

Understanding Water Policy in Bangladesh

27 NOVEMBER 2025

inspiring change

AGENDA

- Welcome, Introduction and housekeeping
  Prasanna Jogdeo, South Asia Operations Manager , IWA
- Water Challenges in Bangladesh
  Dr Anwar Zahid, Senior Researcher, Institute of Water Modelling, Bangladesh
- Current Governance Challenges and Reforms
  Dr. Kazi Matin Ahmed, Professor, University of Bangladesh
- Q and A, lessons learned and closing
  Prasanna Jogdeo, South Asia Operations Manager , IWA

INTRODUCTION

- This is the fourth webinar in our series ‘Understanding Water Policy in South Asian Countries’, and will focus on **Bangladesh**

- The discussion will focus on how international frameworks are translated into practical measures across key sectors in Bangladesh, while addressing the critical interface between policy formulation and on-ground implementation. Panelists will also highlight proposed reforms to strengthen Bangladesh’s water governance in alignment with sustainable development and climate resilience goals.

WEBINAR INFORMATION

- This webinar will be **recorded and made available "on-demand"** on the IWA Connect Plus platform and IWA Network website, with relevant information.
- The **speakers** are responsible for **securing copyright permissions** for any work that they will present of which they are not the legal copyright holder.
- The opinions, hypothesis, conclusions or recommendations contained in the presentations and other materials are the **sole responsibility of the speaker(s)** and do not necessarily reflect IWA's opinion.

WEBINAR INFORMATION



- **'Chat' box**: please use this for general requests and for interactive activities.

- **'Q&A' box**: please use this to send questions to the panelists. (We will answer these during the discussions)

Please Note: *Attendees' microphones are muted. We cannot respond to 'Raise Hand'.*

SPEAKERS PROFILE



Dr Anwar Zahid, Senior Researcher, Institute of Water Modelling, Bangladesh

Dr. Anwar Zahid has professional, research and academic background in groundwater hydrology, environmental and disaster science and management, climate change and groundwater modelling. Worked in Bangladesh Water Development Board (BWDB) for about 28 years and retired as Director (Geology), Ground Water Hydrology, BWDB. Currently working as Senior Researcher (Water and Environment) at the Institute of Water Modelling (IWM), Bangladesh.



Dr. Kazi Matin Ahmed, Professor, University of Bangladesh

Dr. Kazi Matin Uddin Ahmed's research specialization is in the field of Hydrogeology covering different aspects of arsenic, salinity, microbiological contaminations in groundwater; managed aquifer recharge; and sustainable groundwater management. He has been involved in collaborative research with national organizations and NGOs such as the Bangladesh Water Development Board, Department of Public Health Engineering, Brac, NGO Forum for Public Health, UNICEF, Water Aid, icddr,b, etc.



Water Challenges in Bangladesh

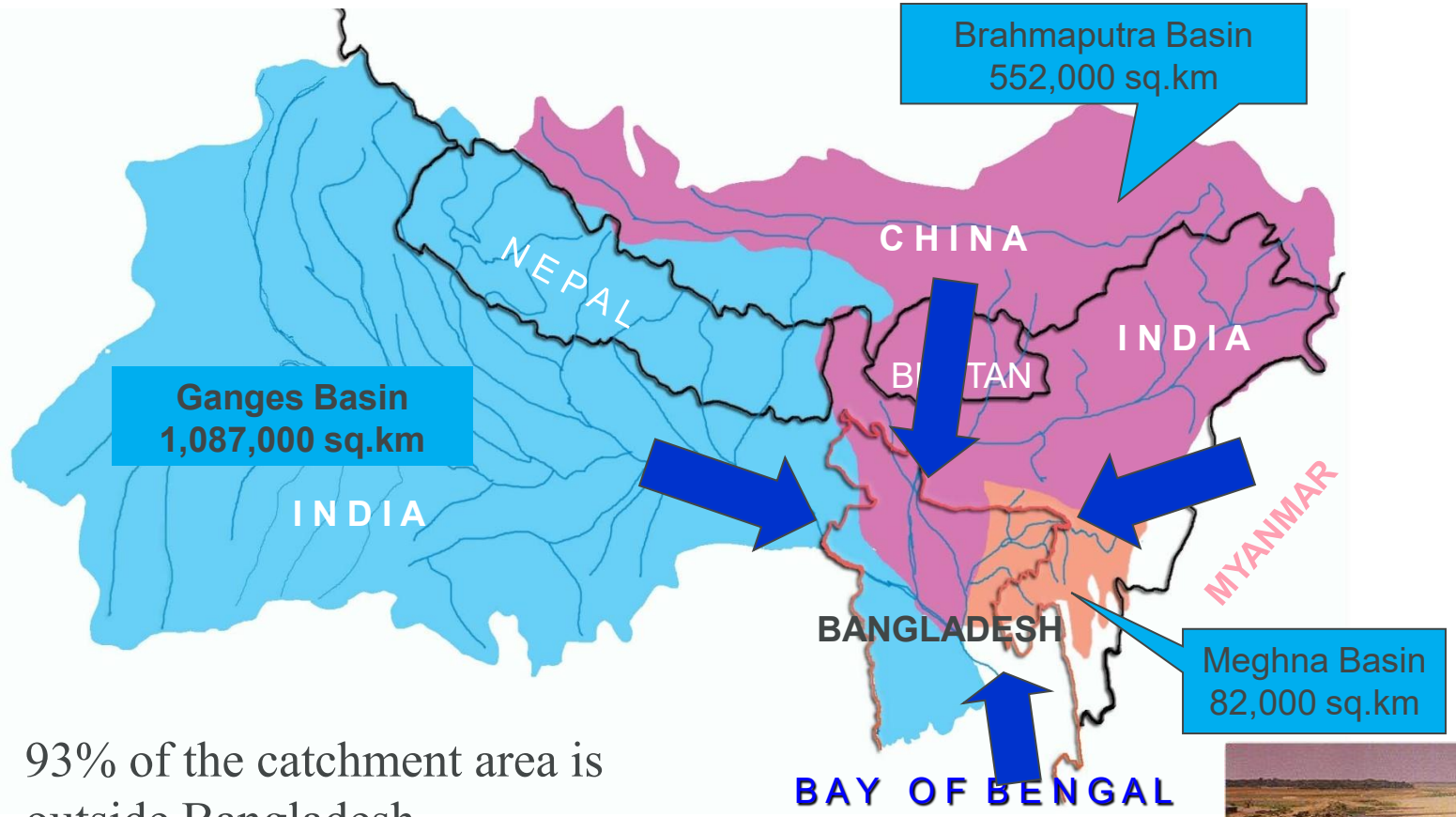
DR. ANWAR ZAHID

RESEARCHER AND ADJUNCT PROFESSOR

FORMER DIRECTOR, BANGLADESH WATER DEVELOPMENT BOARD

inspiring change

DIVERSE MANAGEMENT OF THE GANGES-BRAHMAPUTRA-MEGHNA (GBM) RIVER SYSTEM



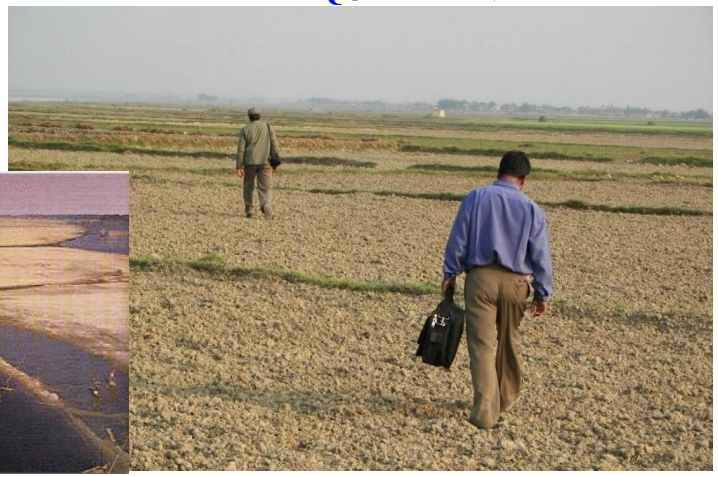
93% of the catchment area is outside Bangladesh

ABUNDANCE OF WATER DURING THE MONSOON CAUSING FLOOD

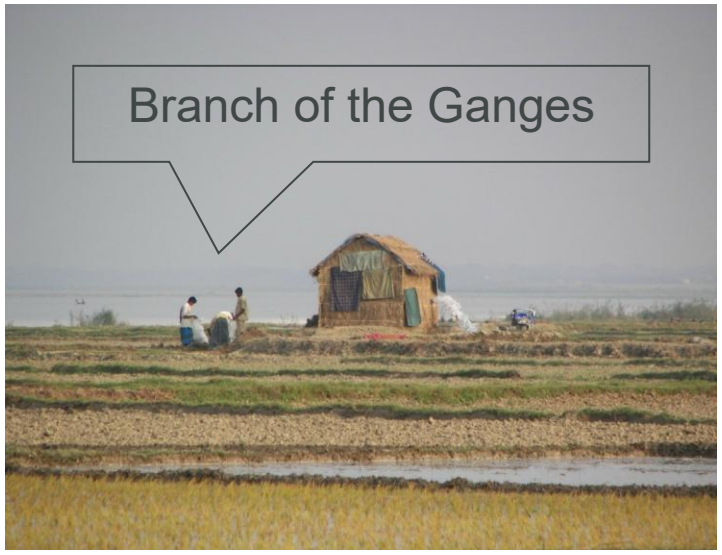


LITTLE WATER IN DRY SEASON TO MEET THE REQUIREMENT





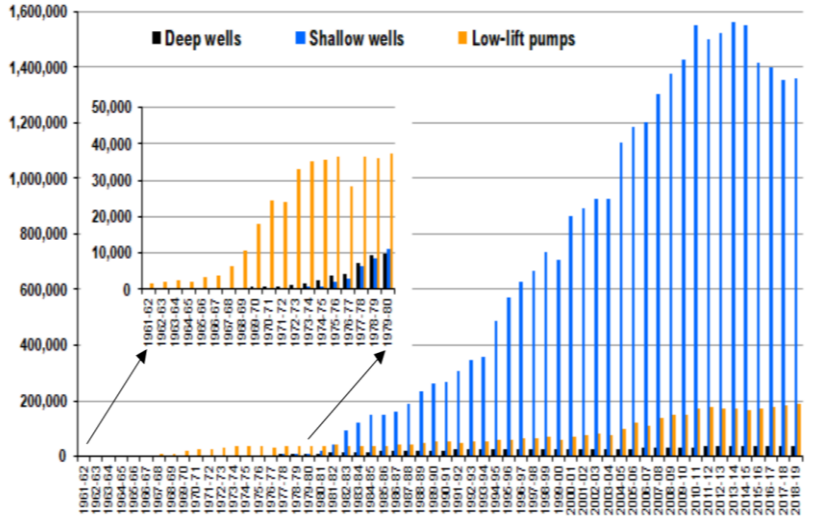
UNCONTROLLED WITHDRAWAL OF GROUNDWATER: MINIMUM WELL SPACING IS IGNORED











IMPORTANCE OF GROUNDWATER MONITORING AND ASSESSMENT AS PER BANGLADESH WATER ACT 2013

CONTROL ON WATER USE AND PROTECTION AND CONSERVATION OF WATER RESOURCES

17. Declaration of Water Stress Area and management thereof.—(1) To protect any water source or any aquifer, the Government may, on the recommendation of the Executive Committee made upon the results of necessary enquiry or scrutiny or survey, declare, by notification in the official Gazette, any area or any part thereof or any land connected thereto with such water resources as Water Stress Area for a period specified therein.

19. Fixing the lowest safe yield level of aquifer and restrictions on abstracting ground water.—(1) Notwithstanding anything contained contrary in any other law for the time being in force, the Executive Committee, on the basis of the results of necessary enquiry, scrutiny or survey, may, by notification in the official *Gazette*, fix the lowest safe yield level of any aquifer of any area.

(2) The boundary of the area, to which lowest safe yield level applies, shall be specified in the notification issued under sub-section (1) by referring the mouza map and plot numbers thereof.

(3) Any person or appropriate authority may, subject to the lowest safe yield level, and the provisions of this Act or any other law for the time being in force, sink shallow or deep tube-well, in the manner prescribed by rules, into the ground for abstracting ground water.

(4) To ensure safe abstraction of water from aquifers, the Executive Committee may, subject to the provisions of this Act, impose restrictions by issuing a protection order.

Explanation: In this section "safe yield level" means the amount of abstraction of water that keeps the aquifer safe and protective.

