



Workshop on Assessment of the State of Water Resources, Bangladesh

Water Resources Planning Organization (WARPO) in association with Institute of Water Modelling (IWM) organized a outcome sharing workshop on “Assessment of the State of Water Resources” on 15 March, 2017 at CIRDAP International Conference Centre Auditorium, Chameli House, Topkhana Road, Dhaka.



Barrister Anisul Islam Mahmud, MP, Hon'ble

Minister, Ministry of Water Resources graced the occasion as the Chief Guest while Mr. Muhammad Nazrul Islam, Bir Protik, MP, Hon'ble State Minister, Ministry of Water

Hon'ble Minister, MoWR, Hon'ble State Minister, MoWR, Senior Secretary, MoWR, DG, WARPO and ED, IWM are seen in the picture

(Cont'd on page 3...)

Bangladesh Water Rules, 2017

The growing challenges regarding water rights, protection of water resources, water use, water services and management is widely acknowledged. Bangladesh Government enacted Bangladesh Water Act (BWA) (14 no. act of 2013) throughout the country from 30th of June, 2013. Bangladesh Water



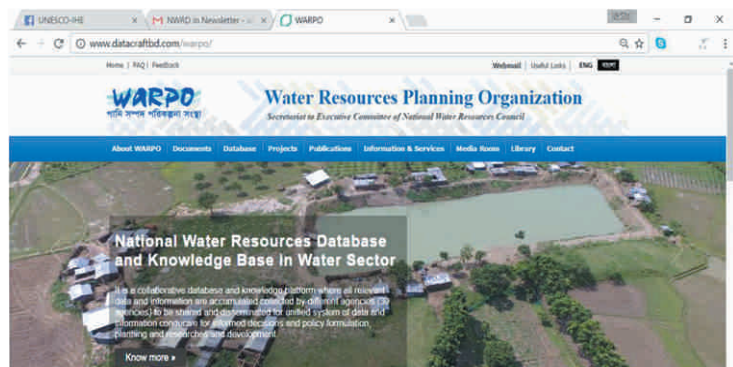
Dr. Mohammad Ali Khan, Additional Secretary (Development), MoWR chairing a District Level consultation workshop on BWR

Act, 2013 is an overarching framework legislation, which entails a coordinated and comprehensive water regime in respect of development, management, extraction, distribution,

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Internet version of NWRD and ICRD tools

An internet version of web-enabled National Water Resources Database (NWRD) and Integrated Coastal Resources Database (ICRD) tools is made available in the new WARPO website. WARPO has the view to disseminate and make data available to wider user groups for efficient natural resources planning and decision making. Over the years, WARPO collated data on surface water, ground water, soil and agriculture, fisheries, forest, socio-economic, meteorological, environment



New web page of Water Resources Planning Organization (WARPO)

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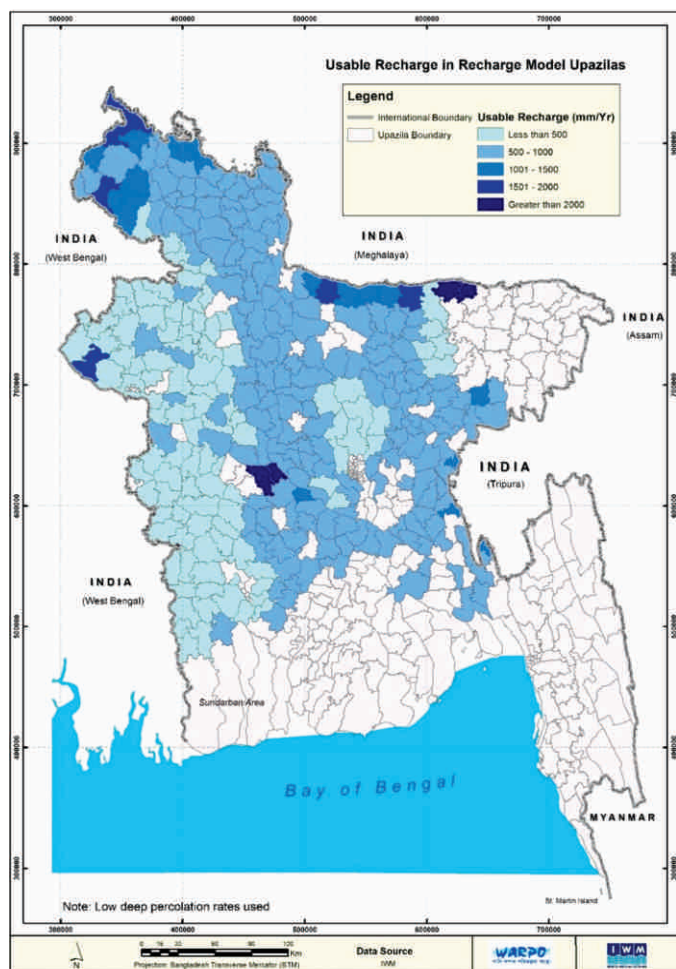
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State of the Water Resources in Bangladesh

Introduction

Bangladesh, despite being one of the few countries in the world with abundant fresh water available in the monsoon, but shortage of water creates a drought-like situation in the dry season, do suffers from its high variability over time and space as well as lack of direct control over the resources generated upstream that flows down through border rivers.



Map showing usable recharge in Recharge Model Upazilas

Surface Water Resources

Based on the historical flow data for the period 1997 to 2012 the average annual transboundary flow to Bangladesh was approx. 1,116 Bm³/yr, compared to 1,050 Bm³/yr before 1985. The analysis of the recent past flood peaks does not show any significant change in the flood frequencies.

