ali, Sr. Secretary MoWR visited WARPO again on 28 February 2012

## Bangladesh Water Act (Draft): A way forward for the implementation of National Water Policy

For effective implementation of National Water Policy (NWP), 1999 existing legislation related to water management in Bangladesh requires supplementing in a number of key areas. Bangladesh water Act is under preparation revising and consolidation of existing laws governing ownership, development, appropriation, utilization, conservation, and protection of water resources in the country.

The first draft of the Bangladesh Water Act was prepared back in 2001, during the preparation of National Water Management Plan (NWMP). The draft went through a number of iteration during the last decade. A revised version of the draft was reviewed by Executive Committee of National Water Resources Council (ECNWC) in 22 May 2011 and also discussed by Cabinet on 11 August 2011. As per suggestion of the ECNWC and directives from Cabinet an inter-ministerial meeting was held on 24 November 2011 to incorporate the comments from different Ministries. The revised draft of Bangladesh Water Act was again discussed in ECNWC in 15 January 2012.

The present form of Act includes the usage rights that are naturally awarded to individuals for the collection of water for domestic uses, for bathing, for navigating small watercraft and small agriculture. There is a provision for general authorization of water usage for specific area, people and time from a particular source. The draft covers protection and conservation of water resources; control over the unauthorized land filling and encroachment of wet lands; administration and enforcement of the Act etc. The responsibilities of water users association, relevant agencies for enforcement and financial provision for its implementation have been identified and included in the Act. It is expected that the new legislation would provide GoB with adequate powers (practicable to enforce) and act on fast deteriorating water resources in the country.

## DG, WARPO Visits Teesta Project



*Down Stream view of Tista Barrage.*

Mr.Md. Shahjahan, Director General (CC), WARPO visited Teesta project during 10-12 November, 2011 to observe the practical scenario of the project area. Mr.Md. Siddiqur Rahman, PSO (CIS), WARPO was accompanied him. They visited teesta barrage, head regulators, flood bypass, silting pond, Main canal and other irrigation and drainage canals. They also visited Tin Bigha Corridor, Dahgram and Angorpota Sitmohol and observe the territorial river erosion.

On the way, they visited Sirajgonj Hard Point and closely observed the damage portions of hard point and river bed siltation on the opposite side of the hard point.

They hold two meetings with the high official of BWDB at Rangpur and Sirajgong. They suggested BWDB officials to

immediate repair of the damage portion of hard point and take special care for operation and maintenance of important structures and other component of teesta project including auto operation teesta barrage gates which is now out of operation.

## WARPO took part in Digital Innovation Fair 2011

Four (4) day long Digital Innovation Fair 2011 started on July 06, 2011 in Dhaka's Bangabandhu Sheikh Mujibur Rahman Novotheatre & concluded with a lot of fan fare on July 09, 2011. All the days it seems that the biggest crowd with thousands of people streaming to different stalls to see the latest e-services provided by various government ministries agencies.

Among with all the government ministries & agencies WARPO took part in the fair highlighting the various services that are currently being offered. With all other offer it highlighted the activities of National Water Resources Database (NWRD), its web enable computerized library database cataloguing system & upcoming Monitoring Information System (MIS).



*Md. Siddiqur Rahaman (PSO, WARPO), Dr Aminul Haque (PSO, WARPO) & Krishna Chandra Bhadra (SO, WARPO) receiving award from Nazrul Islam Khan, PD, A2I Programm.*

The other highlight of the 4-day long innovation celebration was 3 seminars based on contemporary issues related to ICT service delivery.

Digital public innovation fair-2011 is a step towards providing extensive citizen services to citizen. Through this fair citizens will be aware of the extensive e-services at their doorsteps. Also, citizens will be benefited in terms of reduced transaction time.

The objectives of the event are:

- To encourage and promote the current best practices in public service delivery
- To share and replicate these best practices across government organizations
- To set a tone of healthy competition amongst the GoB ministries and agencies

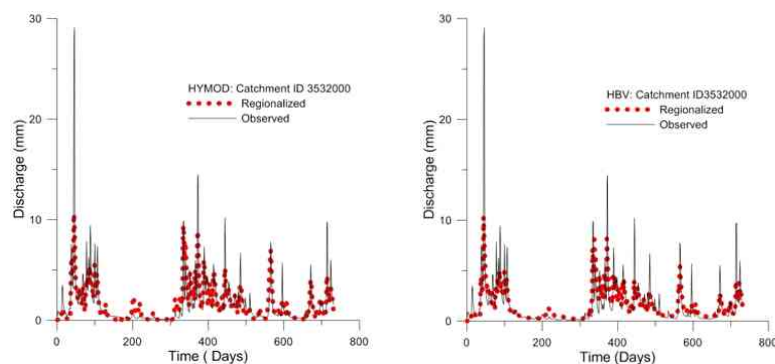
Government participants benefited from learning about best practices in this respective field of service delivery and administration.