FACTORS CONSIDERED FOR THE ASSESSMENT OF WATER RESOURCE MANAGEMENT

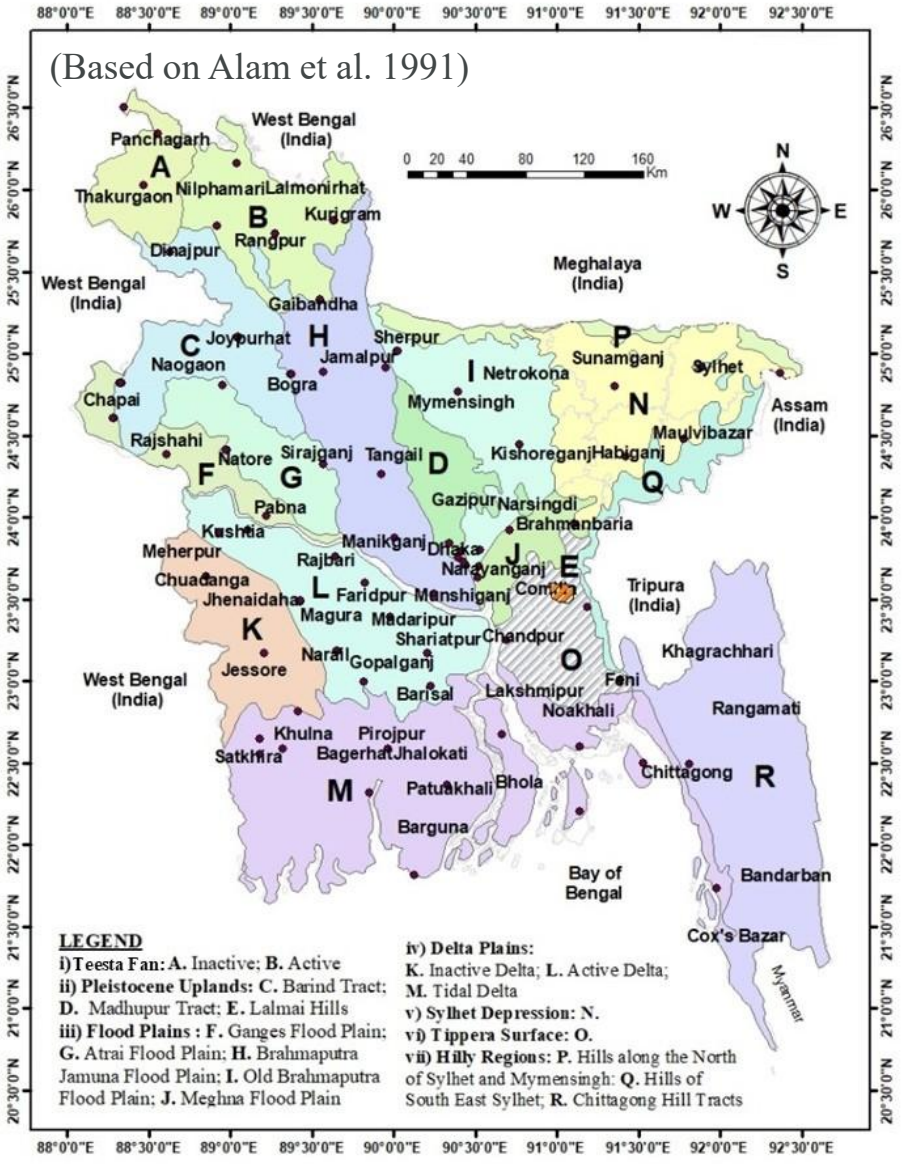
- Spatial distribution: This refers to the pattern of the occurrence of resources in space. Understanding the spatial distribution of water resources is important for their efficient and sustainable management.
- Resource availability: This refers to the extent to which water resources are present and accessible for use. Factors such as geology, climate, and land-use change can affect the availability of this resources.
- Resource utilization: This refers to how water resources are used by humans for health, economic, social, and environmental purposes. Water resources are used for health and healthy ecosystem, food production, industrial processes, recreation, and cultural purposes.
- Resource management: This refers to the planning, implementation, and evaluation of strategies for the sustainable use and conservation of water resources. Resource management involves balancing the needs of different stakeholders and sectors, while minimizing negative impacts on the environment.
- Sustainability: This refers to the use of resources in a way that does not deplete or degrade resources itself and the environment, and that meets the needs of present and future generations. Sustainable resource management requires the integration of environmental, economic, and social factors in decision-making processes.

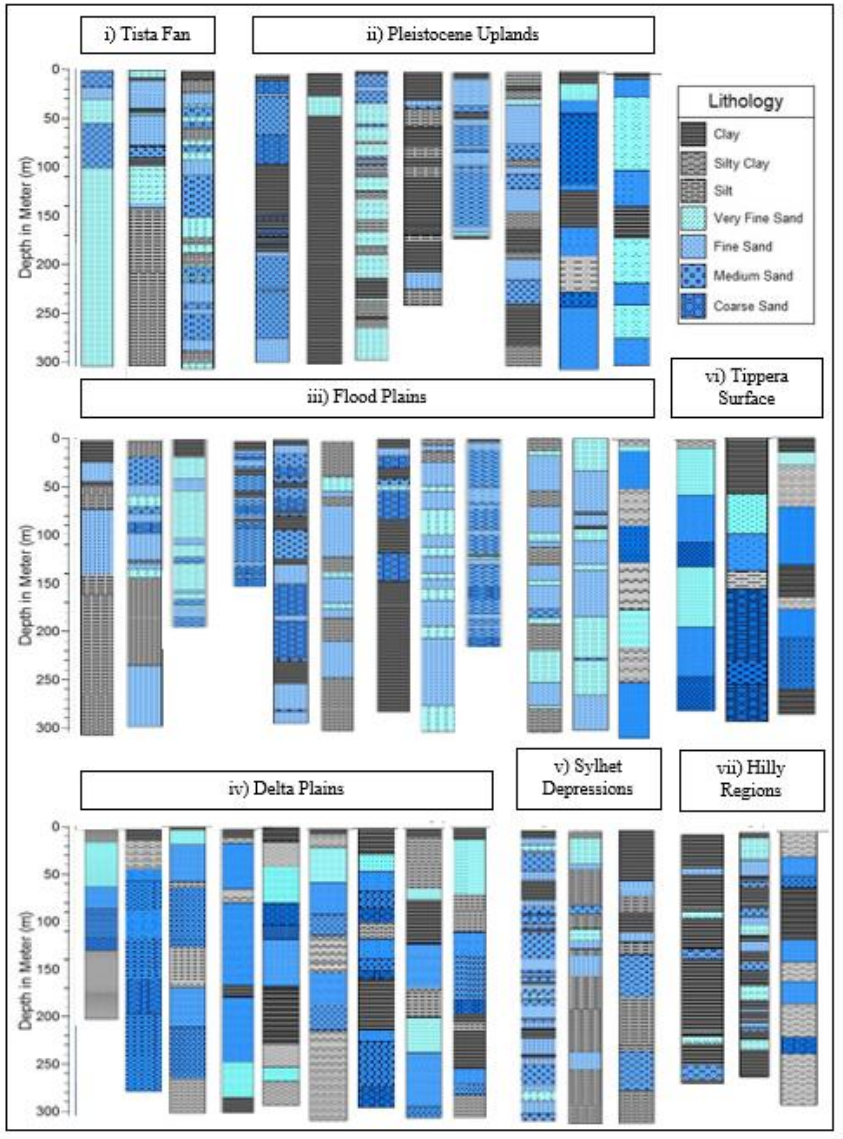
WATER SUPPLY IN BANGLADESH

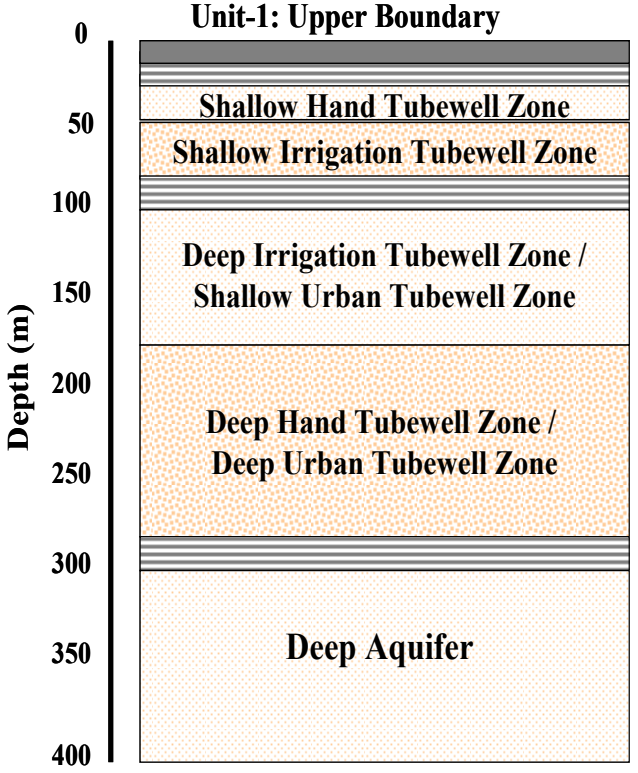
- By early 1990's, Bangladesh achieved almost universal (i.e. about 97-98%) drinking water supply coverage until the success was overshadowed by the presence of excessive arsenic in the shallow groundwater and saline water encroachment in coastal aquifers.
- Bangladesh depends mainly on groundwater sources to meet its domestic demand for potable water. Rural domestic water supplies are obtained mainly from tubewells fitted with hand pumps and dug wells. The development of groundwater resources for potable use has increased substantially over the last decades.
- About 97% of drinking water and 80% of dry season irrigation water supply has been provided by groundwater.
- Although groundwater is generally of better quality than surface water, it has the drawback of being complicated and costly to treat once it becomes contaminated.
- Urban water supply coverage is >85% with piped service of 31%. For rural population this is about 82% and only 1% respectively. Further progress in ensuring better water supply, particularly in Hard to Reach (HtR) areas still remain a big challenge. In HtR areas, the water supply coverage is only 24%.
- Changing climatic conditions may offer for more challenges on the availability of safe and freshwater resources.
- Rechargeable freshwater resources of Bangladesh is over 1210 billion cubic meter where groundwater is only 21 billion cubic meter. However, current annual abstraction of groundwater has been estimated as about 32 billion cubic meter.

Physiography and Complex Multi-layered Aquifer System in Bangladesh (based on Lithology)

the international water association







MONITORING NETWORK FOR ASSESSING WATER RESOURCES

- Bangladesh has 1272 groundwater observation wells throughout the country since 1960's, maintained by Bangladesh Water Development Board (BWDB) and mostly installed at shallow depths (25-50 m).
- Considering the quality problems in shallow and main aquifers and necessity to use deep groundwater BWDB has installed 42 clustered monitoring wells and 510 line wells in 2011-2012 upto the depth of 350 and 100 m respectively, in 19 coastal districts.
- Later on, 69 clustered monitoring wells have been installed in 2019-2020 covering entire country. Each unit consists of 4 wells having the maximum depth of 300 m.
- Amongst all BWDB wells, 905 monitoring wells, including all clustered wells, are automated with telemetry using data-logger since 2020-2021 for temperature, groundwater level and electric conductivity i.e. salinity. The real-time data frequency and accuracy have been enhanced.
- BWDB has also atmospheric and surface water monitoring network since 5-6 decades.
- Bangladesh Agriculture Development Corporation (BADC), Department of Public Health engineering (DPHE), Barind multi purpose Development Authority (BMDA) and Water Resources Planning Organization (WARPO) have also monitoring wells.