The annual dry season (Nov-May) transboundary inflow volume to Bangladesh is around 206 Bm³ average over 1965-1996 (WARPO, 2000), while it is 122 Bm³ during critical months from January to May (Ganges treaty period). 90% of the dry season inflow is from the Ganges and Brahmaputra Rivers alone. The water resources stored

in recognized low lying lands standing in November that lasts well early parts of dry season and also soil moisture available in upper saturated soil profile in January is considered static surface water available which is estimated to be 12 Bm³ (WARPO, 2000).

The flows in the country's major rivers (Ganges, Brahmaputra and Meghna) do not show any significant trends in the wet season. However, peak discharges at Baruria (Padma River) showed a slight increasing trend. Also, in some of the regional rivers, there is a slight increase in peak water levels for the 50yr and 100yr return period flood events with inclusion of the updated data (1990-2012) in the frequency analyses. In some of the rivers, there is a trend of decrease in annual flows in Ganges, Teesta and Dudhkumar between 10-40%. For the other rivers (Brahmaputra, Manu, Khowai, Gumti and Muhuri), increase in annual runoff was found in the range of 10-50% compared to the pre-1986 period.

Ground Water Resources

Study of groundwater has shown that groundwater development limits have either been reached or are significantly exceeded in many parts of the country. There are signs of declining groundwater level trends particularly in the northwest and northcentral region. In the large urban areas, particularly evident in Greater Dhaka, groundwater levels have declined significantly and the downward trend is continuing while the lateral influence of this decline is also extending. The situation appears to be clearly unsustainable and the impact of declining groundwater levels may spread into areas that rely on that resource for irrigation.

A recent study of WARPO, 2016 has established that mean annual rainfall decreased in the recent period compared to the long-term mean. This may be part of a medium-term cycle combined with impact of global climate change. The trend in consecutive dry days in monsoon season show significant increasing trend of dry spells in the northeast and south central region. Conversely, a decreasing trend in dry spells has been noticed in the northwest region. Ground Water use in Bangladesh is dominated by irrigation; 77% of irrigated area is served by groundwater sources. Estimated annual net use of ground water (based on 2014-15 irrigation census) is around 18 Bm³, while medium and large surface water irrigation scheme grossly uses around 13.5 Bm³. In addition to the dry season irrigation, around 0.5 Bm³ is used as supplemental irrigation on an average in case of insufficient rainfall during monsoon. Therefore, present water use for irrigation is approximately around 32 Bm³ (WARPO, 2016). It is observed that ground water is overused in the Barind Area due to irrigation. Water uses for industries are also rapidly increasing and creating significant overuse from ground

water sources in Dhaka, Mymensingh and Chittagong area. Presently Greater Dhaka is consuming alone about 4.03 Mm³ per day and 92 percent is from ground water sources (2030 WRG, 2016). All over the Bangladesh, domestic and municipality ground water use is estimated to be around 2.17 Bm³ (WARPO, 2016). In addition, the use of ground water for paper mills, textile mills, leather factories and others are approximately estimated as 0.2 Bm³, 0.04 Bm³, 5.4 Bm³ and 0.5 Bm³ respectively (WARPO, 2016). There are concerns about the level of use exceeding recharge in these area and elsewhere. The estimates of average ground water resources in terms of availability/usability and quality vary widely in space.

There is also a growing realization that the groundwater resource challenges cannot be successfully overcome by the use of technological solutions only. Basically control of abstraction and usage is often more difficult than for surface water resources. The human element is equally important and needs to be given the appropriate attention and priority. There is thus a need for a holistic approach to groundwater management and this is embedded in the principles of IWRM. Apart from irrigation use, groundwater use in domestic and industrial water supply has grown manifold. Since groundwater is of good quality in a major part of Bangladesh, it has been used as the preferred source of supply.

Water Quality

The growth in manufacturing industries has been a key feature of Bangladesh's economic development in the past couple of decades. Many of these industrial units are located near rivers. Despite efforts to safeguard the environment, untreated industrial effluents continue to pollute the nation's rivers. The highest incidence of industrial pollution occurs in the North Central region, especially around the urban centres of Dhaka, Naryanganj and Gazipur. The pollution levels in the surrounding rivers have become so high, especially in the dry season that these

rivers can no longer be considered suitable as water supply sources. Dhaka Water Supply and Sewerage Authority (DWASA) thus have to take up costly water supply projects to bring water from Padma and Meghna rivers to meet the demand for the future. Apart from the rivers, wetlands are also being polluted by industrial effluents. These challenges need to be urgently overcome to ensure that the state of water resources do not continue to decline.

High levels of arsenic in groundwater, especially in the upper aquifer, is a long standing public health concern. Arsenic not only contaminates drinking water sources from the aquifers but also enters the food chain when the affected groundwater is used for irrigation. In general, the deeper aquifer has less incidence of arsenic contamination. At depths below 250m, the aquifers are generally free of arsenic. Groundwater quality is also affected by high levels of iron in many Upazilas. Manganese contamination of groundwater is another major problem across the country. In most Upazilas, more than 50% of wells tested exceed the Bangladesh drinking water limit for manganese (0.1 mg/l). The problem is relatively less acute in the South Central region and around Dhaka.

Salinity

In the coastal area of Bangladesh saline aquifer exists with various thickness and degree of concentration. The sustainability of the livelihoods of over 40 million inhabitants depends on availability of potable water for domestic, municipal, industrial and port development. Surface water in rivers is saline in most of these areas. Groundwater is the main source of potable water in the coastal area but limited potable groundwater is available mostly in the thin aquifers situated in between the depth of 200m to 300m from land-surface. Salinity intrusion in aquifer may advance further with more withdrawal of groundwater to fulfil future increased freshwater demands. Also sea level rise, a direct consequence of global warming, will have a similar effect on the salinity.

Workshop on Assessment of the State of... (Cont'd on page 1...)