## Predicting Ungauged Basins: Application of Conceptual Hydrological Models

The prediction of the hydrologic response of ungauged catchments is an entrenched problem in hydrology. One of the approaches to solve it is to apply a model to a large number of gauged catchments and to derive statistical relationships between model parameters and catchment characteristics, so called regionalization. Catchment Properties and Hydrological Model parameters are used consistently to predict ungauged basin. Unfortunately this blend was not used properly to find the appropriate solution. Several accustomed procedures in hydrology are no longer valid under changing hydrological regimes, and new analytical procedures need to be developed (or existing ones modified). This study explores the potential of the regionalization process to predict ungauged basins using the data of the Eastern USA. Two conceptual rainfall-runoff models: HYMOD and HBV are used in this study. The aim of this study is to find the new paradigm in predicting ungauged basins combining parameters of a conceptual rainfall-runoff model with catchment properties.

On the way to PUB, our research target is to give a real breakthrough in this process. We analyzed the existing methods in regionalization studies to Predict Ungauged Basins and considering all the aspects a new methodology is developed, which is named as RDS Method. ROPE(R) Data depth (D)-Spatial Proximity (S) together gets this name RDS. Robust Parameter Estimation (ROPE) algorithm ensure all parameter vectors robust with the following criteria: (i) lead to good model performance over the selected time period (ii) lead to a hydrologically reasonable representation of the corresponding process



*Hydrograph comparing regionalized data with observed data in HYMOD & HBV for pseudo ungauged catchments*

(iii) insensitive (iv) transferable (can be regionalized). Data depth function is used to find the boundary or the outlier of the catchments to identify donor catchments. It's also used in ROPE algorithm. Application of the Spatial proximity-one of the earliest approach consists of transferring parameters from neighboring catchments to the ungauged catchment, the inspiration being that catchments that are close to each other should have similar behavior since climate and catchment conditions should vary evenly in space. We blend this three key (ROPE- Data depth- Spatial Proximity) concept together to reach our goal. Use of neighborhood catchments (donor) properties considering the deepest parameter set of the conceptual hydrological model and distributing

the weight in minimum of the maximum contribution of the each catchment properties ensemble prediction of runoff in ungauged basins. Analysis shows 95 percent success in predicting ungauged basins with HBV and 90 percent success with HYMOD. Its undoubtedly perceptible that newly developed RDS method is very effective in predicting ungauged basin and Regionalization is independent of the Conceptual rainfall-runoff model. Out of 74 pseudo ungauged catchments, only 4 regionalization unsuccessfulness in HBV model, and 8 in HYMOD signifies the robustness of the method.

## Strengthening of WARPO: Organizational and Institutional Development

A discussion meeting on “**Strengthening of WARPO: Organizational and Institutional Development**” under Water Management Improvement Project (WMIP-Component-3B) was held on 19 October, 2011 at WARPO conference room. Mr Md Shahjahan, Director General (CC), WARPO presided over the meeting. All WARPO officials were attended in the meeting. In the meeting, Mr. Giasuddin Ahmed Choudhury, Team Leader and Prof. Max Spoor, Institution and Training Expert (International) of the project presented the key findings on the following issues (a) Organization/ Institutional Development of WARPO (b) Human Resources Development Policy and HR management and (c) Training need analysis. All participants discussed about key findings and conclusions regarding Organization Development and Human Resources Development of WARPO and training need analysis in water sector.



*Professor Max Spoor, International Institutional Expert is seen with WARPO and CEGIS Professionals at a discussion Meeting.*

## WARPO professional has been awarded Erasmus Mundus Scholarship for a two-year Masters Program in 'Coastal and Marine Engineering & Management (CoMEM)'



Mr. Kazi Saidur Rahman, Scientific Officer, WARPO has been awarded Erasmus Mundus Scholarship for a two-year Masters Program in 'Coastal and Marine Engineering & Management (CoMEM)'. In August 2010, He has successfully completed this joint Masters program organized by three high-rated European Universities i.e Technical University of Delft (Netherlands), University of Southampton (United Kingdom) and Norwegian University of Science and Technology (Norway). This program aims to provide familiarity with key issues concerning sustainable, environmentally friendly solutions to challenges in Coastal Engineering; a European perspective as well as a coherent & integrated global perspective on coastal and marine issues and problems.