Manual and Automated Groundwater Monitoring Wells of BWDB

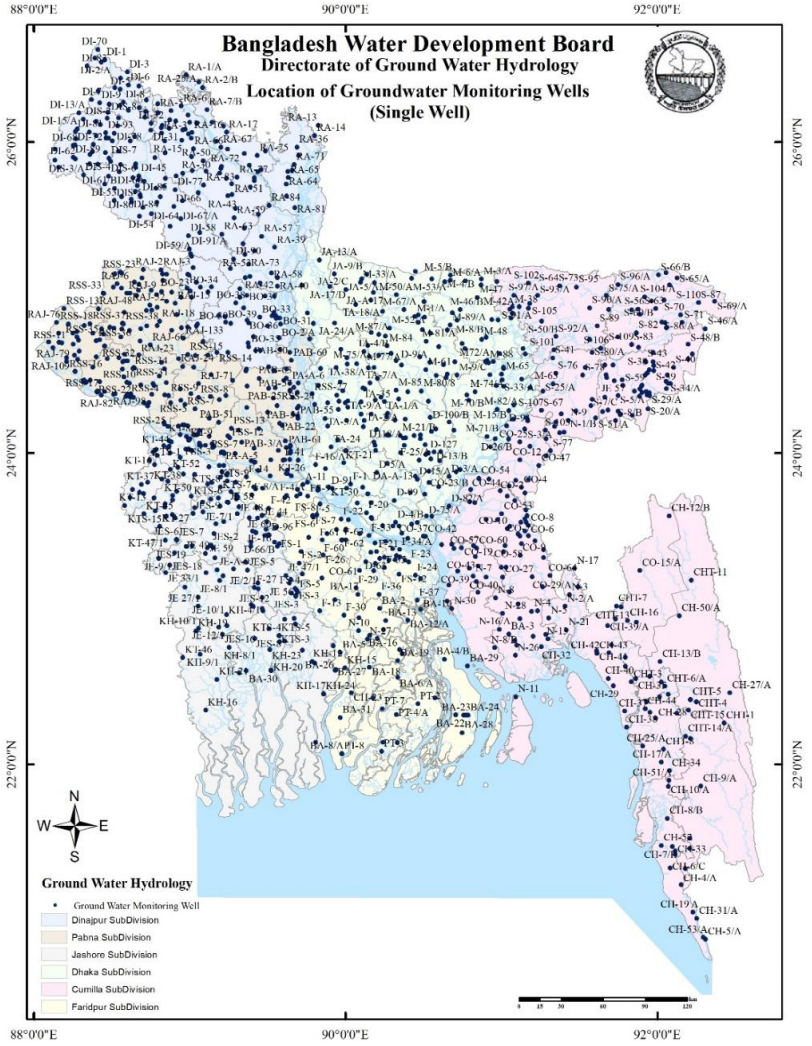


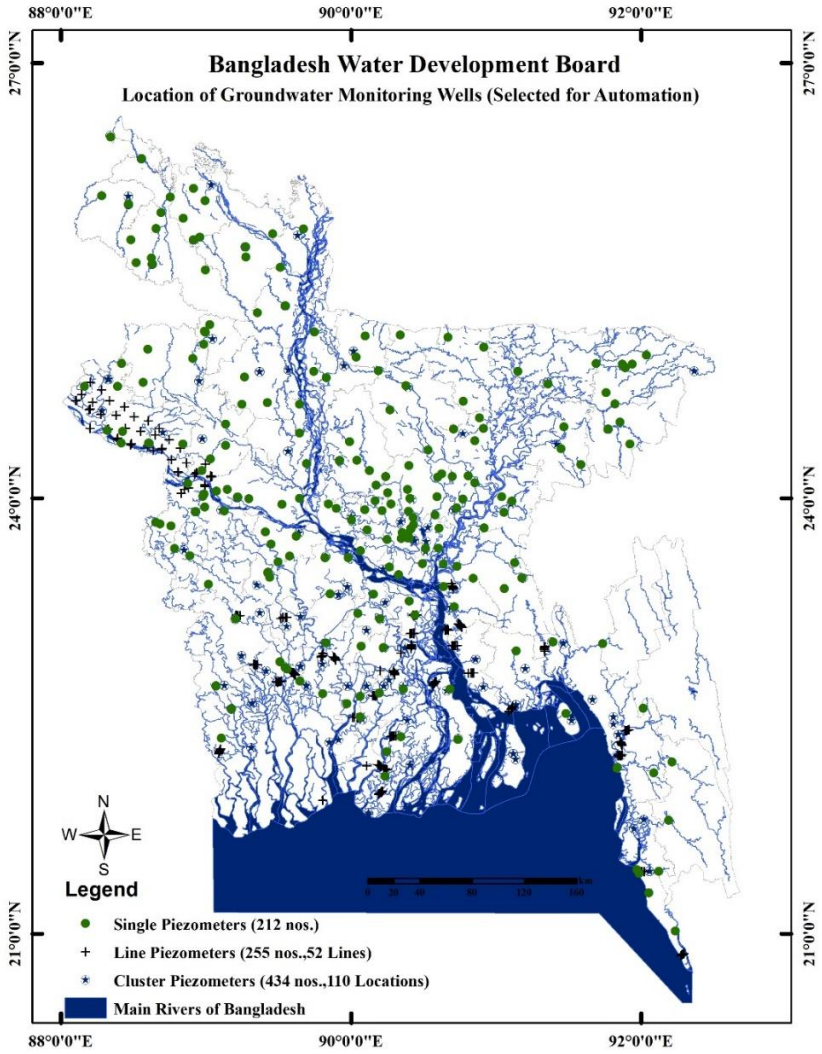




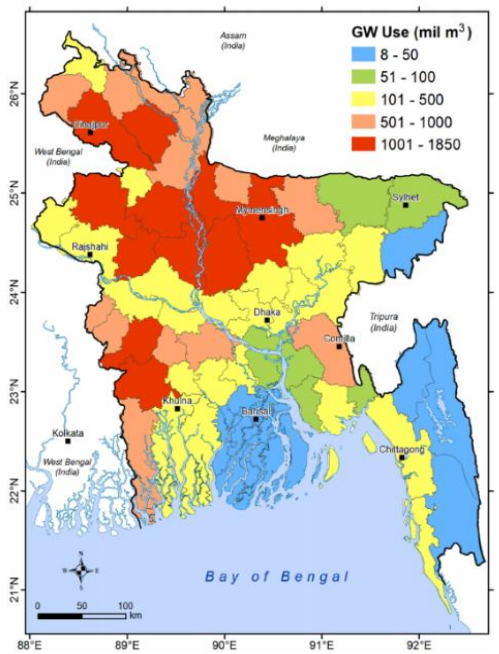


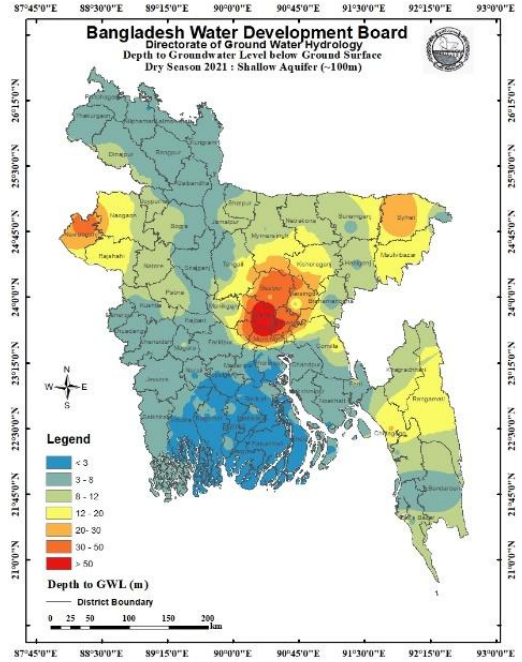


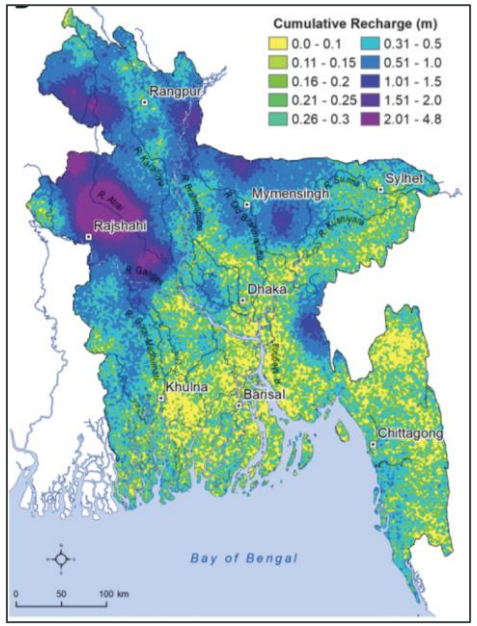


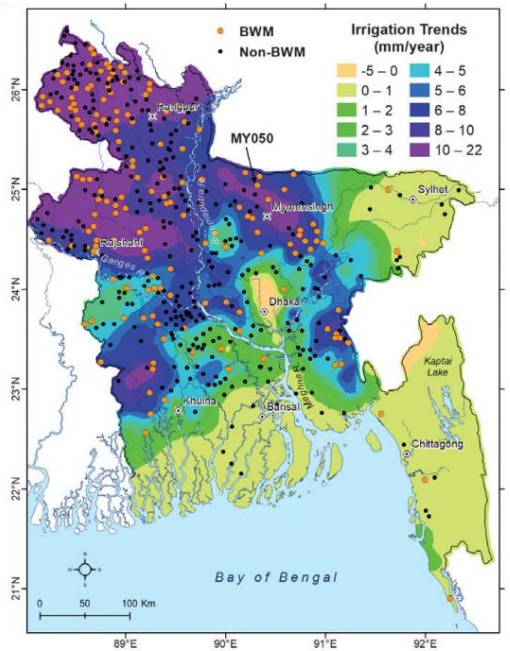


the international water association







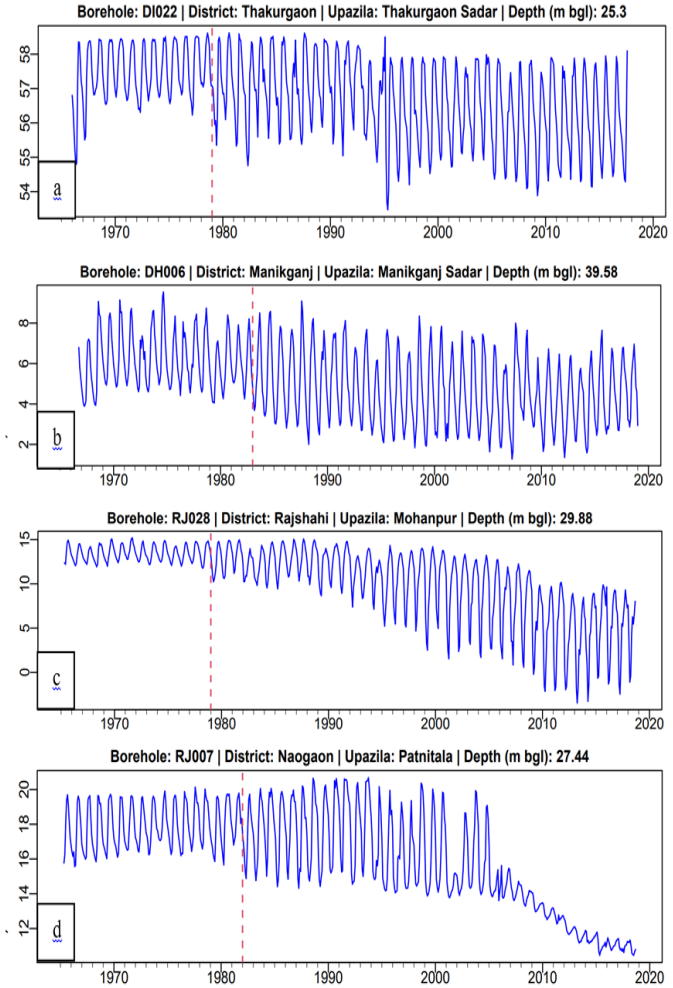


RESEARCH

GROUNDWATER

The Bengal Water Machine: Quantified freshwater capture in Bangladesh

Mohammad Shamsudduha[1,2]*, Richard G. Taylor[3], Md Izazul Haq[3,4], Sara Nowreen[5], Anwar Zahid[6], Kazi Matin Uddin Ahmed[7]



the international water association

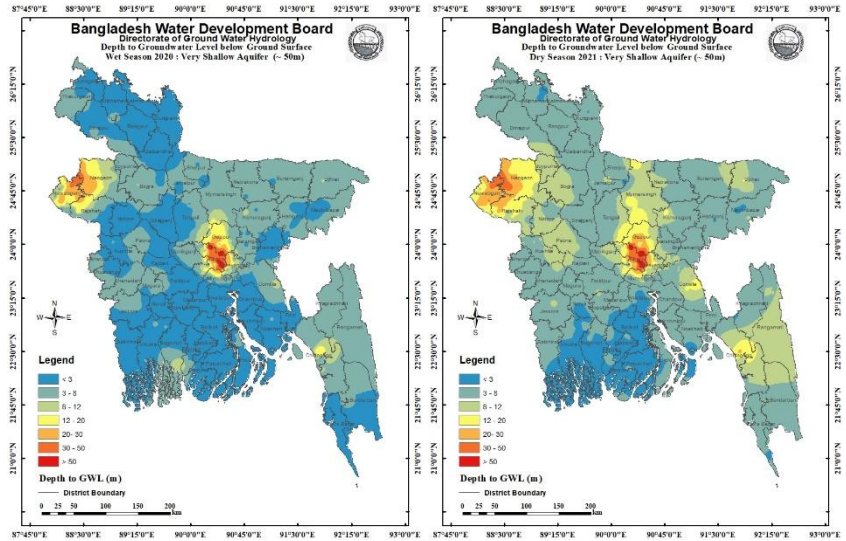


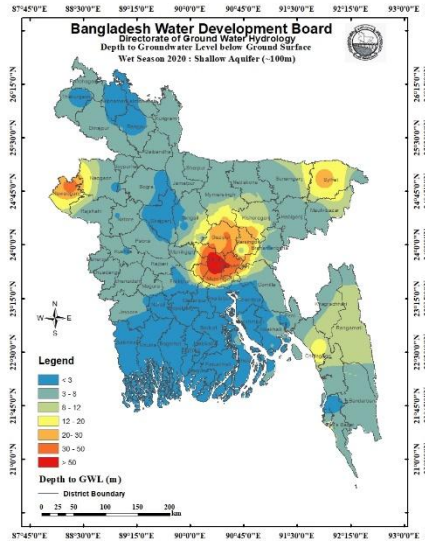
SALIENT FEATURES OF THE ANALYSIS OF GROUNDWATER LEVEL/TABLE DATA

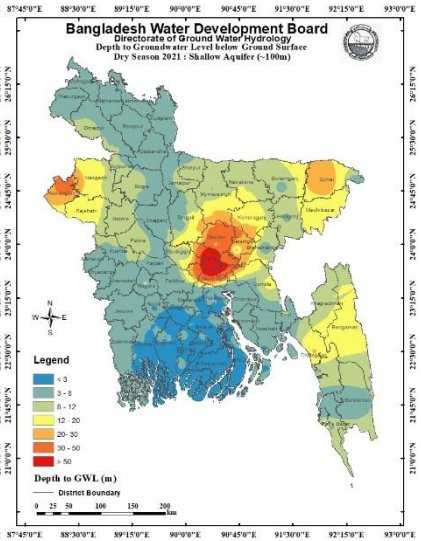
- Incremental increases in dry-season groundwater pumping for irrigation lower groundwater levels and enhance leakage under gravity of surface water from rivers, ponds and canals during the subsequent monsoon. This broad set of recharge pathways induced by dry-season groundwater pumping are described as ‘The Bengal Water Machine’ or BWM (Shamsudduha et al., 2022).
- This nature-based solution to seasonal freshwater storage capture, showing that the collective operation of ~16 million smallholder farmers in Bangladesh from 1988 to 2018 has induced cumulative freshwater capture of between 75 and 90 cubic kilometres.
- However, the research also highlights limitations in areas where induced monsoonal recharge is insufficient to fully replenish groundwater abstracted during the dry season, depleting groundwater storage and rendering groundwater inaccessible to households reliant on shallow wells. Amongst 465 monitoring well locations, about two-third show non-functionality of the BWM.
- Therefore, it is vital to assess the suitability of locations in order to maximize benefits to farmers and minimize the risks of groundwater depletion. The importance of long-term hydrological monitoring to assess the status and trends of country's groundwater resources are highlighted.

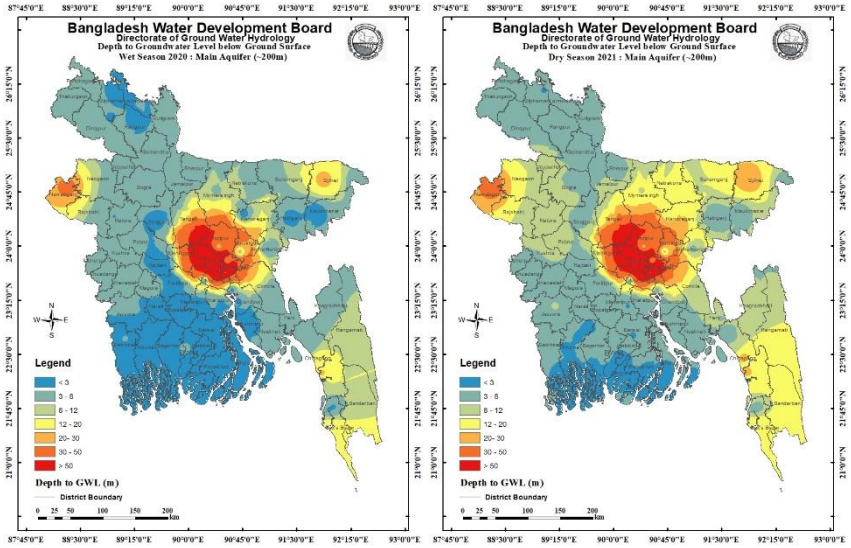
Depth-wise Monitoring of Groundwater Levels in Multi-layered Aquifers

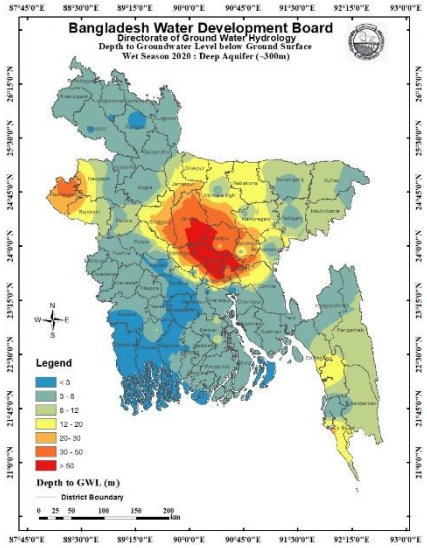
(about 50, 100, 200 and 325 m depths)