Resources was present in the occasion as the Guest of Honour. Dr. Zafar Ahmed Khan, Senior Secretary, Ministry of Water Resources and Prof. Dr. M. Monowar Hossain, Executive Director, IWM attended the program as Special Guests. The workshop was chaired by Mr. Md. Sarafat Hossain Khan, Director General, WARPO.

The "Assessment of the State of Water Resources" includes assessment of both ground water and surface water resources and the implications under future challenges of climate

change and development among others issues related to water. The study was aimed to generate a database to support the preparation of National Water Resources Plan (NWRP). The assessment has become relevant also to operationalize the Bangladesh Water Act 2013 through identifying water stress areas and set the limit of abstraction as a means to managing the resources (ground and surface water resources) for future avoidance of any risk associated with water scarce situation in the country.

Scenario Development for Integrated Water Resources Management: Coping with future challenges in Bangladesh

The project called "*Scenario Development in Integrated Water Resources Management: Coping with Future Challenges in Bangladesh*" funded by Government of Netherlands was implemented from March 2013 to February 2017, aimed to capacitate graduates, researchers, policy staffs of organizations of Bangladesh through undertaking research, dissemination and policy support to sustainable water management and coping with future challenges in the country. Four organizations namely Department of Water Resources Engineering (DWRE) of Bangladesh University of Engineering and Technology (BUET), Department of Irrigation and Water Management (DIWM) of Bangladesh Agricultural University (BAU), Water Resources Planning Organization (WARPO) and Center for Environmental and Geographic Information Services (CEGIS) were involved in the project. A Dutch consortium representing UNESCO-IHE, Wageningen UR - Alterra and Deltares offered advice, guidance and assistance to meet the goals of the project. The process of scenario development for water planning has been the central focus of all the activities under different work packages.

A scenario is a consistent description of a possible future situation, a story about the way the world might turn out tomorrow. It is not a forecast or prediction; rather it is a plausible story about the future with a logical plot and narrative governing the manner in which events unfold (Schwartz, 1991). Different strategies and decisions can be assessed for each scenario, which is likely to provide 'robustness' and 'flexibility' of measures to face surprises in the future.

There were eleven Collaborative Applied Researches (CAR) implemented under four important themes of IWRM in Bangladesh namely water safety, food security, sediment transport and land-use change. CAR1 addressed the reflections from the historical development of the planning and implementations in the water sectors.

Land Use Modeling (CAR2)

The CAR2 aims to develop an approach and skill on **land use scenarios** development in harmony with different drivers e.g. climate change, population and economic development and integrate the land use planning with the infrastructure, urbanization. Land-use Scanner was used to support the analysis of the causes and consequences of land-use change in order to have better understanding, the functioning of the land-use system to provide information on possible future land-use patterns. The model includes three major processes i) land suitability assessment, ii) land demand assessment, and iii) land allocation. The land suitability assessment of

each location for different land use types is assessed by determining and integrating the effects and impacts of environmental and socio-economic factors. Land demand is calculated based on analysis of population growth trend and scenarios. Finally, in the allocation model, land use conversion rules have been applied for assignment of new settlement location considering land suitability and land demand. Important gaps of land use modeling in an integrated land use planning settlement patterns and changes, trends in rural settlements in polders and embankments, growth and trends in major urban areas are now studied; criteria /priority / claims/ policy conditions are tentative for best possible allocation of land; understanding settlement pattern associated to risk to disaster, urbanization and industrialization, interventions in water management is insufficient.

Sediment Dispersal and Land Formation Processes in the Meghna Estuary (CAR3)

In a tide-dominated estuary, sediment dispersal process is one of the crucial issue in the delta building processes. The Ganges, Brahmaputra and Meghna Rivers (GBM system) have been building the delta of Bangladesh by the flow and sediment transported from their catchments. Annual fluvial input from the GBM system is one billion tons of sediment of which 75% is fine (silt and clay) and 25% is coarse (fine sand). Fine fraction of the sediment plays an important role in estuarine morphology. Previous studies under Land Reclamation Project (LRP), Meghna Estuary Studies (MES) and Estuary Development Programme (EDP) during 1978 to 2010 have helped to summarize the followings:

- Annual average rate of net accretion at Noakhali area varies between 11 to 15 km²/y. Sarker et al. (2011);
- The net rate of accretion at Patuakhali District area was about 14 km²/y, during mid 1980s to mid 1990s, on the contrary, in the following decade erosion has been the dominating process.
- This process coincided with the entrance of sand wave during that period in the Meghna estuary as suggested by Sarker (2009).
- Huge accretion at this area was mainly due to the supply of abundant coarse sediment, and different dispersal processes of coarse and fine sediments in the estuary.

The study by CEGIS attempted to establish that sediment accumulation pattern is governed mainly by the texture of

sediment, apart from other factors through an investigation, how the texture of the deposited sediment at different locations in the estuary have governed the dispersal process in the Meghna estuary.

Methodology

The shoreline delineated as a line that separates the land from water in the coastal region (CEGIS, 2009); superimposing the shorelines of different periods provided the location of accretion/erosion; period between 1974 and 2015 divided into three categories for assessing the role of the characteristics of input sediment on the deposited sediment; a total of eight locations at Urir Char & Char Montaz area as well as seven locations each inside the Noakhali and Char Kukri were investigated; sediment samples were collected from three locations; three time period are before 1984, from 1984-1996 and after 1996 as follows; no net accretion in Patuakhali district (1974 to 1984); high rate of net accretion (1984-1996); no net accretion (1996 till to date).

Result and discussion

- Coarse content is high where sediment is deposited through fluvial process.
- Decrease in coarse sediment input due to interventions such as construction of dam, barrages may cause the erosion downstream of Bhola.
- Noakhali is in accreting phase. Afforestation or land management would decrease the rate of net accretion at Noakhali.
- The result of this study supports the findings of Sarker and Thorne (2006) and Sarker et al. (2011).

