Dhaka University Law Journal, 2024, 35 (2), 167-191
DOI: https://doi.org/10.3329/dulj.v35i2.82848

Integrated Water Resource Management to Secure Sound Environmental Management: Reflections in Two Major Water Laws of Bangladesh

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Abstract: *Water, as a core component of natural environment, requires ensuring its wise management along with other core components of environment. As a segment of environmental management (EM), water resource management (WRM) should be holistic and sustainable, for which 'integrated water resource management' (IWRM) is considered globally as an effective tool. There is a linkage between EM and WRM; and IWRM is practiced in many countries as a WRM mechanism. In Bangladesh context, preserving country's deltaic character and protecting the aquatic ecosystem require designing and implementing IWRM in a prudent manner which may lead to attain sound EM. Invariably, such implementation is a pressing concern for Bangladesh, as complex issues are associated with their applications. The challenges derive substantially from various developmental activities which have been taken, disregarding factors associated with the protection of the natural environment and aquatic ecosystem. Bangladesh has enacted ample of sector-based laws and policies, having direct and indirect bearing on WRM and EM, but these sectoral laws also have some lacking. The deteriorating state of overall natural environment, especially of the aquatic ecosystem, also corroborates the failure of the relevant governmental organizations to perform their statutory responsibilities. Therefore, this research article largely attempts to explore the linkage among the EM, WRM and IWRM, and their reflections in two vital water laws of Bangladesh along with their gaps and challenges. Upon reviewing different literature on these concepts, and analysing the Bangladesh Water Act 2013 and Bangladesh Water Rules 2018, it is found that the IWRM principles as prescribed internationally have fair reflections in these two national laws, though not all these principles have been recognized. Moreover, the IWRM principles which are already mentioned in these two national laws are, in most cases, applied lightly or even non-implemented, because of the relaxed exercise of institutional good governance, which is a persistent challenge for Bangladesh, affecting to secure sound EM as a whole.*

Key words: Environmental management in Bangladesh, governmental institutions, integrated water resource management, water laws, water resource management.

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1. Introduction

Nature is the finest blessing of the Earth. Over the passage of time, the natural environment has been facing progressive degradation by various human-made activities for economic development. As a result, securing sound environmental management (EM) becomes one of the pressing issues for the global community. Water, as a core component of natural environment, is a pre-requisite for the survival of all lives and for maintaining Earth's healthy eco-system. Water provides numerous services to humankind. It is a significant catalyst for human civilizations and an important input for any sectoral endeavor. Besides its value as a natural, cultural and ecological resource, water is also a commercial resource and recognized as an economic good. The cross-sectoral freshwater demand has a six-fold increase from its 1900 level[1] and by the year 2080 around half of the global community may live in water-scarce countries[2], resulting to enhanced water footprints and conflicts amongst its users. The current climate crisis and global warming phenomena may further intensify the water security and sustainability issues and may impact adversely on the Earth's natural environment and ecosystem. It is predicted that over 5 billion people may suffer in accessing sufficient freshwater at least a month of a year by 2050.[3] Being the primary water collectors for their families, women and girls collectively devote 200 million hours per day,[4] exposing themselves to further climate impacts.

To keep Earth's natural environment healthy, practicing a sound EM is imperative for every country. Besides other actions, it involves designing efficient water resource management (WRM), as different ecosystems need water for their healthy functioning. However, while deciding water allocation or making water policies or implementing any management plan, the necessity to protect the natural environment is often overlooked or less prioritized.[5] For WRM, different approaches have been applied by different countries. In the last few decades, the jargon 'integrated water resource management' (IWRM) has gained

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[1] USAID, 'Water and Development, Water Resource Management' (Technical Brief II, 2021), 2 <https://www.globalwaters.org/sites/default/files/usaid_water_wrm_tb_11_508_3.pdf> accessed 25 May 2024

[2] World Bank, 'Water Resources Management: Sector Results Profile' (2014) <https://www.worldbank.org/en/results/2013/04/15/water-resources-management-results-profile> accessed 25 May 2024