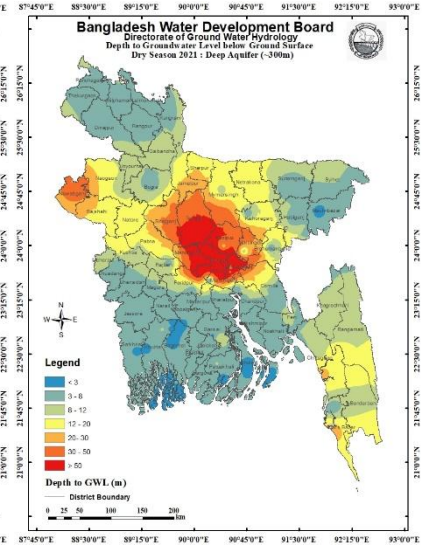








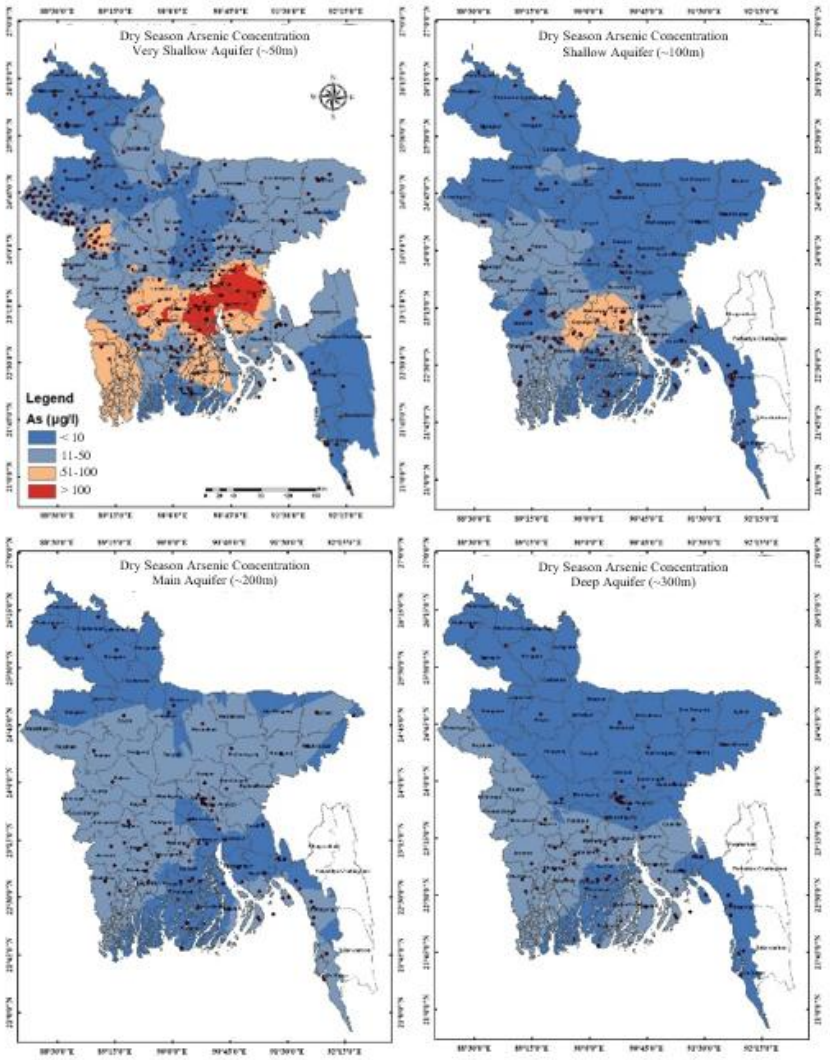


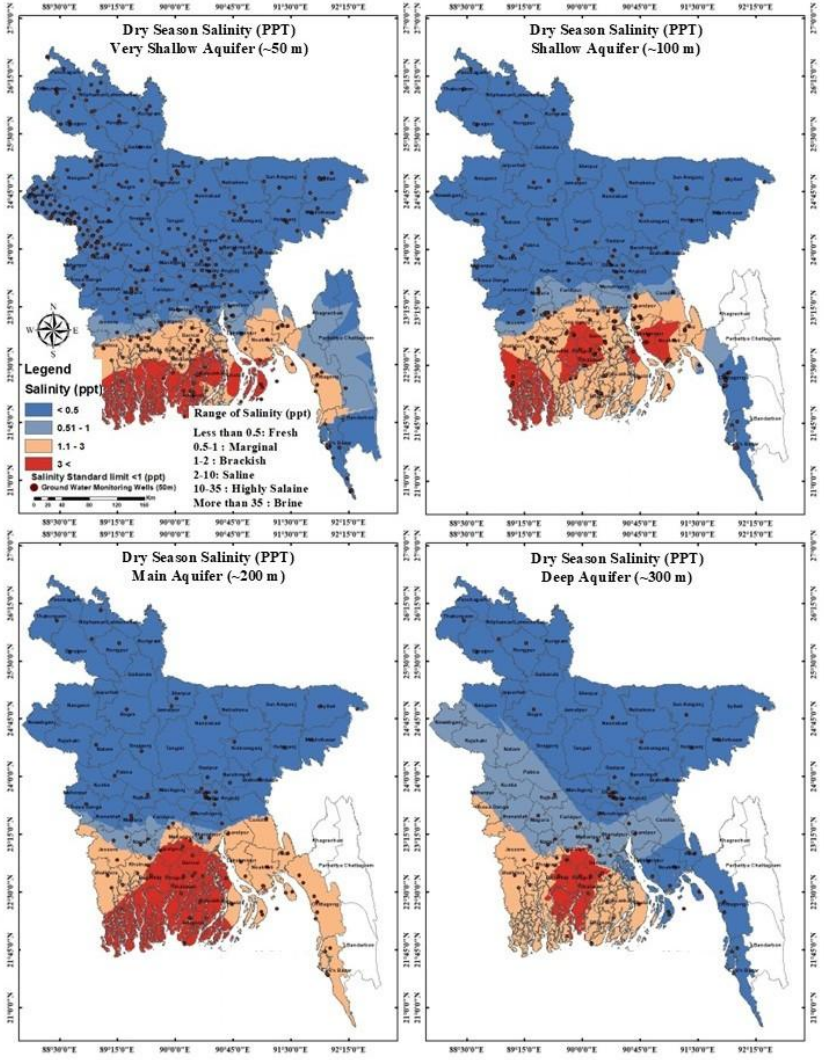


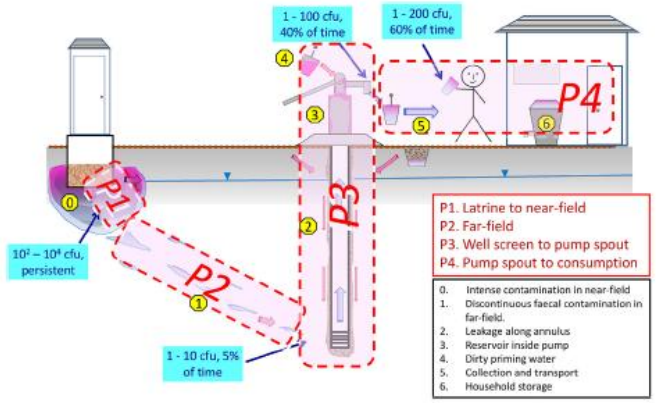
GROUNDWATER CHEMISTRY AND QUALITY

- Generally, groundwater is rich in calcium carbonate; however, in the coastal belt, it is predominantly sodium chloride-type water.
- The groundwater is predominantly of the Ca-Mg-HCO3 and Ca-Mg-Cl types, while Na-Cl and Na- HCO3-Cl types are also observed, with seasonal variations noted at certain locations.
- The trends in most samples indicate Ca2+>Na+>Mg2+>K+ or Na+>Ca2++>Mg2+>K+ and HCO3->Cl->SO42->NO3- or Cl->HCO3->SO42->NO3-.
- The evaporation-sedimentation process significantly influences the chemical composition of all samples taken from depths of 50 to 335 meters, with the majority of samples near the 50-meter depth, as well as the interaction between water and rock, which is anticipated for deeper groundwater to exhibit considerably longer travel times.
- Arsenic contamination in shallow groundwater, salinity encroachment in the coastal region, microbial pollution and few other parameters at various locations and depths are the major water quality concern.

ARSENIC CONTAMINATION AND SEA WATER ENCROACHMENT ARE MAJOR CONCERN



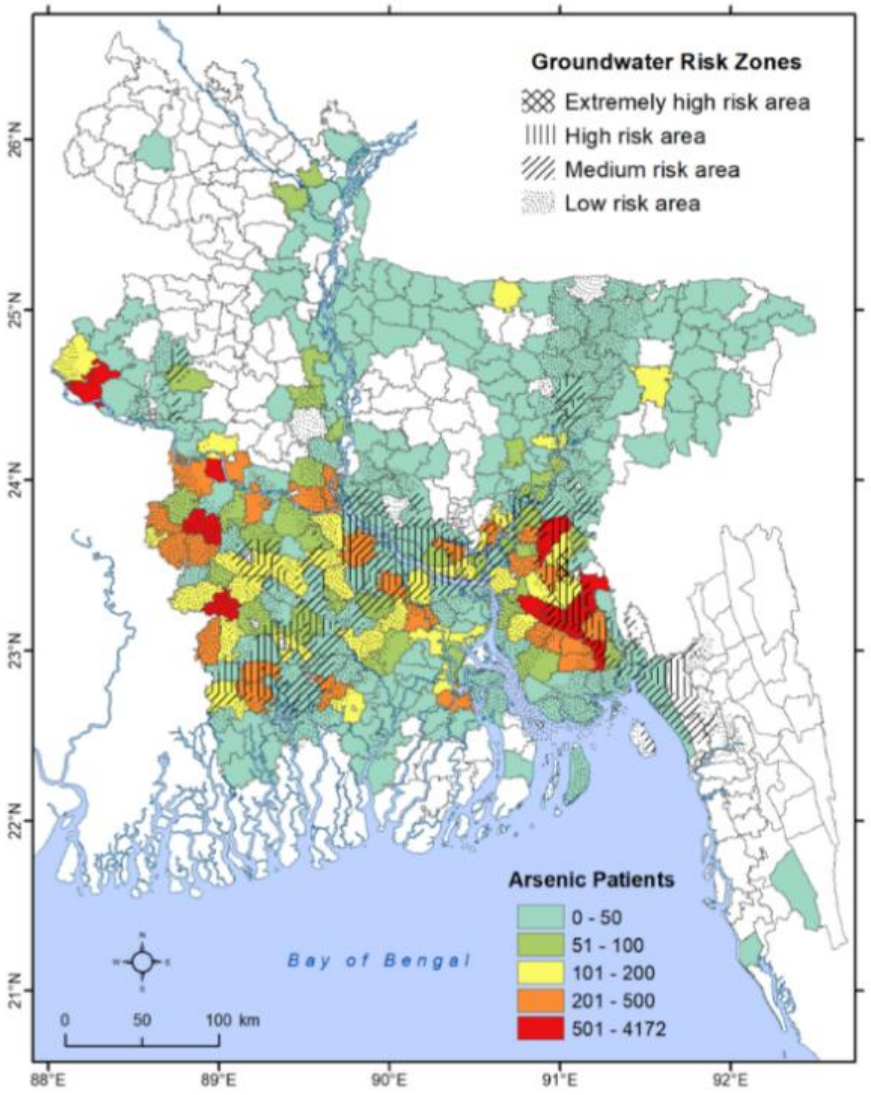




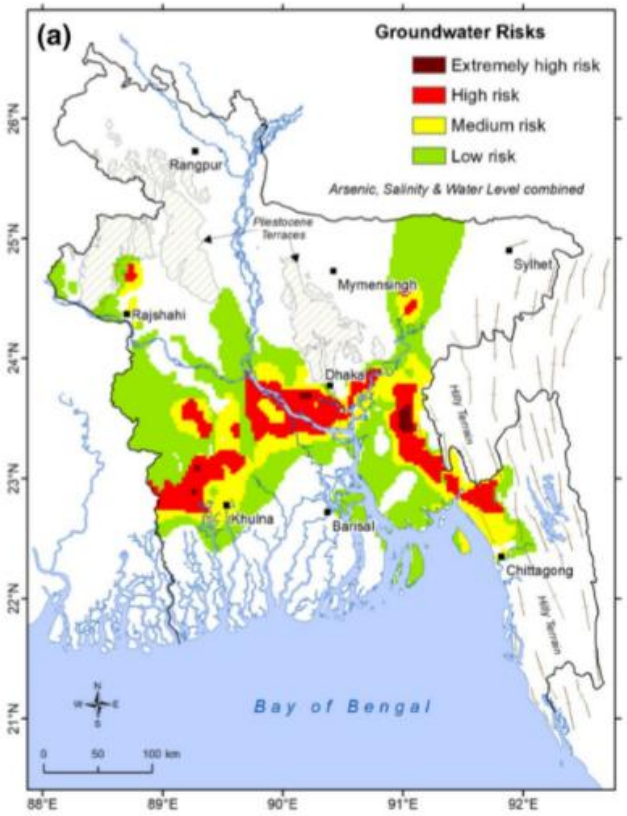
(Ravenscroft et al., 2017)

Pit latrines enhanced microbial contamination of adjacent shallow tubewell water where hydrogeological conditions (i.e. thickness and hydraulic properties such as hydraulic conductivity of surface clay aquitard, depth of groundwater table and groundwater flow direction) plays important role on the transport of bacteria. Existence and level of contamination of bacteria differed in different hydrogeological conditions in both lateral and vertical distances.