Recommendations

Result is indicative in determining the role of sediment texture on the sediment dispersal process in the Meghna estuary. No role of the texture of deposited sediment has been found on the characteristics of input sediment. The findings do support the assumption/hypothesis of Sarker and Thorne (2006) and Sarker et al. (2011). However, further research is needed to draw firm conclusions.

Impact of Climate Change on Crop Water Requirement and Crop Yield (CAR4)

The effect of climate change on rice and non-rice crop production in Bangladesh was investigated. The study was led by BAU. The research question sought:

- What are the dynamic climatic parameters that influence crop-water requirement?
- What are the impacts of climate change on irrigation water requirement for rice and non-rice crop production?

- What are the impacts of climate change on yield and yield gaps of major crops?

Methodology

The evaluation of the effect of climate change was made on Rice, Wheat and Potato. MAGICC/SCENGEN model was used together with observed climate data to generate Intergovernmental Panel on Climate Change (IPCC) climate change scenario B2 and A2. Wheat, rice and potato growth and yield were simulated using CERES-Wheat, CERES-Rice and SUBSTOR-Potato models under future projected changing climatic conditions.

Result and discussion

- Results from this study show that climate change is likely to depress yields of both rice and non-rice crops, which are considered staple foods for Bangladesh.
- By an increase in temperature of 5.32 °C in the year 2100, the yield of wheat, potato and rice would decrease by 47%, 38% and 55%, respectively.
- Both grain yield and biomass water use efficiencies decreased for potato but only grain yield WUE decreased for rice.
- Increased temperature accelerated physiological maturity, which was reflected by the decrease in growing season length.
- The growing season length of rice and wheat was the most affected and the potato was the least affected due to changing temperature and precipitation. Because of the reduced growing season length, seasonal evapotranspiration decreased for all crops.

Recommendations

- Similar results were also obtained from climate change studies in other parts of the country, which indicates, coupled with population growth, the risk of food insecurity in the country.
- Some points may be considered as how to cope with the negative impacts or how to make farming practices resilient to climate change.

Statistical Downscaling of Selected GCM results for GBM Basin (CAR5)

Ganges-Brahmaputra-Meghna basin falls under one of the most vulnerable regions with respect to climate change. In the study led by DWRE, BUET, downscaling of GCMs (Global Climate Models) parameters (rainfall, temperature) to local level has been done using statistical downscaling tools, namely the SDSM (Statistical Downscaling Model) for three time periods, e.g., 2030s (2021-2040), 2050s

(2041-2060) and 2080s (2071-2090). Following were the research questions:

1. Which GCM results are representative for GBM basins?
2. Which statistical method would be suitable for downscaling?
3. What would be the future scenarios of precipitation and temperature for GBM basins?

Methodology

A suitable predictor for the prediction, calibration and validate the model were selected. In this study most of the predictors for maximum temperature and rainfall projections are s500, temp and p8_v, p8_z respectively. The calibration and validation were done based on the observed data from BMD (Bangladesh Meteorological Department) and National Climate Data Center (NCDC). Three statistical parameters- coefficient of determination (R2), Nash–Sutcliffe model efficiency (NSE) and percent bias (PBIAS) were estimated to explain the statistical agreement between observed and simulated data. Twenty two gauge stations on GBM basin were calibrated and validated and statistical parameters analyzed. After successful calibration and validation both maximum temperature and rainfall are projected for 2030s, 2050s and 2080s for both RCP4.5 and RCP8.5 with respect to the base period (1986-2005).

Results and discussion

The R2, NSE and PBIAS were found to be in the range of 0.91 to 0.99, 0.76 to 0.99 and 0.05 to 7.83 respectively for maximum temperature and 0.75 to 99, 0.69 to 99, -0.65 to -13.25 respectively for rainfall for both calibration and validation. The statistical parameters indicate good agreement between observed and model simulated data. In case of maximum temperature projection, it is found that the range of monthly maximum temperature change is -1.1°C to 8.3°C but in 17 stations (out of 22 stations) maximum temperature changes are between 0.5°C to 3°C. Yearly mean maximum temperature is increased from 0.1 to 2.3°C for 30s, 0.3 to 3.2°C for 50s and 0.2 to 5.2°C 2080s with respect to base period. The range of sum of monthly rainfall change is from -180mm to 250 mm but in 16 stations (out of 22 stations) , the change is about -50 to +50 mm. Percent changes in seasonal rainfall varies between -48% to +98% with respect to the base mean annual rainfall. The variation of rainfall changes is higher in summer and autumn than winter and spring. The highest change in rainfall occurs between April to October for monthly projection. Yearly mean rainfall varies in different stations from -7.6% to 15% for 2030s -13.1% to 31.8% for 2050s and -17.1% to 42.6% for 2080s.

Recommendations

This research can be extended to identify seasonal shifting due to changes in temperature and rainfall which can affect in agriculture.

Bangladesh Water Act, 2013... (Cont'd on page 1...)

use, protection and preservation of water resources. It declares water as public commodity and assigns high priority to drinking water supply. The Act is the culmination of the core principles of NWPo. The National Water Resources Council (NWRC), formed under BWA 2013, is an apex water sector body, headed by Honourable Prime Minister, responsible for policy making, overall guidance of the sector, and national and international level coordination while the Executive Committee for National Water Resources Council (ECNWRC), headed by the Minister, Ministry of Water Resources, is responsible for inter-agency coordination and conflict resolution, with WARPO designated as its secretariat. BWA 2013 emphasizes integrated and sustainable use and management of water resources through imposing limits on abstraction up to safe yield. The Act empowers authorities to issue protection, compliance, removal orders for management of water resources as a public good.