During his two years study, Mr. Rahman has achieved specific specialization on Coastal Morphodynamics, Shoreline Management & ICZM and GIS applications in Coastal Engineering, He has completed some projects such as design of Marinas in Dutch Delta, Environmental Impact Assessment in some UK coastal habitats using GIS. He also presented a Poster how to analyze the validity of the 'equilibrium beach profile' concept using SBEACH simulation model. In his thesis, he worked with systematic analysis of simultaneous occurrences of large waves and high storm surges along the Norwegian Coast. His study aimed to estimate the individual probability distribution and extremes of these two variables, the combined distribution of their joint occurrences, their degree of dependence & correlation by performing statistical analysis of sequential data of waves and storm surges and also with the application of different joint probability methods.

## WARPO professional participated in a short Course on Water Resources Planning

Mr.Md. Siddiqur Rahman, Principal Scientific Officer (CIS) of WARPO participated in a short course on "Water Resources Planning" held at UNESCO-IHE, Delft, the Netherlands from 28 March-15 April, 2011. The content of the course was Framework for Analysis (FFA), Multicriteria Analysis (MCO) and Cost-benefit analysis (CBA) to gain knowledge on participate and guide water resources planning activities applying planning techniques and water resources system analytical methodologies for economic concepts of water resources planning.

About 30 participants of different countries including the regular Masters course students were attended the course. The course has been very useful in the context of WARPO's role on Macro Planning of Water Resources.



*Mr. Md. Siddiqur Rahman, PSO (CIS), WARPO  
with other participants*





## WARPO Official Participated in International Visitor Leadership Program in the USA

Dr Md Aminul Haque, Senior Scientific Officer, WARPO participated in the International Visitor Leadership Program entitled "**Water Resources Protection in the U.S.**" organized by United States Department of State at Washington DC from September 13 - October 1, 2010. The main objectives of this program were (i) to review U.S. efforts to protect the quantity and quality of surface and groundwater supplies for a variety of sustainable uses at local, state, national and international scales (ii) to assess trans-boundary water management programs for conserving, developing, and allocating shared water resources (iii) to examine innovative technologies for monitoring, assessing and conserving water resources. The program addressed the federal government's role in water policy and regulation, water resource management in urban and arid environments, sharing of scarce resources; conflict resolution, native



Dr Md Aminul Haque, SSO, WARPO among other participants (4th from left standing in the first line)

American water rights issues, water education and public outreach, implications of climate change for water management. The program was attended by a multidisciplinary group consisting of policy-makers, scientists, academicians from 20 countries of the world.

## Hydro-meteorological data availability in NWRD of WARPO

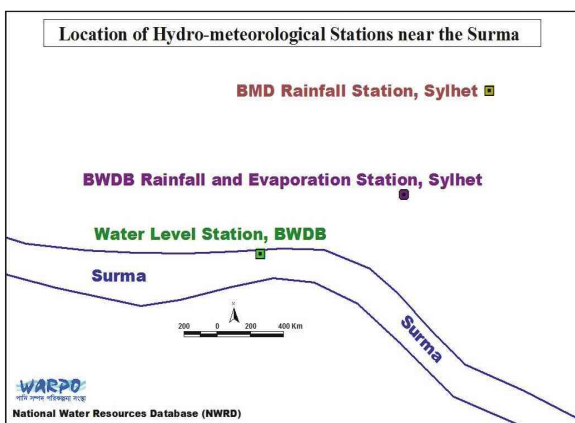
WARPO is updating and upgrading the National Water Resources Database (NWRD) under component 3B-2 of Water Management Improvement Project (WMIP). The ultimate aim of the NWRD updates is to provide the latest and updated information to the data users.

NWRD, the collection and compilation of huge volume of data on surface water, groundwater, meteorology, environment, soil and agriculture, socio-economic condition etc., has become an important resource in many disciplines. NWRD contains three types of data - spatial, time series and attribute. All data collected from different sources in hardcopy or digital format have been checked for obvious errors and processed to convert into NWRD database format.