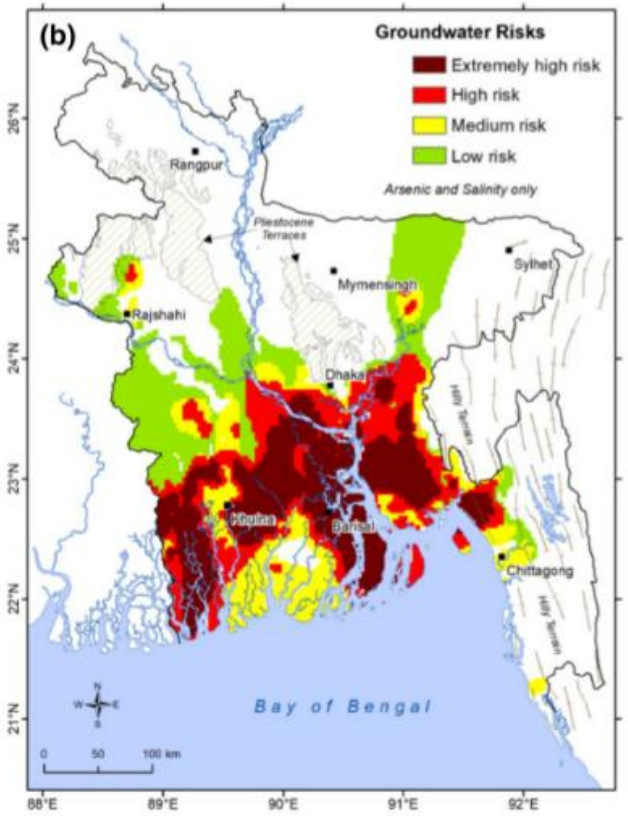
Groundwater Risks Mapping: Based on Storage and Quality



Risk Map based on Arsenic, Salinity and Depleting Groundwater level



Risk Map based on Arsenic, and Salinity



(The World Bank, 2019)

INTEGRATED WATER RESOURCE MANAGEMENT

Preparation of Water Budget (Yearly)
(and Water Allocation Plan)

Demand Calculation for Different Uses/Sectors

- Drinking and Potable
  (Data source: DPHE, population demand calculation, BBS etc.)
- Agriculture
  (Data source: BADC, DAE, BBS etc.)
- Others (if any)
  (e.g. industrial, ecosystem etc.)

Estimation of Available Fresh Water Resource

- Surface Water
  (Data source: BWDB, field survey, LGD etc.)
- Groundwater
  (Data source: BWDB, field survey etc.)
- Rainwater
  (based on reservoir capacity and shortage of SW and GW, if any)

Water Allocation (Priority: Water Act 2013)

- Drinking and potable
  (Source: groundwater, rain water and surface water)
- Agriculture
  (Source: surface water and rain water)
- Ecosystem
  (e.g. minimum stream flow, biodiversity etc.)
- Other Uses

Benefit: * Minimize unwise and misuse of inadequate freshwater resources in the coast.
* Mitigate social conflict by considering right and equality of water allocation.
* Preserve water for ecosystem and thus reduce water quality degradation.
* Lead to initiate the preparation of National Water Allocation Plan for entire country.

MITIGATION ACTION: MORE USE OF SURFACE WATER AND RAINWATER









MITIGATION ACTION: ENHANCE WATER USE EFFICIENCY









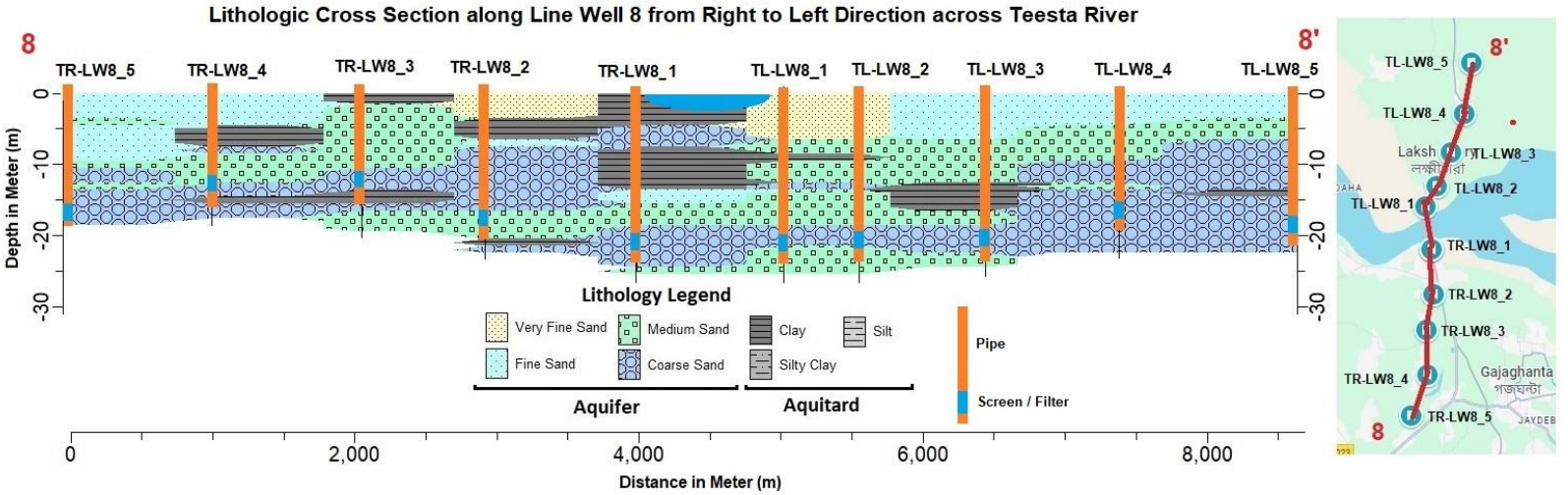


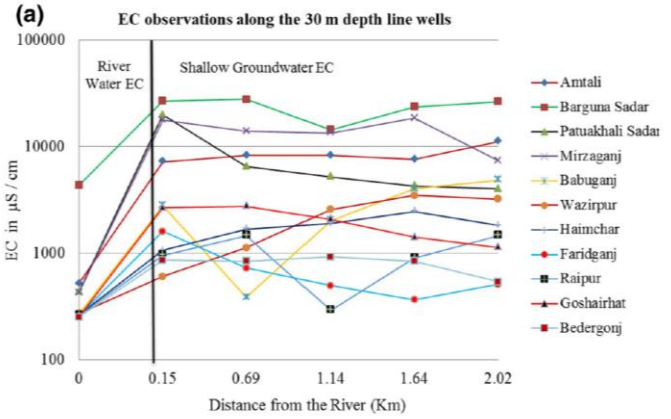
MITIGATION ACTION: EFFICIENT ESTIMATION OF GROUNDWATER RECHARGE

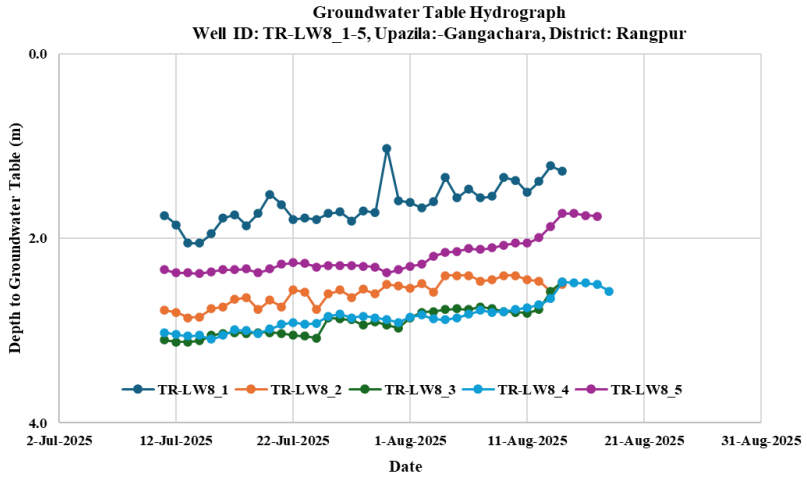
- Where hydro-mechanical coupling is significant, groundwater hydrographs are unreliable indicators of the status of groundwater storage.
- Assessments of recharge, judgement concerning sustainability, and comparisons with GRACE ΔGWS should acknowledge the coupled hydro-mechanical context, otherwise misleading conclusions will be drawn.
- The situation in the Bengal Basin may occur more widely in South and SE Asia, and in other deltaic regions and sedimentary basins worldwide.