WARPO took the initiatives to prepare the Bangladesh Water

Rule (BWR) in compliance with the Bangladesh Water Act 2013. In draft BWR, WARPO proposed 14 chapters and 60 rules. Drafting of these rules is carefully considered, thus it will overcome contradictions and overlaps. In the meantime, Water Rules has been updated considering valuable comments provided by the District Administrations, International Institutes, key stakeholders, water experts, NGOs, private sectors and local level representatives. Currently, MoWR is overviewing context specific Water Rules to operationalize the BWA 2013, where WARPO is being empowered to issue protection, compliance, and removal orders for management of water resources as a public good. By BWA, WARPO is mandated to issue clearance certificate for water resources development projects to ensure legal, planning and environmental compliance.

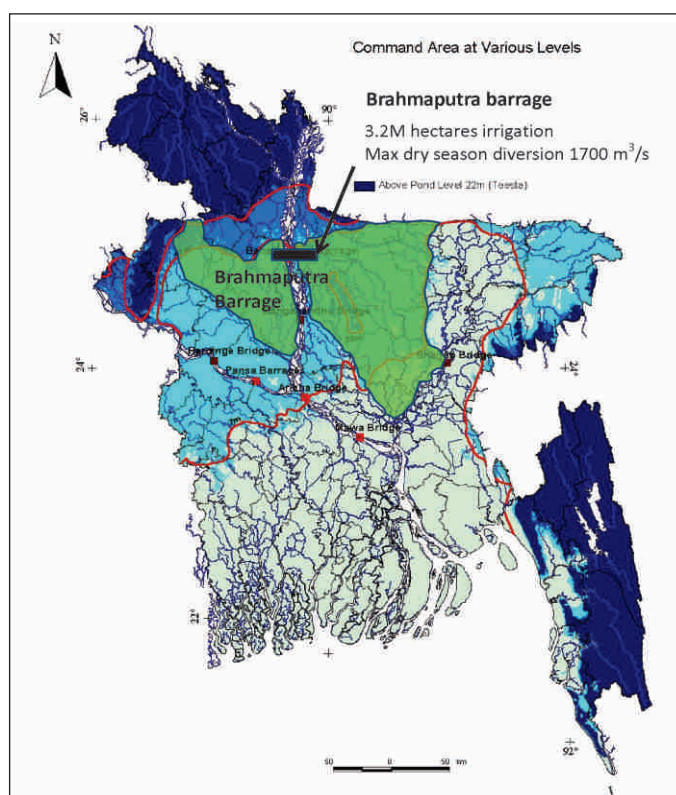
National Water Resources Plan (NWRP) Project

The National Water Management Plan (NWMP) was prepared in a comprehensive and integrated manner, with regard to the interests of all water-related sectors and taking full account of other sectoral policies of the Government. The plan was approved by National Water Resources Council (NWRC) on 31st March 2004. National Water Management Plan is a framework plan of the government for the implementation of National Water Policy (1999); a guiding outline to formulate projects by the line agencies responsible for the maintenance and delivery of water and water related services under 13 ministries and invest and make impact on water resources by private entrepreneur and development partners. The document is a rolling plan; need to be updated periodically to incorporate the changes in the government policy and environment. By this time, the Government of

Bangladesh enacted the Bangladesh Water Act, 2013. The Act (Article 15.1) has explicitly entrusted WARPO to prepare the National Water Resources Plan (NWRP).

After completion of NWMP, new problems, objectives and priorities of actions have emerged and need to be looked into, e.g. climate change, arsenic contamination, over abstraction of groundwater, cooperation of co-riparian countries, change in international policy and strategy, economic growth, population growth, urbanization trend, natural resources, social and political development, integrated land and water resources management towards an strategic adaptive planning. With this backdrop WARPO is undertaking a project to formulate the National Water Resources Plan (NWRP). This plan will facilitate to operationalize the Bangladesh Water Act, 2013.

Brahmaputra Barrage Study



Map showing the command area and proposed location of Brahmaputra Barrage

The Brahmaputra is a major trans-boundary river and contributes about two-thirds of the total dry season flows in Bangladesh. It plays an important role in overall socio-economic development of the country. National Water Management Plan (NWMP) has proposed to undertake study to assess the feasibility of harnessing the water resources of Brahmaputra River in order to meet the future demand for multipurpose water use. In order to reduce the over-dependence on ground water and meet the increased demand due to more urbanization and industrialization development, Brahmaputra river flow is essential. Presently irrigation in the Northwest region to a great extent is dependent on groundwater through shallow and deep tube wells. Majority of the districts net cultivable area is being irrigated through groundwater resources. A significant part of the Northwest region, along the border with India, notably the western part of the High Barind and level Barind area are in deficit of groundwater resources due to low recharge. Brahmaputra Barrage will increase the Brahmaputra River flow which can meet the deficit in the Northwest and the North Central regions in the near future apart from the need for environment in other regions. WARPO initiate the proposed Brahmaputra Barrage Study with an objective to conduct the Feasibility Study and Detailed Engineering Design (if found feasible) of proposed Brahmaputra Barrage in Bangladesh. The duration of the study project is 4 years.

LET'S TALK WATER

“Let's Talk Water” is a platform formed to facilitate dissemination of research and related knowledge on different strategic issues relevant to water and create a stronger community equipped to respond today's difficult water related problem in the country. Initially the initiatives has been a joint collaboration between WARPO and Delta Alliance, sponsored

by Dutch assisted Nuffic NICHE 155 project to implement its dissemination strategy. There has already been four workshops organized since August 2016 since its inception. Hopefully, the activity under the platform will continue through collaboration between WARPO and DeltaCap project. Important topics discussed in the workshops are as follows:

1. Assessing Health, Livelihoods, Ecosystem Services and Poverty Alleviation in Populous Deltas: The ESPA Deltas Project (10 August, 2016);
2. Gender issues in National Water Resources Planning (28 September, 2016);
3. Adaptive Water Management In Bangladesh (30 November, 2016);
4. Drought, Water Scarcity and Rice Yield: Way Forward for Water Resource Management in Barind Area, Bangladesh (30 December, 2016).