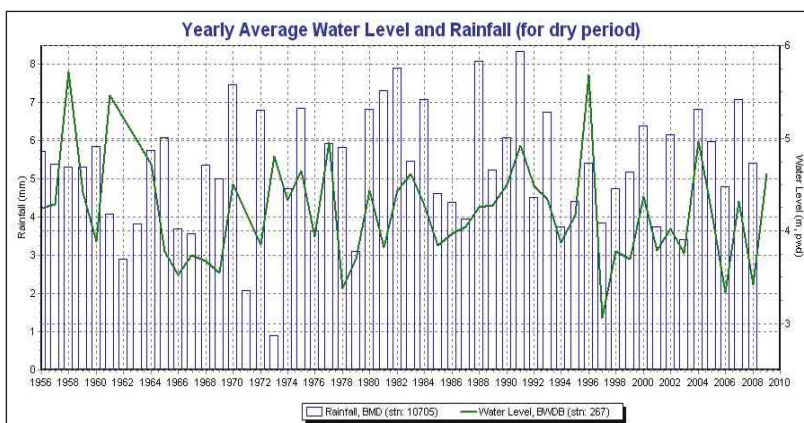
The integrated hydrological and meteorological data for the whole country is a vital issue for water resources planning and management, disaster monitoring and climate change issues. NWRD has collated and stored historical hydro-meteorological data in user-friendly formats. All of the NWRD data layers contain the metadata also. The following table shows the availability of hydro-meteorological data in NWRD:

Data Name	Data Format	Data Availability
Climatic stations of BMD	Shape File	Location Information of 36 nos. climatic stations
Daily Humidity Data of BMD	Time Series Table	1948 - 2008
Daily Rainfall of BMD	Time Series Table	1948 - 2008
Daily Sunshine Hours, BMD	Time Series Table	1961-2008

Data Name	Data Format	Data Availability
Daily Temperature Data of BMD	Time Series Table	1948-2008
Daily Wind Speed of BMD	Time Series Table	1948-2008
Daily Solar Radiation, BMD	Time Series Table	1983-2008
Daily Rainfall of BWDB (312 nos. stations)	Time Series Table	1957-2008
Daily Water Level (Non Tidal) of BWDB (281 stations)	Time Series Table	1910-2010
Daily Water Level (Tidal) of BWDB (181 stations)	Time Series Table	1909-2009
Daily Non Tidal Discharge of BWDB (133 stations)	Time Series Table	1934-2007
Daily Tidal Discharge of BWDB (14 stations)	Time Series Table	1964-2006
Water Level Stations, BWDB	Shape File	Location Information of non-tidal (293) and tidal stations (188)
Discharge Stations, BWDB	Shape File	Location Information of non-tidal (133) and tidal stations (16)
Water Level Stations, BIWTA	Shape File	Location Information of 47 non-tidal and tidal stations
Rainfall Stations, BWDB	Shape File	Location Information of BWDB Rainfall stations



Rainfall, Evaporation and Water Level Stations near the Surma River



Statistical Analysis of Hydro-meteorological Data near the Surma River

Besides, NWRD contains Surface Water Salinity, Sediment and River Cross Section data of BWDB, Evaporation Data of BMD and BWDB, Hourly Tidal Water Level of BIWTA, Dependable Rainfall of BMD and BWDB, Rainfall (Monthly) of BMD and BWDB, Evapo-transpiration data, etc. During the project period of WMIP component:3B-2, NWRD data will be updated twice (at year 2009-2010 and 2013-2014) to provide the latest information at the end of the project.

Moreover, NWRD has developed some user-friendly application tools like time series viewer, statistical tool, mapping tool etc. to facilitate planners to analyze data for generating required information easily.

## Professional Training at AIT, Thailand on Planning and Monitoring of Water Resources Projects

The Water Management Improvement Project (WMIP) was conceived aiming at enhancing institutional performance of the country's principal water institutions particularly WARPO and BWDB. To this view a professional training course on **Planning and Monitoring of Water Resources Projects** was organized by Asian Institute of Technology (AIT), Thailand from 12 – 22 December 2011. This two-week training course was developed to provide an understanding on the key components of water resources planning, management, monitoring and evaluation. The selection and design of all the modules for academic session was need based addressing the rapid changing circumstances in water resources in national and international arena. This course also covered critical subject areas like quality & risk management, leadership & team building which are balanced in terms of theory, tools, and applications. In order to justify the conceptual knowledge gained from academic sessions, WARPO professionals also visited some field oriented activities like **Pasak Jolasid Dam, Srinagarind Hydro-electric Project and Suvarnabhumi Airport Drainage Project**. Seven (7) officials from WARPO attended this training course which will substantially improve the attitude for better service performance on future water resources planning and management.



Officials of WARPO along with AIT personnel

## Master of Science in Water Resources Engineering from Katholieke University Leuven & the Vrije University Brussel, Belgium.