[3] USAID (n 1)

[4] USAID, 'WASH for women and girls'<https://2017-2020.usaid.gov/sites/default/files/documents/12-18-20_WASH-Fact-Sheet.pdf> accessed 27 May 2024

[5] Kees Leendertse, Steve Mitchell, Joakim Halin, 'IWRM and the environment: a view on their interaction and examples where IWRM led to better environmental management in developing countries',(2008) Water SA vol.34 n.6 Pretoria Jan., Online ISSN 1816-7950 <https://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S1816-79502008000600005>accessed 27 May 2024

a special importance and momentum globally as a better approach. However, in recent years, 'adaptive water management' is also thought of as an upgraded version of IWRM. Moreover, climate-smart mechanisms are to be applied to raise sustainability and resiliency.[6]

Like many other countries, Bangladesh has been experiencing mounting environmental issues including water issues. Consequently, the country has responded in taking steps to secure sound EM. As a part of EM, Bangladesh has been implementing various strategies of WRM and in recent years it has opted to implement IWRM; but in doing so, it is also struggling for numbers of reasons.

1.1 Objectives, Scope, Methodology, Limitation and Significance of Research

In this research article, attempts have been taken to: conceptualize the terms EM,WRM and IWRM and their inter-linkage; comprehend the general concerns and the current institutional and legal set-ups of Bangladesh associated with these terminologies; ascertain the mandates of various institutions and authorities as prescribed in two major national water laws of Bangladesh, namely, The Bangladesh Water Act 2013 and The Bangladesh Water Rules 2018; and identify the key gaps and challenges in these two water laws for applying the IWRM as part of better WRM, leading to secure sound EM.

For this article, both the primary and secondary literatures including statutes, policy documents, journal articles, institutional reports and news media reports are analyzed and reviewed. However, this paper shed light only on two key water laws, excluding few others from perusal, for example, The Groundwater Management for Agriculture Act 2018, The National Commission of River Protection Act 2013, The Bangladesh Water Development Board (BWDB) Act 2000, The Water Resource Planning Organization (WARPO) Act 1992, etc. This qualitative legal research is significant for the policy makers as they may consider, bringing necessary amendments, based on the gaps spotted herein, and also for the future legal researchers in enhancing their knowledge base.

2. Conceptualization of EM, WRM and IWRM

First it is necessary to clarify the different aspects of EM, WRM and IWRM as these concepts are interlinked. Understanding these concepts will help identify their reflections in the two major legal instruments of Bangladesh along with their challenges and gaps, as discussed in subsequent heads of this article.

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[6] Benson Turyasingura and others, 'Climate Smart Water Management Practices for Sustainable Agriculture in Uganda' (2024) Journal on Water and Climate Change, (2024), 15(7): 2940–2960 <https://doi.org/10.2166/wcc.2024.471> accessed 5 September 2024

2.1 Environmental Management (EM)

The commencement of industrial revolution around the globe invited multiple issues including the rise of mass environmental degradation. Shifting from agriculture revolution to industrial revolution for quick money by the global community has the lasting adverse impact on natural resources, environment and eco-system. It felt necessary to take required actions for environmental protection and to prevent injury to Earth's natural environment and its resources, resulting mainly from human-made activities. To reduce various environmental risks, better resource use planning is imperative for keeping improved physical surroundings.[7] For that, EM comes both as a process and a tool to ensure prudent exploitation of natural resources and to secure the environmental equilibrium and healthy ecosystem from various anthropogenic activities, leading to improved relation between man and his environment.[8] It handles two major aspects: ensuring socio-economic development; and keeping the biosphere and ecosystem stable. EM requires acts of individual persons, organizations, governmental agencies to conserve the natural environment and its resources, along with the ways of restoration when it faces any harm.[9] Some key features of EM include proper planning, framing comprehensive policy/regulations, doing environmental impact assessment (EIA), adopting techniques to reduce environmental pollution, protect biodiversity, encourage industries and communities to do sustainable practice and also requires its monitoring and adopting necessary improvements in the management plans.[10] Now a day, an accepted EM system for companies or industries is to maintain ISO 14001 standard.[11]