Workshop on Adaptive Water Management in Bangladesh at WARPO Conference Room under the platform of “Let's Talk Water”

Consultation workshop on “Brahmaputra River Basin-Need for Cooperation and Role of Dialogue”

Consultation workshop on “**Brahmaputra River Basin-Need for Cooperation and Role of Dialogue**” sponsored by SaciWATERS, India and Institute of Water Modelling (IWM), Bangladesh was held at WARPO on 4 June 2016 to promote a strong need for dialogue and discussion across multiple stakeholders (government, civil society organizations, academia, scientific community and media). The workshop has been initiated under the project titled “Transboundary Policy Dialogue for Improved Water Governance in Brahmaputra River” by SaciWATERS. Dr. Zafar Ahmed Khan, Senior Secretary, Ministry of Water Resources was present as the Chief Guest. The workshop was chaired by Prof Dr. M. Monowar Hossain, Executive Director, IWM. Mr. Md. Sarafat Hossain Khan, Director General, WARPO presented the key note paper in the workshop and Ms. Vishaka Gulati, SaciWATERS presented the Institutional Mapping

Framework. Dr. Anamika Baruah, SaciWATERS gave her comments and suggestions on the presentations which was followed by an open discussions where participants shared their views and ideas.



Senior Secretary, MoWR presiding the workshop on “Brahmaputra River Basin-Need for Cooperation and Role of Dialogue”

Workshop on National Integrity Strategy in WARPO

On 17 October 2016, WARPO organized a workshop on National Integrity Strategy and Ethics Implementation. Director General, WARPO chaired the session. Mr. Md. Khalilur Rahman, Joint Secretary (Admin-2), Ministry of Water Resources was present as the key note speaker on the occasion.

As per National Integrity Advisory Council decision, Ethics Committee has been formed in all ministries/departments/concerned organizations in order to implement the National Integrity Strategy. The terms of reference of the Ethics Committee have been defined as follows:

- Identification of success and problems encountered in establishing integrity in the concerned sector;
- Formulation of a time-bound work-plan to resolve the identified problems;
- Assign responsibilities to personnel for implementation of the work-plan;
- Implementation and monitoring of the work-plan undertaken for establishment of integrity in the concerned sector; and

- Sending progress report on establishing integrity in the concerned Ministry/ Division/Institutions to the National Integrity Implementation Unit (NIIU) of the Cabinet Division.

The meeting decided for rewarding the outstanding practice of integrity and thus to encourage others to be more sincere in implementing the National Integrity Strategy and Ethics set out by the government.



High Level Exposure Visit to Australia

A nine member delegation led by Dr. Zafar Ahmed Khan, Senior Secretary, Ministry of the Water Resources visited Australia during 23 August to 05 September 2016. Members from Ministry of Water Resources, Planning Commission and Water Resources Planning Organization (WARPO) were included in the delegation. The objective of the visit was to share and exchange the experience on the water resources management in Australia. Mr A N Shamsuddin Azad Chowdhury, Member of the Agriculture, Water Resources and Rural Institutions Division of the Planning Commission, Dr. Mohammad Ali Khan, Additional Secretary, Ministry of the Water Resources, Mr Md. Sarafat Hossain Khan, Director General, WARPO, Mr S M Feroz Alam, Director, WARPO, Mr Md. Ekram Ullah, PSO, WARPO, Mr Mohammad Alamgir, PSO, WARPO, Mr Krishna Chandra Bhadra, SSO, WARPO and Mrs Nazmun Nahar Chowdhury. Library and Information Officer, WARPO participated the delegation as team members.

The team visited dam operations, lock/weir function, irrigated horticulture, inspecting new irrigation delivery technology, understanding local irrigation practices (operational rules, water sharing and water trading), Murray mouth and lower lakes region (RAMSAR site) etc., which were of great importance for Bangladeshi counterpart.

The team was also briefed of the State Water Policy, planning and governance in the Murray Darling Basin



Team members in front of the Parliament House, Australia

(MDB) and its rural water management, irrigation and environmental issues in connection with the water governance in the basin. The issues of data collection, processing, weather forecasting in Bangladesh and prospect of future bilateral research project with ACIAR and CSIRO was discussed. Finally, the team visited Department of Foreign Affairs and Trade (DFAT), Government of Australia to share the experiences on different water related issues. Discussion was also made on important areas for future cooperation between the two countries.

Internet version of NWRD and ICRD tools... (Cont'd on page 1...)

from myriad institutional sources and established the NWRD and ICRD as one stop and integrated water sector data center. Up to now, number of data layers reached 543 for NWRD and 559 for ICRD. 260 of those are GIS layers. Technologies of new WARPO website has facilitated to incorporate a number of user friendly and easily accessible NWRD-ICRD tools, such as, meta-database, data source viewer, statistical analysis, data availability tool etc. In Addition, WARPO has uploaded

the data request form, data dissemination policy and data catalogues of NWRD and ICRD on the website. The data sample, attribute information, bundle information, metadata have been included in the data catalogues. Guidelines for spatial data quality and Time series data have also been placed in website to assess and improve the quality of data in an integrated way.

National Workshop for Preparation of Country Paper on Sustainable Development Goal (SDG) – 6

In April 2016, United Nations Secretary-General and President of the World Bank Group convened a High Level Panel on Water (HLPW), consisting with Sheikh Hasina, the Hon'ble Prime Minister of the Peoples Republic of Bangladesh as one of 11 sitting Heads of State and Government and one Special Adviser, to provide the leadership required to champion a comprehensive, inclusive and collaborative way of developing and managing water resources, and improving water and sanitation related services in sustainable manner.