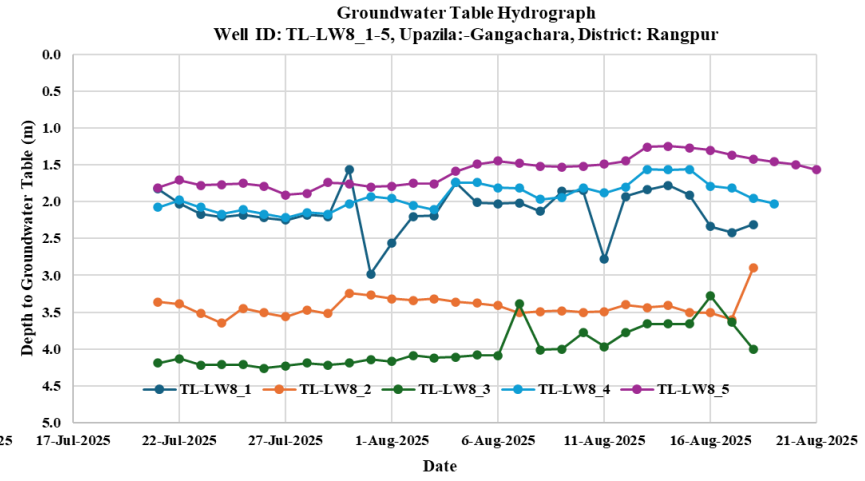


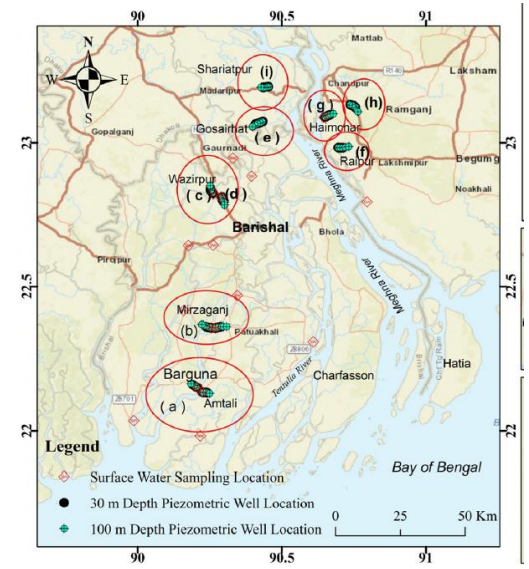
MITIGATION ACTION: UNDERSTANDING SURFACE WATER GROUNDWATER INTERACTIONS



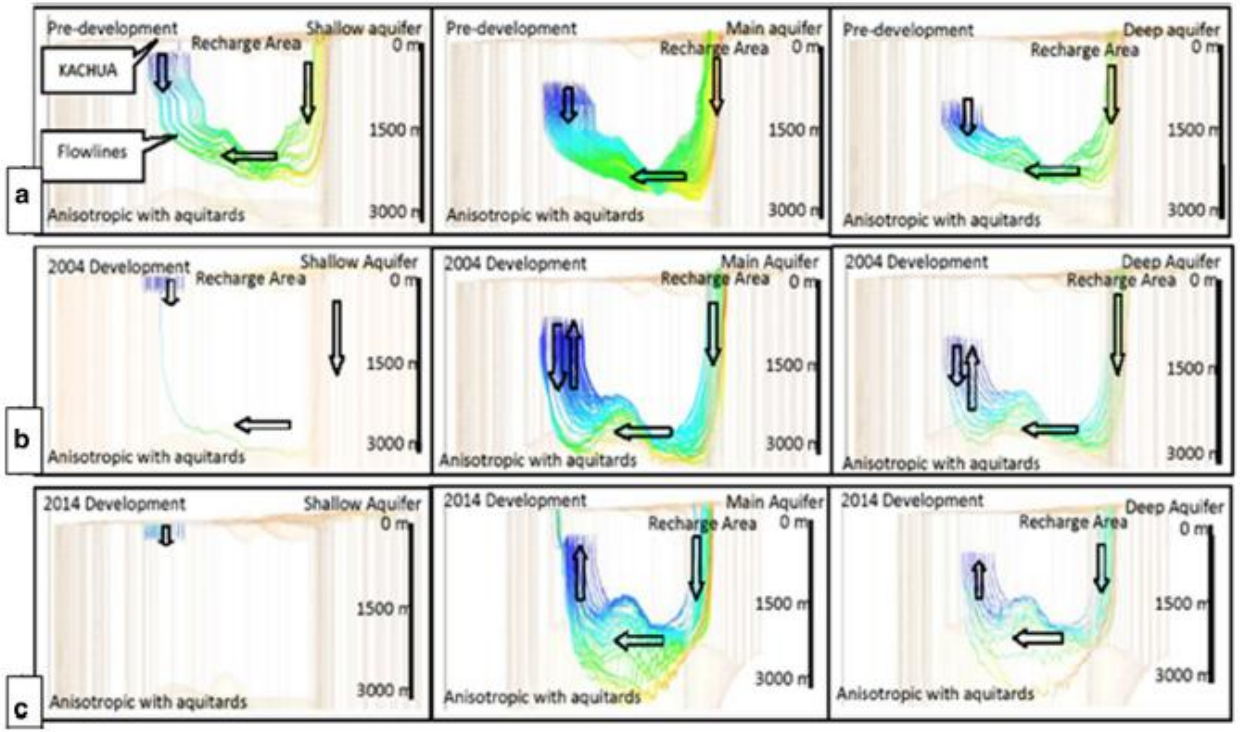


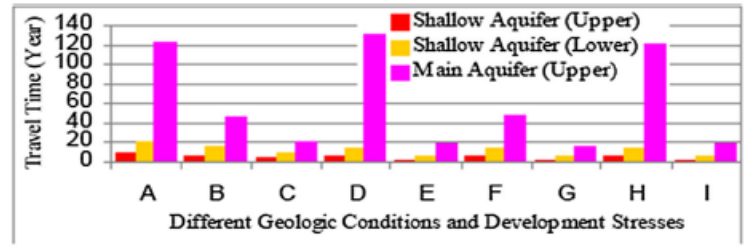


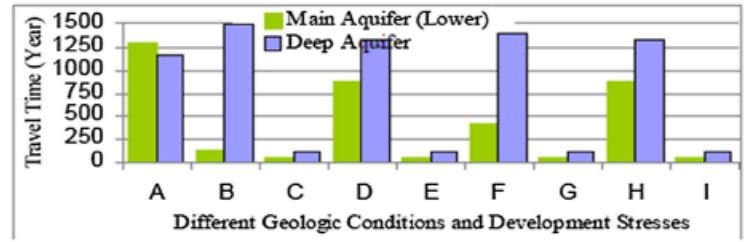




MITIGATION ACTION: APPLICATION OF NUMERICAL MODEL FOR RESOURCE ASSESSMENT





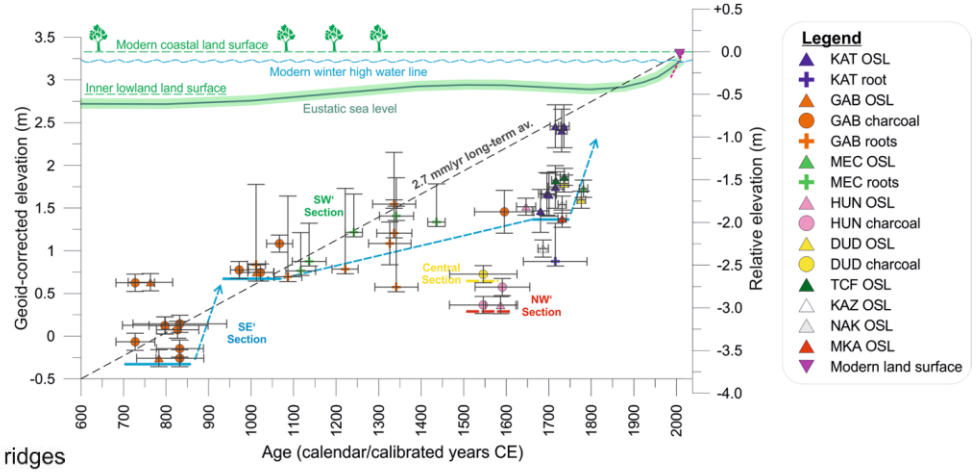


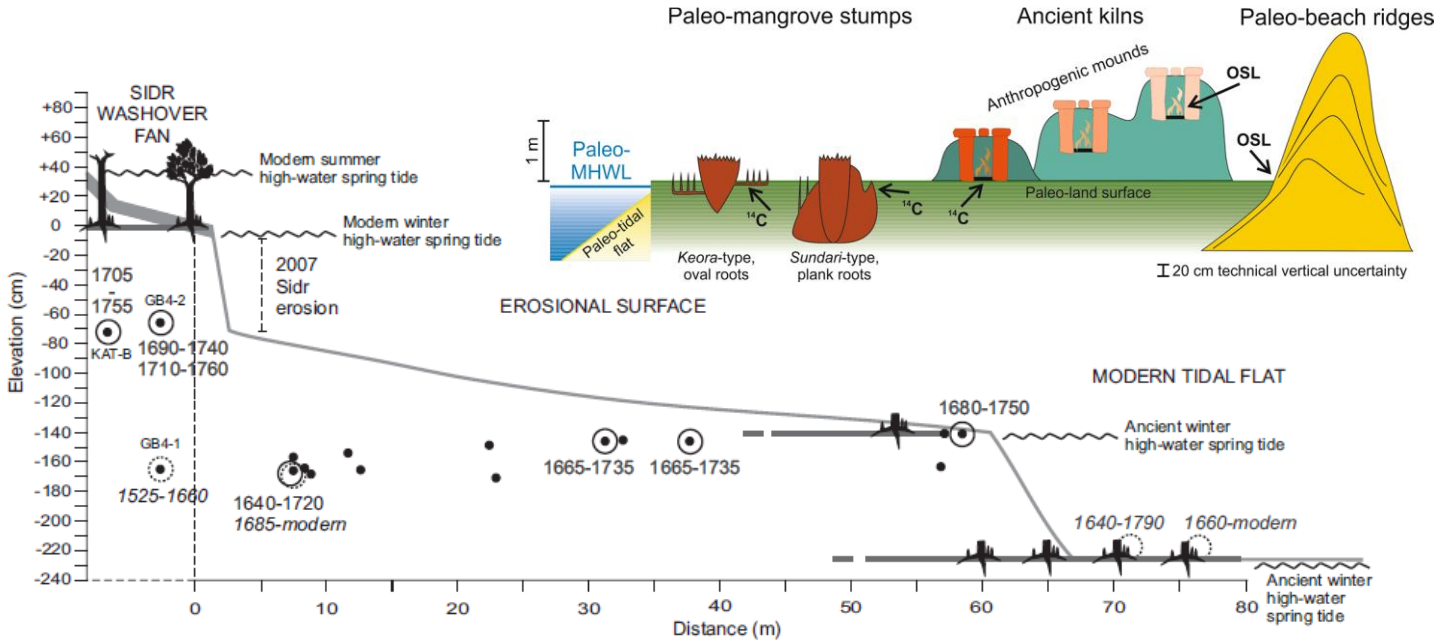
A	2004 development stresses (anisotropic)
B	2004 development stresses (anisotropic, discontinuous aquitards)
C	2004 development stresses (low anisotropic)
D	2014 development stresses (anisotropic)
E	2014 development stresses (low anisotropic)
F	2014: new Shallow Irrigation Wells in unit 6 (anisotropic)
G	2014: new Shallow Irrigation Wells in unit 6 (low anisotropic)
H	2014: Hand Tube Wells in main aquifer upper (anisotropic)
I	2014: Hand Tube Wells in main aquifer upper (low anisotropic)

Flow paths and travel time of groundwater are primarily controlled by the hydrogeologic characteristics and the pattern of pumping. Aquifers are recharged by vertical percolation as well as long distance travel of water from highly elevated hilly areas, mainly to deeper aquifers. Under the current trend of groundwater development, the average travel time, i.e., age of water for the upper and the lower parts of the 1st and 2nd and the upper part of the 3rd aquifers at different geologic conditions is estimated between 37 and 234, 133 and 317,832 and 2,485, 1,009 and 3,027 and 1,065 and 3,543 years, respectively. Maintaining the current trend of irrigation abstraction, if only domestic wells are shifted to the 2nd aquifer from the 1st aquifer, would provide better results and the lower part of the 2nd aquifer and the 3rd aquifer will remain safe for a longer period of time. Where seawater encroachment is a problem in coastal basins, the possibility of sea-water intrusion may be increased with increased stress on groundwater.

MITIGATION ACTION: ASSESS IMPACT OF CLIMATE CHANGE, SEA LEVEL RISE

This study reconstructs the coastal subsidence over the past 1300 years in a mangrove region along the coast of the Ganges–Brahmaputra Delta, an area not affected by anthropogenic interference. The relative sea level (RSL) history is based on radiocarbon and luminescence ages measured on 108 submerged kilns and in situ mangrove stumps. While the regional, long-term average subsidence rate is calculated to be 2.7 ± 0.3 mm/yr, modern RSL (including eustacy, isostasy, ocean level, and subsidence) rises by 8.7 ± 0.4 mm/yr. This rate has been balanced by natural sediment accretion so far (Hanebuth et al., 2021).









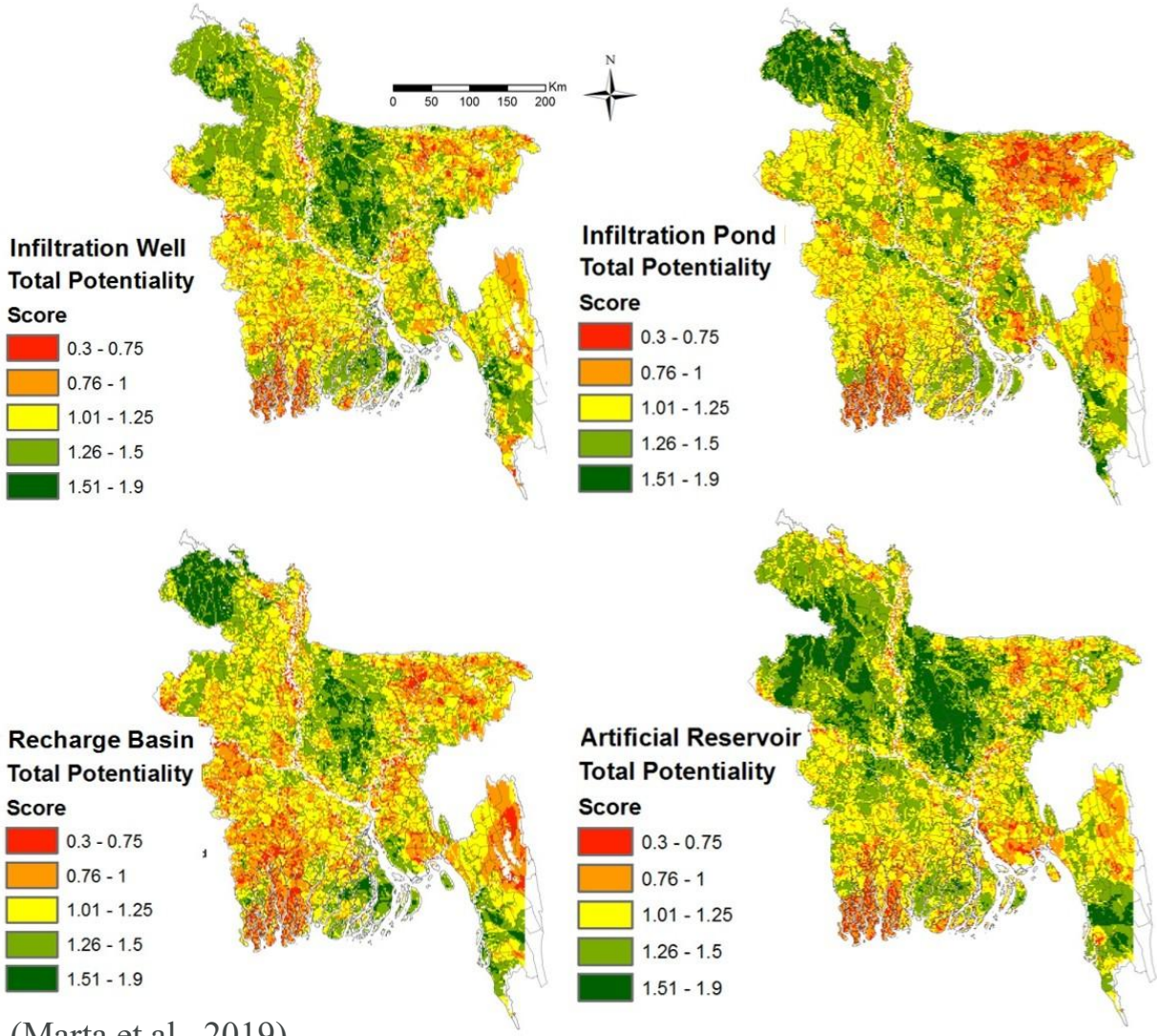




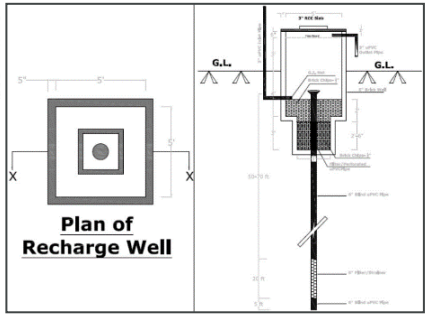
MITIGATION ACTION: MANAGED AQUIFER RECHARGE (MAR)

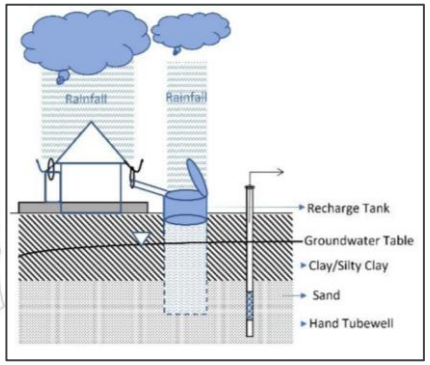
- Artificial recharge i.e. the augmentation of infiltration into groundwater by different technologies (e.g. recharge basins, recharge wells, induced infiltration by injection wells etc. of treated safe and fresh surface water and harvested rainwater) is very much accepted worldwide for overstressed aquifers.
- MAR and the artificial storage and recovery (ASR) is useful for aquifers subject to declining water levels, salinity encroachment etc.
- However, artificial recharge to groundwater does not pay adequate attention in developing countries like Bangladesh.
- In Bangladesh, groundwater means a lot for its livelihood and socio-economic development as groundwater has a very close link to fresh and safe water supply and dependent agriculture.
- Areas where groundwater is either already over-exploited e.g. Dhaka city and Barind tract in north-western Bangladesh or saline prone areas, like in the coastal belt where high rates of pumping from the shallow aquifers may result in saltwater intrusion, recharge enhancement has potential to store excess runoff or rainwater and to reduce salinity.

MAPPING OF RECHARGE POTENTIAL AND RECHARGE TECHNOLOGIES FOR DIFFERENT AREAS OF BANGLADESH



(Marta et al., 2019)





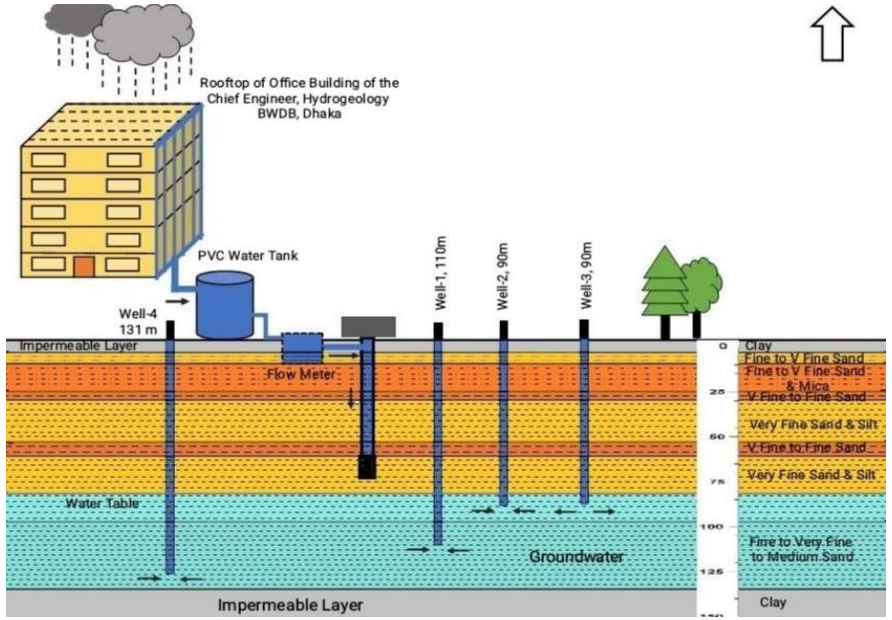
The identified variables that define the **Physical Potential** are:

- Precipitation intensity and duration
- Evaporation loss
- Surface geology
- Thickness of the aquitard
- Groundwater depth below the surface in the middle of the Monsoon (June)
- Wells contaminated with Arsenic
- Inundation land type

The identified variables that define **Demand Urgency** are:

- Population density
- Depth of the groundwater table below the surface at the driest month (April)
- Poverty
- Absence of perennial rivers close by
- Irrigation demand

EXAMPLE OF MAR (INFILTRATION/RECHARGE WELL) PILOTING IN DHAKA CITY



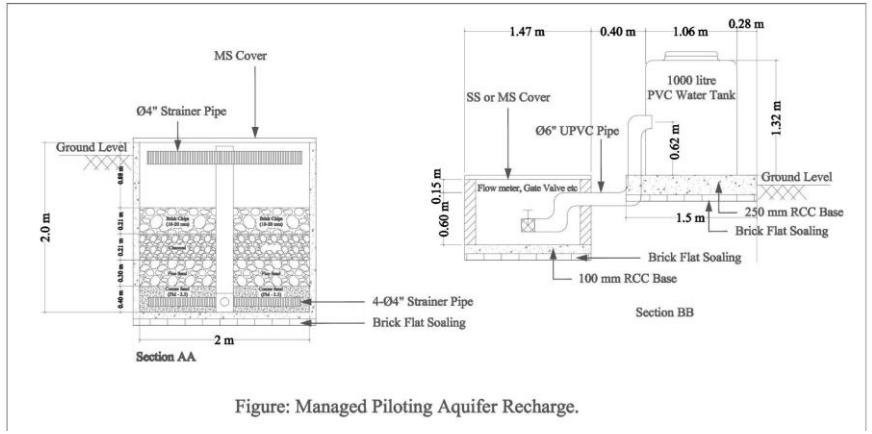


Figure: Managed Piloting Aquifer Recharge.