Mr. Md. Masud Alam, Scientific Officer of WARPO, obtained his MSc. in Water Resources Engineering in September 16, 2011, from the Katholieke University Leuven & the Vrije University Brussel, Belgium. The title of his master's thesis was 'An Evaluation of Integrated Water Resources Management (IWRM) activities in Bangladesh for sustainable Water Resources development and Comparison with European Water Management System'. The study included the courses on : GIS and Remote Sensing in Water Resources Engineering, Aquatic Ecology, Irrigation Agronomy, Advanced Engineering Mathematics in Water Resources, Hydrological Data Processing, Groundwater Hydrology, Water Quality Monitoring and Treatment, Surface Water Hydrology, Statistics in Water Resources Engineering, Hydraulics, River Modeling, Surface Water Modeling, Ground Water Modeling, System Approach in Water Resources Engineering; Social, Political and environmental Aspects in Water Resources, Integrated projects in Water Resources etc. and the thesis. The overall objective of the thesis was to evaluate the existing IWRM activities in Bangladesh based on IWRM tools and principles for sustainable Water Resources Development in the country and to investigate the European Water Management System for incorporating the lessons to the country's Water Resources System that might be the proper guideline for effective implementation of IWRM activities in Bangladesh.



**Editorial****WARPO celebrates its 20 years of birth.**

It was June 1991; Water Resources Planning Organization was established transforming from Master Plan Organization (MPO); gazette was published on 22 December 1991. MPO was established in 1983 to prepare the first National Water Plan (NWP); the plan was completed in 1987 and updated in 1991. Today's WARPO mandates have been drawn from Water Resources Planning Act, 1992. Soon after its emergence in 1992 until 1998, WARPO remained literally unattended. Major activity was initiated through National Water Management Plan (NWMP) project which continued during 1998-2001.

Effective role play is important for sustainability of any organization; WARPO has developed its short and medium term plan to play its role through routinely monitoring the implementation of NWMP and periodically update the NWMP to guide the investments and implementation of projects in the water sector. WARPO should also routinely review water projects that have implication on water management in the country (Clearing house). WARPO's role as 'Clearing House' is to provide technical assistance to Planning commission in its approval process of water sector projects. WARPO is currently reviewing BWDB's projects only. WARPO is also updating/upgrading its National Water Resource Database (NWRD).

WARPO received much attention in the first 10 years during the preparation of NWMP (1998-2001). In the remaining 10 year (2001-2011) was poorly funded. WARPO undertook a project called 'Integrated Coastal Zone Management Plan (ICZMP) project' which produced Coastal Zone Policy (2005) and Coastal Zone Strategy (2006); a programme Coordination Unit (PCU) was established at WARPO to monitor the implementations in the coastal area. Other projects implemented during this period were ADB's Regional TA Project supporting IWRM implementation (TK 1.9 crore), Impact assessment of Indian River linking Project (TK 2.79 crore) and updating the NWRD and Human Resources Development (TK 3.2 crore) under WMIP. WARPO needs additional manpower and resources to strengthen its mandated role. WARPO has its plan for new activities under the ongoing WMIP projects to support for updating of NWMP and strengthen other role of WARPO in 2012.

**Contributors list**

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**New Director General Takes Over**

Mr. Md. Shahidur Rahman, took over the charge of Director General of Water Resources Planning Organization (WARPO) on 01 February, 2012. Earlier, he was Additional Director General, O & M-1, Bangladesh Water Development Board (BWDB). He had his B.Sc. Engineering (Civil) degree from Bangladesh University of Engineering & Technology (BUET) in 1977 and Post-Graduation in Water Resources survey, watershed management and conservation

from International Institute for Aerospace Survey and Earth Science (ITC) Netherlands. He started his career as Assistant Engineer in Bangladesh Water Development Board (BWDB) in 1977 and served as AE, SDE, XEN, SE, ACE, CE and Additional Director General in BWDB from 1977 to 2012 (January) in different projects & Head Quarter.

He is the fellow of the Institution of Engineers, Bangladesh (F/7190).

**Master of Science from University of Stuttgart, Germany**

Mr. Syed Abu Shoaib, Scientific officer of WARPO, received MSc. in Water Resources Engineering and Management on 28 September 2011, from University of Stuttgart, Germany. The title of his master's thesis was 'Regionalization of Hydrological Model Parameters to Predict Ungauged Basins'. Major focus of his master's studies were in : Modeling of Hydro Systems, Integrated Watershed Modeling, Geohydrological Modeling, Integrated River Management and Engineering, Stochastic Modeling,

Geostatistics, Fuzzy logic and Operation Research, Hydraulic Structures, Environmental Informatics, Multiphase Modeling in Porous Media, Water Resources and Irrigation - Planning Methods and Tools, Limnic Ecology, Flood Control Project and Analysis, Sediment Transport and GSTARS Computer Modeling. During his study he did several hydrological investigations with pumping test analysis.

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