The sustainable development Goals (SDGs) are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. The Heads of UN State adopted the SDGs in September 2015. The SDGs supported by a total of 17 goals and 169 targets will guide the international development agenda over next 15 years. Among the 17 goals, SDG 6 is “Ensure availability and sustainable management of water and sanitation for all” consists of six themes and two means of action.

Under the leadership of Ministry of Water Resources, the national workshop on SDG 6 was held on 20th November, 2016 at Prime Minister's Office. Five government organizations i.e. WARPO, BWDB, DPHE, DoE and DBHWD in association with relevant departments presented the six concept paper along with the action plan on six targets of SDG 6. Under the guidance of the Ministry of Water



Director General, WARPO presenting the concept paper on SDG-6.4 at the Prime Minister's Office

Resources, WARPO prepared the concept paper on **SDG 6.4-Increase Water Use Efficiency**.

Mr. Md. Sarafat Hossain Khan, Director General, WARPO presented the concept paper on SDG 6.4. The theme of SDG 6.4 is by 2030, “*substantially increase water use efficiency across all sectors; Ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity*”. In the workshop, action plan for achieving SDG 6.4 and possible light house project have been presented for discussion during technical session. The draft action plan will also be finalized after incorporating feedback from the participants of the workshop and thereafter a final country paper will be prepared.

Institutionalizing 'Scenario development and analysis'... (Cont'd on page 12...)

external Scenarios are to test what happens under external factors (climate, economic development); they are policy free and test strategies or policy options under the external factors; Strategic Scenarios aim to describe a range of possible consequences of strategic decisions. They consider internal factors or consequences of policy/decisions under different external factors as they unfold. *Normative scenarios* aim to specify how a specific target can be reached, e.g. Bangladesh reaching status of middle-income country through a series of Five Year Plans.

Bangladesh Delta Plan 2100 (BDP) recently used two axis approach that focus on global economy on one and climate change on the other as external context scenarios for testing preferred strategies. In addition to the four external scenarios two other scenarios namely business as usual where all policies are in place except the implementation of the Delta Plan and the scenario with climate change and other delta related adaptation measures to achieve higher and sustainable growth in the face of the various weather-related natural hazards and risks, thereby ensuring that the government's long-term poverty reduction of eliminating extreme poverty by 2030 and the objective of achieving high middle income status by 2035 was used.

In the National Water Management Plan (NWMP) and Five Year Plan, scenarios are used to model/predict future developments to achieve a targets on water demand or GDP

growth respectably. In the recently concluded Ecosystem Services for Poverty Alleviation (ESPA Deltas) project implemented by IWFM, BUET and University of Southampton, UK, delta three scenarios (Business as Usual, More Sustainable and Less Sustainable) were used to include policy options and strategies and are as such directly used to formulate strategies.

In order to institutionalize the 'Scenario development and analysis in the cycle of the Five Year Plans as well as of NWRP and also in other sectoral planning a clear mandates and responsibilities regarding scenario development, decisions, use and update should be made. Reviewing the past scenario use a collaborative research implemented under Nuffic NICHE 155 identified 15 tasks of scenario delta planning. The tasks are grouped into *uptake in the top-down hierarchical planning system, development and revision of scenarios, connection between scenarios and strategies/measures in planning, research and capacity building*. It has been recommended that 'Scenario development and analysis should be linked to the cycle of the Five Year Plans at GED as well as the cycle of NWRP at WARPO and may be also in other sectoral planning. In addition, mandates and responsibilities regarding scenario development, decisions, use and update should be made clear. The report recommends that the allocation of responsibilities in these tasks be distributed among GED and WARPO with support from different knowledge and research institutes.

New Director General takes over



Mr. Md. Sarafat Hossain Khan joined the Water Resources Planning Organization as Director General in March 2016. Prior to this position, he was the Additional Director General (Planning) in BWDB. He completed B.Sc. in Civil Engineering from Bangladesh University of Engineering & Technology (BUET) in 1981.

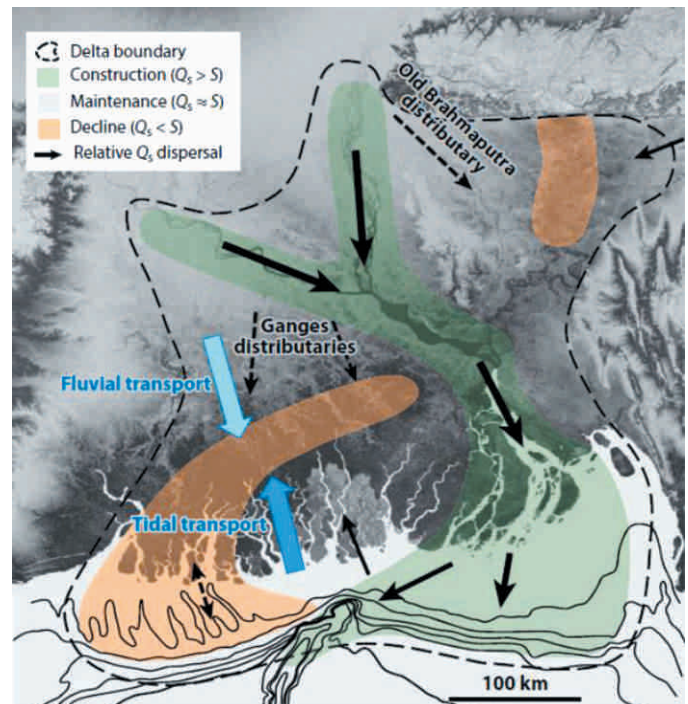
He has also accomplished M. Engg. (Civil) from the same University in 1988. He has more than 34 years diverse professional experience in the fields of water resources management, coastal zone management, drainage, irrigation and flood management, climate change impact

assessment on infrastructure and natural resources and adaptation options. He has vast experience in writing technical and feasibility reports, organizing interaction meetings, local and national workshops. He was involved in preparation of policy document for Bhutan Climate Summit and preparation of OIC Water Vision Document. He Worked as a Focal Point for "D-8 Water Cooperation" to develop a network with high level authorities from the public sector related to water, and enhance the collaboration among D-8 countries for Water Cooperation. His areas of expertise relate to management of Water Resources, Irrigation and Drainage, Food Security, Climate Risks and Vulnerability Assessment, Climate Change Adaptation, Disaster Risk Reduction, Climate Proofing, Mainstreaming Climate Change in development planning for agricultural production, livelihoods, emission reduction strategy etc.