WAY FORWARD

- Sustainable use of available safe water including groundwater can be planned by analyzing data and information of the components of the hydrologic cycle.
- In Bangladesh where groundwater is the principal source of irrigation, industrial and potable water supply, regular assessment and monitoring of this resource is very important.
- Maintaining the water balance of withdrawals and recharge is vital for managing human impact on water and ecological resources. Groundwater resources that can safely be abstracted from both upper and deeper aquifers need to be assessed properly.
- Because of increasing demand of water and to reduce dependency on limited fresh groundwater resources, utilization of available surface water and conjunctive use should be emphasized as per National Water Policy 1999 and other guidelines of the Government.
- Regional modelling of the groundwater systems has to be developed for effective water resource management to plan agricultural, rural and urban water supplies and to forecast the groundwater situation in advance for dry seasons.

WAY FORWARD

- Preparation of water budget and water allocation plans are important up to union level based on available data and information as well as conducting required survey and investigations. All of these tools can be implemented under the authority of the Water Act 2013 Water Rules 2018.
- Augmentation of both natural and artificial recharge of groundwater (MAR) can be done in groundwater depleted and water stressed areas by implementing appropriate programs and techniques.
- Extension and upgrading existing network of groundwater monitoring wells should be done spatially and vertically in different aquifers for estimating recharge, monitoring fluctuation of water table and movement of groundwater and water quality assessment.
- To facilitate the actions for sustainable development and management of groundwater resources of Bangladesh, strengthening and capacity building of appropriate organizations is required.
- Isotope techniques can be used to investigate and assess groundwater resources potential towards sustainable development and management of water resources.

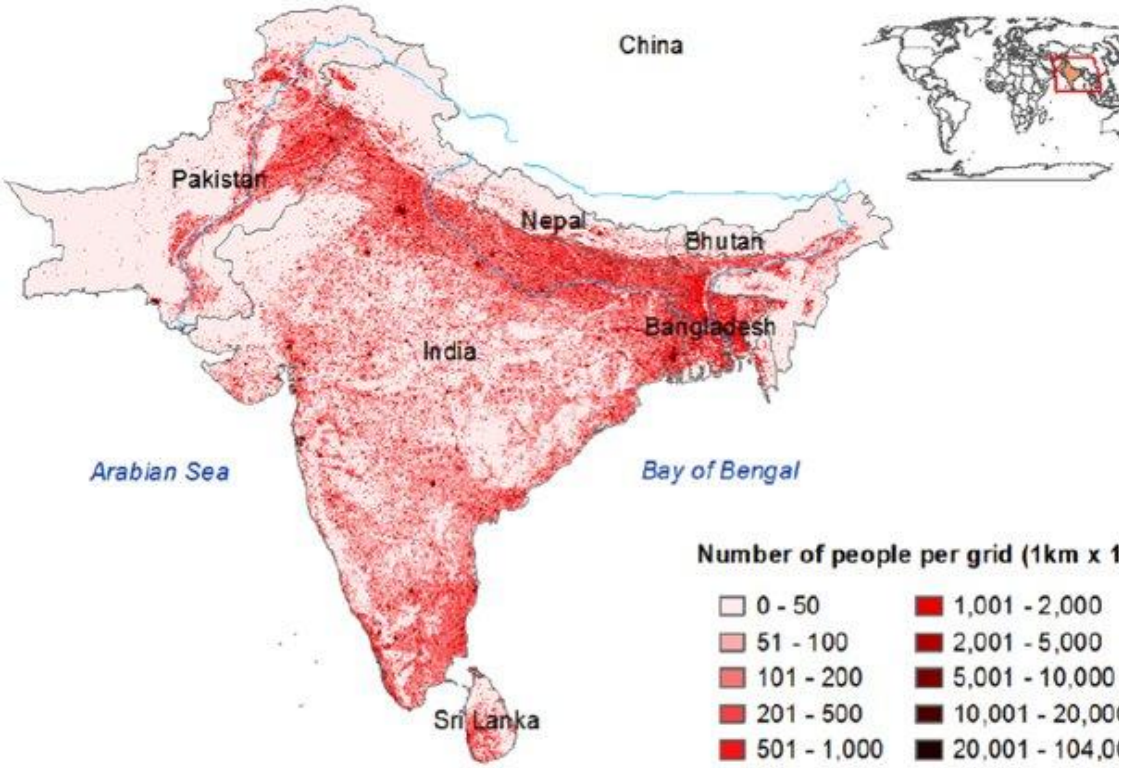
Understanding Water Policy in Bangladesh: Current Governance Challenges and Reforms

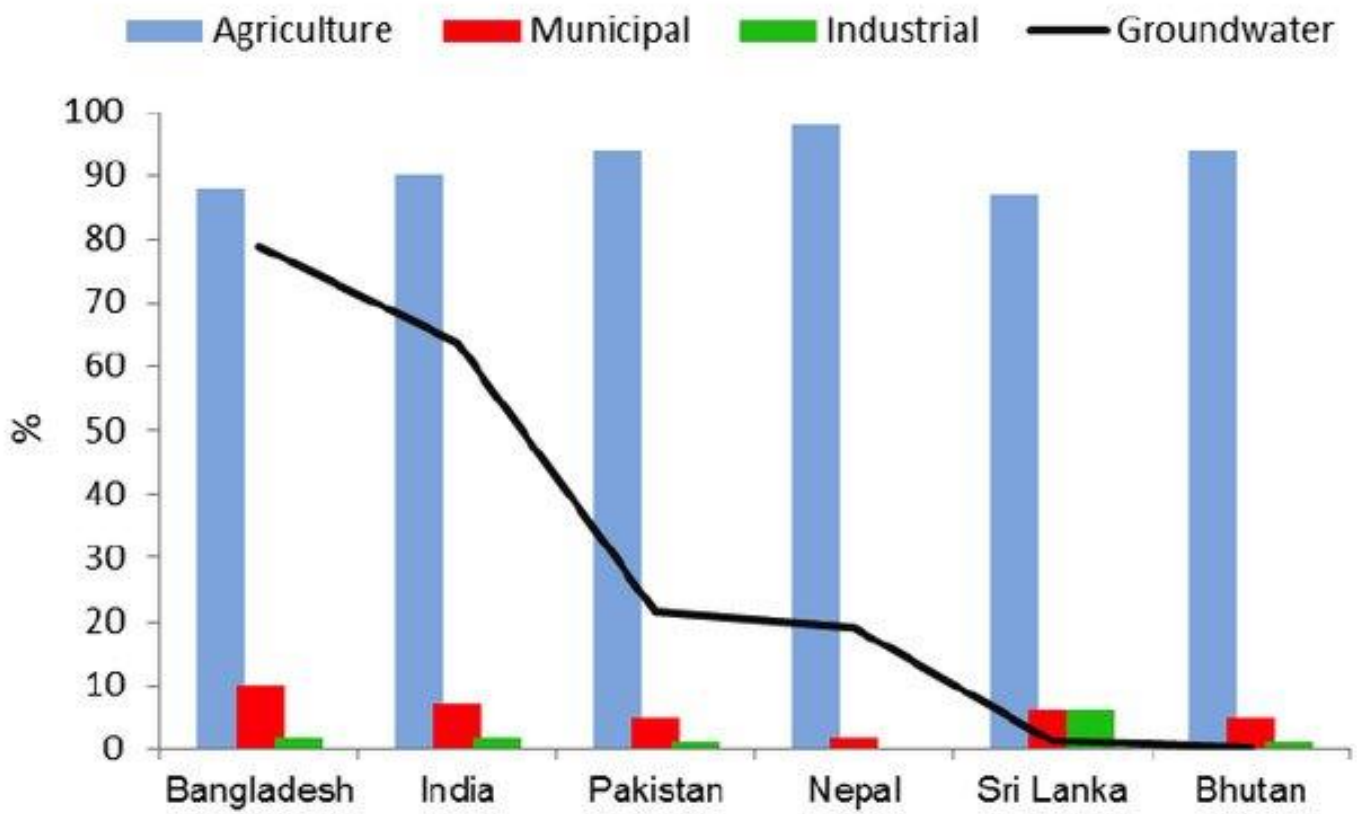


DR. KAZI MATIN AHMED, PROFESSOR
DEPARTMENT OF GEOLOGY, UNIVERSITY OF DHAKA, BANGLADESH
(EMAIL: kmahmed@du.ac.bd)

inspiring change

POPULATION DENSITY, SECTORAL WATER USES, AND GROUNDWATER DEPENDENCY IN SOUTH ASIA





Shamsudduha, M. (2013). Groundwater resilience to human development and climate change in South Asia. GWF Discussion Paper 1332, Global Water Forum, Canberra, Australia.

KEY ASPECTS OF WATER RESOURCE USE

- **Dominance of Groundwater:** Groundwater is the main source for all major needs due to the widespread contamination of surface water and the ease of access via tube wells.
- **High Agricultural Demands:** The high demand in agriculture is mainly driven by the irrigation of *Boro* rice in the dry season when surface water is scarce.
- **Domestic Reliance:** About 98% of the population depends on groundwater for drinking, though safety is a major concern due to natural arsenic contamination in shallow aquifers and increasing salinity in coastal areas.
- **Increasing Industrial Use:** Water-intensive industries like textiles, tanneries, and power plants use river water and groundwater, contributing to localized water pollution with heavy metals and other contaminants.

NON-CONSUMPTIVE USES

- Water bodies are also crucial for other uses, including:
  - **Navigation:** Rivers serve as an arterial transportation network, especially during the wet season.
  - **Fisheries:** The sector provides significant employment and a major source of protein for the population.
  - **Environmental Management:** Water flow is essential for maintaining the river regime and controlling salinity intrusion in coastal regions.

KEY POLICY AREAS

- **Water Supply and Sanitation**: Policies address the severe challenges of arsenic contamination in groundwater and polluted surface water, aiming to ensure universal access to safe drinking water and adequate sanitation.
- **Agriculture**: The policy encourages private development of minor irrigation (primarily groundwater) while promoting efficiency measures like conjunctive use of surface and groundwater and crop diversification.
- **Industrial:** No specific policy water, industrial water management policy is being developed.
- **Environment and Climate Change**: The framework emphasizes protecting natural water bodies (haors, baors, beels), preserving ecosystems, and integrating climate change adaptation measures into water management plans.
- **Transboundary Rivers**: Recognizing its downstream location, the government's long-term policy aims to negotiate agreements with co-riparian countries (e.g., India and China) for equitable water sharing and data exchange to mitigate issues like dry season water scarcity and monsoon floods.

KEY CHALLENGES

- **Seasonal and Transboundary Surface Water Flows: T**oo much and too little.
- **Extensive Pollution:** Industrial waste, poor sanitations in urban and rural areas, agricultural runoff.
- **Groundwater Depletion (Over-extraction):** The reliance on groundwater (accounting for 79-90% of all water use) has led to dangerously declining water tables across the country.
- **Arsenic Contamination:** This is considered the largest natural calamity in the world in terms of the population affected.
- **Other Contaminants:** Beyond arsenic and salinity, groundwater is also threatened by localized contamination from pathogens (fecal coliform), agricultural chemicals (pesticides, fertilizers), and industrial effluents containing heavy metals in areas near industrial zones.
- **Salinity Intrusion:** In the coastal regions, the low-lying delta is vulnerable to saltwater intrusion from the Bay of Bengal, a problem worsened by climate change and reduced upstream freshwater flow in the dry season

CORE POLICIES

- **National Water Policy (NWP) 1999**: The foundational policy that sets principles for comprehensive and integrated water resource management.
- **National Policy for Safe Water Supply and Sanitation (NPSWS) 1998**: Guides the provision of safe drinking water and sanitation services.
- **Coastal Zone Policy (CZP) 2005**: Provides general guidance for the management and development of the coastal zone, focusing on poverty reduction and vulnerability reduction.
- **National Environment Policy 2018**: A broad policy guiding environmental conservation, including water-related ecosystems.
- **National Industry Policy 2016**.
- **National Agriculture Policy 2018**.

STRATEGIES AND PLANS

- **National Water Management Plan (NWMP) 2001**: A 25-year plan with 84 programs to implement the National Water Policy in a coordinated manner.
- **Bangladesh Delta Plan (BDP) 2100**: A long-term prospective plan to ensure delta safety, water security, and climate resilience over the next century.
- **National Strategy for Water Supply and Sanitation 2021**: Promotes a risk management approach (Water Safety Plans) for ensuring safe drinking water.
- **Coastal Development Strategy (CDS) 2006**: Outlines strategies for the management of the coastal zone in line with the CZP.
- **Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009**: Outlines the national strategy for adapting to and mitigating climate change impacts, many of which are water-related.
- **Haor Master Plan 2012-2032**: A specific plan for the conservation and development of the haor (wetland) regions.
- **Sector Development Plan for Water Supply and Sanitation Sector of Bangladesh (2011-2025)**.
- **Water Safety Framework in Bangladesh 2011**: Provides guidelines for ensuring water safety from source to consumption.
- **Guidelines for Participatory Water Management (GPWM) 2000**: Synthesizes agency experiences and requirements for involving communities in water management.