EM system acts as a process to guide an institution in attaining its environmental goals through reviewing, evaluating and upgrading its policies, plans and actions on environmental performance.[12] It is a framework to assess the

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[7] Law Insider, 'Environmental Protection Definition' <https://www.lawinsider.com/dictionary/environmental-protection> accessed 20 April 2024

[8] Environmental Pollution, 'Environmental Management: Concept, Scope and Aspects of Environmental Management' <https://www.environmentalpollution.in/environmental-management/environmental-management-concept-scope-and-aspects-of-environmental-management/361> accessed 20 April 2024

[9] Rajan Janardhanan, 'Water Management: A Key to Sustainable Development' (2021) DOI: 10.4018/978-1-7998-8327-2.ch023 <https://www.igi-global.com/chapter/water-management/285380> accessed 20 April 2024

[10] 'Environmental Management: Meaning, Feature, Objectives and Types, (2024), <https://www.geeksforgeeks.org/environmental-management-meaning-features-objectives-and-types/> accessed 25 May 2024

[11] Altan Dayankac, 'Environmental Management System', (DQS Group 2024) <https://www.dqsglobal.com/intl/learn/blog/environmental-management-system-the-ultimate-guide> accessed 25 May 2024

[12] US EPA, 'Environmental Management System' (2023) <https://www.epa.gov/ems/what-ems>

environmental impacts; set and appraise the goals and targets for reducing those impacts; monitor the EM performance of the use of environmental components. For planning and implementing a holistic EM, sustainable utilization of resources must be focused. Unless the indiscriminate industrialization for economic development is not regulated through proper EM, the environmental pollution and degradation may turn into an ecological nightmare. Advanced technologies should be applied to rectify the ecological brutality and to halt the environmental degradation and environmental management accounting is to be applied.[13] Institutional good governance (IGG) is crucial to establish to facilitate the whole process of sound EM. It is also necessary to hear people's voice, to consider the traditional knowledge of local and indigenous communities and to follow the good practices around the world.

2.2 Water Resource Management (WRM)

Water is an integral component of the ecosystem. With the increase of water footprints, various water issues are growing. WRM is initiated to address water related issues, especially to regulate issues regarding water projects or water developmental actions. WRM is usually a part of water cycle management and an essential component of broader EM.

Traditional WRM of the developed countries follows 'top-bottom' or 'top-down approach' (command and control approach) with a mechanism for stakeholder consultation on a given or specific water issue i.e. using of 'bottom-up approach' (grass-root approach). But unfortunately, in the developing counterparts, the 'top-down approach' in applied mostly, leaving a minimum scope to adhere the community views, using 'bottom-up approach' and ignoring other associated factors, demands and issues.[14] In many developing countries, such a faulty practice exists mainly to please and reflect the desires of the influential quarters, especially where the IGG is loosely exercised. Based on the 'top-down' approach, the typical WRM fails, since 1990s, to consider that the finite water resource is used for many purposes and most importantly these uses are interdependent and impacting each other.[15] For example, a country's high irrigation demand means

accessed 25 May 2024

[13] Pradip Kumar Das, 'An Introduction to the Concepts of Environmental Management: Indian Context' (2016) International Journal of Innovation and Economic Development, Vol.2, Issue 4, 25, 26

[14] Jonathan I. Matondo, 'A Comparison Between Conventional and Integrated Water Resources Planning and Management' (2002), Physics and Chemistry of the Earth, Elsevier Science Ltd., 27 (11-22) 831-438 <https://doi.org/10.1016/S1474-7065(02)00072-4> accessed 1 September 2024

[15] 'The Adaptive Water Resource Management Book', edited by Jaroslav Mysiak and others, (Earthscan Publishing, London 2010), 4 <https://www.pseau.org/outils/ouvrages/earthscan_ltd_the_adaptive_water_resource_management_handbook_2010.pdf> accessed 14 November 2024

less freshwater for drinking or household purposes; its untreated wastewater from industrial activities or municipal actions means loss to agricultural production, to contaminate rivers and to degrade ecosystems; to protect fisheries and aquatic ecosystems, less river water can be diverted to grow crops. The wasteful and inherently unsustainable use of scarce freshwater requires regulations.