MoU signed between WARPO and IWFM, BUET to undertake research on Coastal Morphology

Water Resources Planning Organization (WARPO) and Institute of Water and Flood Management (IWFM), BUET agreed to implement a collaborative research entitled *"Research on the Morphological processes under Climatic Changes, Sea Level Rise and Anthropogenic Intervention in the Coastal Zone"* to support some strategic policy decisions in the coastal region of Bangladesh. MoU has been signed between WARPO and IWFM on June 2016 in this regard and research work is going on with full swing.

The main objective of the research is to compute the dynamic distribution of water and sediment flows in the coastal region of Bangladesh, their impacts on coastal sedimentation and morphology under sea level rise, climatic changes and anthropogenic interventions with special emphasis on water logging in the region. The expected output of the research will cover (a) impact assessment of water and sediment distribution on the entire coastal region in general and south-west region in particular; (b) assessment of the past, present and future water logging situation of the region; and (c) recommendation on the mitigation and adaptive strategies for the existing problems and also strategies to adapt with future scenarios.



Morphological Process of the Coastal Zone of Bangladesh

EDITORIAL

WARPO has been transformed from its predecessor Master Plan Organization (MPO) in 1992 for the preparation of Master Plan for bringing about harmonization and integration of overall water sector activities with due focus on social and environmental perspective. In the meantime, FAP Studies were conducted during 1989-1995. Later, Bangladesh Water and Flood Management Strategy (BWFMS, 1995), National Water Policy (NWPo, 1999), National Water Management Plan (NWMP, 2001), Coastal Zone Policy (CZPo, 2005) and Coastal Development Strategy (CDS, 2006) have been accomplished. Finally, Bangladesh Water Act (BWA, 2013) has been enacted in May 2013. As the secretariat to the Executive Committee of National Water Resources Council (ECNWRC) the most crucial issue for WARPO now is to operationalize BWA and coordinate its implementation. On the other hand, as per the directive of BWA an initiative has been taken to prepare National Water Resources Plan (NWRP). Preparation of Bangladesh Water Rules is also at the final stage to embracing the measures for protection, conservation, restriction and allocation of water resources introducing the necessary governance mechanism. WARPO gained sufficient experiences through 'clearing' BWDB projects and preparing to expand its 'clearing house' role for other kinds of project proposals. Necessary rules are being prepared to undertake the responsibility of project clearance and to decentralize certain authorities for permitting and clearing projects to the local institutions. The National Water Resources Database (NWRD) would be further expanded and strengthen to cater the needs for 'Clearing House', monitoring of BWA and preparing NWRP. In the meantime Bangladesh Delta Plan 2100 has been prepared as water centric holistic longer term plan with strategies for 2021 and 2035 and vision for 2041 and 2100. A new approach of scenario development and analysis has been introduced that need to be institutionalized with lead from WARPO and GED and periodically used for strategies in the Five Year Plans and NWRP. Initiative is already on progress to expand WARPO at Divisional level and improve its capacity to dealing with the implementation of BWA.

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WARPO BHABAN

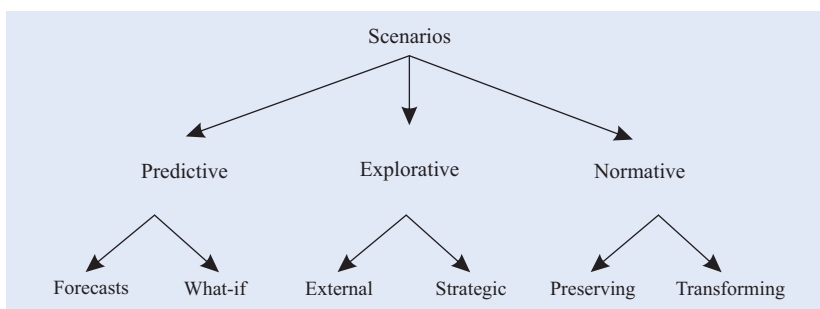
WARPO moved to its permanent office in January 2016 at 72 Green Road, Dhaka 1215. It is a five storied building with a provision of extension up to level 10. Construction of the main building was funded from the development budget of the government while the interior decoration and apparatus were accommodated from Dutch funded Nuffic NICHE 155 project.



WARPO Bhaban at Green Road, Dhaka

Institutionalizing 'Scenario development and analysis' in the water planning (CAR 6a)

Water Resources Planning in Bangladesh is shifting from blue-print/point based planning to an approach that deals with uncertainties, multiple futures and scenarios in making a strategy more robust and flexible as future unfolds. Review of the water planning so far been made shows that there are various types of scenario planning exist in Bangladesh. Broadly there are three categories of scenario analysis such as Predictive, Explorative and Normative. Predictive scenarios aim to making an attempt to predict what is going to happen in the future. Forecast are primarily used to plan and adapt to situations that are expected to occur; *what-if scenarios* can be developed, exploring what will happen on the condition of specified events. Probabilistic scenarios and policy package scenarios are both examples of what-if scenarios. *Explorative scenario* are used for 'stress testing' of the chosen options;



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