ACTS, ORDINANCES, AND TREATIES

- **Bangladesh Water Act, 2013**: The main legal framework for the use, control, protection, and disposal of all water resources, establishing the National Water Resources Council.
- **Groundwater Management Act, 2018 (For Agricultural Use)**: Replaced the 1985 Ordinance and manages groundwater resources for agriculture, including licensing and local committee formation.
- **Bangladesh Water Rules 2018**: Provides detailed rules for the implementation of the Bangladesh Water Act 2013.
- **Environmental Conservation Act, 1995 (ECA)**: The primary legislation for environmental protection and pollution control, with relevance to water quality.
- **Environmental Conservation Rules, 1997 (ECR)**: Rules under the ECA that set specific standards for effluent discharge and water quality.
- **Bangladesh Water Development Board Act, 2000**: Established the BWDB as the principal implementing agency for major water development projects.
- **Water Reservoir Conservation Act, 2000**: For the preservation of natural water bodies in municipal areas.
- **The Ganges Water Sharing Treaty 1996**: The only active bilateral treaty with India on sharing the Ganges river water.

EXISTING LEGAL FRAMEWORKS

- **Groundwater Management Act, 2018**: This Act is the core legislation for managing groundwater specifically for agricultural production. It outlines provisions for:
  - **Licensing**: The need for a license to install new tube wells for irrigation is a key regulatory mechanism.
  - **Upazila Irrigation Committee**: The Act provides for the formation of local committees to manage and regulate tube well installation at the local level.
  - **Governance Authority**: The Act provides legal authority to manage groundwater resources for agricultural purposes.
- **Bangladesh Water Act 2013**: This general act declares water as a state resource and empowers the government to regulate its use, control, protection, and preservation for all sectors, including agriculture.
  - It calls for an integrated approach to water management (IWRM) across the country's hydrological regions.
  - It outlines the role of the National Water Resources Council (NWRC) and its Executive Committee (ECNWRC) in coordinating all water management activities and resolving conflicts.
- **National Water Policy 1999 (NWP)**: This policy encourages private sector involvement in minor irrigation (mostly groundwater) and promotes efficiency measures like conjunctive use of surface and groundwater. It outlines a vision for equitable water use and environmental protection

INSTITUTIONAL FRAMEWORK

- Ministry of Water Resources (MoWR): The focal ministry for water governance, responsible for formulating policies and plans. The National Water Resources Council (NWRC) headed by the PM and its Executive Committee (ECNWRC) headed by the Minister anchored at MoWR.
  - Water Resources Planning Organisation (WARPO): Serves as the secretariat to the NWRC and is responsible for preparing and updating the National Water Management Plan and monitoring its implementation.
  - Bangladesh Water Development Board (BWDB): The principal agency for implementing major surface water development projects, including flood control, drainage, and irrigation (FCDI) projects.
  - Department of Public Health Engineering (DPHE): Manages the infrastructure and operations for rural drinking water supply and sanitation under the Ministry of Local Government.
  - Bangladesh Agricultural Development Corporation (BADC): Facilitates irrigation all over the country except the NW.
  - Barind Multipurpose Development Authority (BMDA): Facilitates irrigation in the NW.
  - Water Supply and Sewerage Authorities (WASAs): Facilitate water supply and sewerage in four large cities.
  - City Corporations and Municipalities: Facilitate water supply and sewerage cities and towns outside the four large cities served by WASAs.
  - Department of Environment (DoE): Responsible for monitoring water and effluent quality

CHALLENGES

- Despite comprehensive policies, implementation faces challenges including a lack of coordination among the many involved agencies, insufficient resources, and complex transboundary water politics. The "polluter pays" principle is established in policy but enforcement is often weak.

KEY GOVERNANCE GAPS

- Fragmented Institutional Framework: Responsibility for water management is spread across various government ministries and agencies (e.g., the Bangladesh Water Development Board, Department of Public Health Engineering, and local government bodies), often with overlapping or unclear mandates. This lack of coordination makes integrated water resource management (IWRM) extremely difficult to implement effectively.
- Inadequate Legal and Policy Instruments: While policies like the National Water Policy (1999) and the Bangladesh Water Act (2013) exist, they often lack specific, actionable guidelines for crucial aspects of groundwater management.
  - Abstraction Limits: There are no clear, enforceable rules on groundwater extraction limits for agriculture and industry.
  - Pricing Policy: Groundwater is not directly priced (other than the cost of pumping), which means users have little incentive to conserve or meter their water usage, leading to over-extraction.
  - Contradictory Directives: Some policy documents contain contradictory instructions, for example, promoting both the increased use of groundwater for irrigation and the need to conserve it.

KEY GOVERNANCE GAPS

- **Weak Monitoring and Enforcement**: There is a significant gap in the ability to monitor groundwater extraction and quality on the ground. Penalties for non-compliance with existing regulations are often too low to be an effective deterrent, and the mechanisms for pursuing these penalties are weak.
- **Limited Data and Science-Technology Application**: There are challenges regarding the validity of water data and the application of science and technology in water management. Data are often collected by different agencies and stored in varied locations, making a holistic, evidence-based approach to decision-making difficult. No national-scale, multi-hazard groundwater risk maps currently exist.
- **Lack of Public Participation and Accountability**: There is an absence of consistent public participation in planning and implementation. Accountability and transparency in water sector operations are often not clearly specified or enforced, which can be linked to issues of corruption.
- **Absence of Transboundary Aquifer Management Policy**: While there are issues with transboundary rivers, there is no specific policy instrument found that addresses the management of transboundary aquifers, which is crucial given the shared nature of the region's water resources.

LEGISLATIVE AND REGULATORY REFORMS

- **Amend the Bangladesh Water Act 2013**:
  - **Define Quantitative Limits**: Introduce specific legal provisions that define clear, enforceable maximum groundwater extraction limits for agricultural, industrial, and domestic uses, based on scientific assessment of aquifer recharge rates.
  - **Mandate Pricing and Metering**: Legally require the metering of all significant groundwater abstraction points and introduce a fair water pricing system (beyond just the pumping cost) to incentivize conservation and penalize over-extraction.
  - **Simplify Legal Recourse**: Amend the Act to allow citizens and local government bodies to file complaints or lawsuits in environmental courts regarding water pollution and mismanagement without requiring permission from central authorities, thereby enhancing accountability.
- **Update National Policies and Plans**: The National Water Policy (1999) needs updating to align with current climate change realities, urbanization challenges, and sustainable development goals, providing specific guidance for groundwater management strategies.
- **Strengthen the "Polluter Pays" Principle**: Enact stricter amendments to the Environment Conservation Act 1995 to enforce the "polluter pays" principle with substantial fines that act as a meaningful deterrent for industrial and other polluters contaminating groundwater sources

INSTITUTIONAL AND REGULATORY REFORMS

- **Mandatory Coordination Mechanisms**: Introduce legally binding forms or Memoranda of Understanding (MoUs) that enforce coordination among the various ministries and agencies (e.g., MoWR, DoE, DPHE) to prevent conflicting mandates and ensure an integrated water resource management (IWRM) approach.
- **Decentralization of Authority**: Legal instruments must be introduced to facilitate genuine decentralization, transferring real power and resources to local government institutions and water management committees (WMCs) for local water governance.
- **Data Sharing Protocols**: Formal, legally-backed protocols or a central data repository system are needed to ensure consistent, real-time data sharing on water quality, usage, and aquifer conditions among all relevant government bodies and, where appropriate, the public.

INSTITUTIONAL AND REGULATORY REFORMS

- **Clarify Institutional Roles and Coordination:** Introduce a legal instrument, such as a Memorandum of Understanding or a coordinating act, that clearly defines the roles, responsibilities, and mandatory coordination mechanisms among all relevant ministries and agencies (MoLGRD&C, MoWR, DPHE, DoE, WASAs, etc.) to prevent overlap and ensure integrated water management.
- **Establish an Independent Water Quality Regulator:** Legislate the establishment of an independent regulatory body dedicated to monitoring and enforcing water quality standards for both supply and wastewater discharge, thereby ensuring accountability across service providers.
- **Mandate O&M Funds:** Legally require the creation and ring-fencing of dedicated Operation and Maintenance (O&M) funds for water supply and sanitation infrastructure at both national and local government levels to ensure the functionality and longevity of facilities.
- **Standardized Monitoring Protocols:** Legally enforce the establishment of a national water quality monitoring system and protocol, delineating the clear roles and responsibilities for monitoring at all levels, from consumer to central government.

QUALITY AND MONITORING GAPS

- **Inadequate Water Quality Standards**: The Act falls short in making a clear government commitment to ensure specific water quality standards for various beneficial uses (beyond drinking water), failing to address widespread issues like arsenic and industrial contamination effectively.
- **Insufficient Data Management**: A lack of robust legal requirements for continuous and standardized monitoring of groundwater levels, quality, and usage across different regions means effective planning is hindered by insufficient data.
- **Arsenic and Salinity**: While policies acknowledge the issues of arsenic contamination and saline intrusion in coastal areas, specific, legally binding, and well-funded action plans to provide alternative safe water sources are often slow to be implemented effectively.

INSTITUTIONAL COORDINATION AND CAPACITY BUILDING

- Establish a Unified Coordinating Body: Legally mandate a single, apex body with authority to coordinate all seven agencies currently involved in groundwater management (e.g., MoWR, BWDB, DPHE, DoE). This body would ensure integrated water resource management (IWRM) and prevent conflicting mandates.
- Decentralize Management Authority: Formally transfer real power and resources to local government tiers (e.g., Upazila Parishads and Water Management Committees) to manage local groundwater resources, as originally envisioned in the Ground Water Management Ordinance 1985.
- Capacity Building: Provide adequate funding, training, and skilled personnel to these local bodies and the main regulatory agencies to effectively monitor groundwater levels and quality, manage data, and enforce regulations.

PARTICIPATION AND ACCOUNTABILITY

- **Enable Citizen Lawsuits:** Amend the **Bangladesh Water Act 2013** to allow citizens and civil society organizations to file lawsuits or complaints regarding water issues without requiring prior permission from a government authority. This improves transparency and accountability.
- **Mandatory Public Participation:** Introduce legal requirements for mandatory, inclusive public participation and consultation in all stages of water management planning and implementation, especially for projects affecting vulnerable and marginalized groups.

INSTITUTIONAL REFORMS AND ENFORCEMENT

- **Mandate Inter-Agency Coordination:** Introduce a legal instrument that enforces mandatory coordination among the numerous agencies involved in water management (e.g., MoWR, DoE, BWDB, WASAs), preventing conflicting mandates and ensuring a unified approach to allocation.
- **Empower Local Authorities:** Legally decentralize water governance by providing local government bodies (like Upazila Parishads and Water Management Committees) with clear mandates and resources for enforcing allocation decisions and resolving local water conflicts.
- **Enhance Enforcement Mechanisms:** Revise existing laws, particularly the Environment Conservation Act 1995, to impose severe penalties and fines for illegal water abstraction and pollution, ensuring a strong deterrent.

UNIFIED AND COORDINATED INSTITUTIONAL STRUCTURE

- A single, apex regulatory body: A single institution (or a significantly reinforced Water Resources Planning Organisation (WARPO)) with a clear mandate for overall water governance (surface and ground water) would address current fragmentation and overlapping responsibilities.
- Mandatory inter-ministerial coordination: Formal mechanisms should ensure consistent collaboration among key ministries and agencies, including those for Water Resources, Agriculture, Local Government, and Environment.

PROPOSED BANGLADESH GROUNDWATER REGULATORY AUTHORITY (BGRA)

- **Apex body and structure:** The BGRA would function as a centralized regulatory authority, drawing on the model of the CGWA. It would work in close collaboration with the Water Resources Planning Organization (WARPO) and the Bangladesh Water Development Board (BWDB).
- **Legal foundation:**
  - The BGRA could be established under the Bangladesh Water Act 2013, similar to how the CGWA derives its power from India's Environment (Protection) Act, 1986.
  - It would be responsible for issuing and enforcing regulations, with the power to impose penalties for non-compliance.
- **Proposed functions:**
  - **Registration and permits:** The BGRA would issue "No Objection Certificates" (NOCs) for groundwater extraction, particularly for industrial and commercial purposes.
  - **Water audit and reporting:** The BGRA would require industrial users to conduct annual water audits, similar to the Indian model, to ensure sustainable consumption.
  - **Groundwater conservation:** The BGRA would mandate water conservation measures, such as rainwater harvesting and the use of treated wastewater, especially for industries.
  - **Notification of stressed areas:** The BGRA would identify and declare areas with critical or over-exploited groundwater resources, restricting or prohibiting new extraction in those zones.
  - **Scientific input:** The BGRA would rely on BWDB and other scientific bodies for data on groundwater levels, quality, and aquifer mapping to inform its decisions.

INTEGRATING BGRA INTO BANGLADESH'S WATER GOVERNANCE FRAMEWORK

- **BGRA (Regulatory):** Take on regulatory and enforcement duties, including NOCs, penalties, and setting extraction limits. It would operate under the Ministry of Water Resources and follow the policy guidance of WARPO and the NWRC.
- **BWDB (Scientific):** Continue its role as the national scientific and monitoring body, providing hydrogeological surveys, data collection, and aquifer mapping to the BGRA.
- **WARPO (Policy):** Continue setting national water policy, which would guide the regulatory actions of the BGRA.
- **DPHE (Quality):** Maintain responsibility for monitoring public health-related groundwater quality.
- **Decentralized approach:** Implement a more decentralized and participatory management system at the local level. This would involve forming local groundwater management committees with representatives from farmers, industries, and local government bodies.

Thank You!





Q&A AND PANEL DISCUSSION

PRASANNA JOGDEO, SOUTH ASIA OPERATIONS MANAGER, IWA

inspiring change

UPCOMING IWA WEBINARS & EVENTS



Co-organised by AIT Asian Institute of Technology

Learn more at
https://waterdevelopmentcongress.org/

JOIN OUR NETWORK OF WATER PROFESSIONALS!

IWA brings professionals from many disciplines together to accelerate the science, innovation and practice that can make a difference in addressing water challenges.

SCAN THE QR CODE

Use code **WEBINARS25IWA**

for a **20% discount off**
new membership.

Join before 31 December 2025

inspiring change



Learn more at

http://www.iwa-network.org/iwa-learn/