Therefore, an ideal WRM covers measures to design different plans for addressing various quantitative and qualitative issues, emanating from multifaceted water uses. The factors associated with WRM need to be addressed properly including, capacity building, adapting with the situation and designing sustainable future plans.[16] As global climate change increasingly impacts on water resources, it is important to design effective management mechanisms, including desalinization and reprocessing of waste water.[17] Moreover, WRM is to be undertaken in a way that would help achieve a comprehensive EM in the given area, focusing not only the 'right-based approach' but also the 'ecosystem approach'. Therefore, the Global Water Partnership (GWP) recommends to involve insights of different fields for taking coordinated actions to develop and manage water resources with other resources.[18]

2.3 Integrated Water Resource Management (IWRM)

Since the traditional approach of WRM fails to cover the diverse aspects associated with sustainable WRM, the concept IWRM has been introduced, since last few decades. IWRM is an empirical concept, involving multidisciplinary actions in accelerating the sustainability approach.[19] It is a cross-sectoral policy approach that has been designed to substitute the traditional and fragmented approach of WRM, which often provides poor services and may lead to unsustainable use of resources.[20]

The concept of IWRM involves activities of planning, developing, distributing and managing the optimum use of water resource. It concentrates

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[16] Aqua Tech, 'Water Resource Management: Our Essential Guide to Water Resource Management Objectives, Policy and Strategies' (2023) <https://www.aquatechtrade.com/news/water-treatment/water-resource-management-essential-guide/> accessed 20 April 2024

[17] GRT, 'What is Water resource management?' (2021)<https://globalroadtechnology.com/water-resource-management-importance-challenges-techniques/> accessed 25 June 2024

[18] IWA Publishing, 'Integrated water resources management: Basic concepts' <https://www.iwapublishing.com/news/integrated-water-resources-management-basic-concepts#:~:text=IWRM%20is%20based%20on%20the,the%20benefits%20from%20its%20use%3F> accessed 30 June 2024

[19] Aqua Tech (n 16).

[20] UNEP, 'What is Integrated Water Resource Management?', <https://www.unep.org/explore-topics/disasters-conflicts/where-we-work/sudan/what-integrated-water-resources-management> accessed 28 June 2024

three inter-connected basic principles: social equity; economic efficiency; and environmental sustainability. To implement IWRM, it is necessary to: have the political will and commitment; set a clear vision and formulate a proper plan for efficient water utilization; ensure effective participation and coordination through information sharing and increasing the knowledge base; enhance institutional capacity building; formulate well defined legal and policy frameworks; set a flexible water allocation mechanism; secure financial sustainability; and also to establish a comprehensive monitoring and evaluation mechanism as part of the IGG.[21]

To foster IWRM process globally, the GWP was established in 1996 to facilitate networking among the organizations which are associated with WRM, for learning and sharing their experiences and works as partners. The GWP interprets IWRM as "a course of action that promotes a harmonized development and management of various natural resources, especially water and land, with the aim of optimizing the economic and social wellbeing efficiently, putting due regard on the sustainability issues of all vital ecosystem as well as natural environment".[22] Though dreamed in the first global Water Conference in 1977, but the specific IWRM implementation principles were prescribed by the Dublin Principles 1992[23], which contains four basic principles: i. recognizing freshwater as a finite and vulnerable resource and is essential to sustain life, development and the environment; ii. practicing the participatory approach at all levels for WRM and development; iii. endorsing the role of women in water safeguarding and management; and iv. recognizing water as an economic good for its competing uses. IWRM was also reflected in the Agenda-21 which was the first comprehensive action plan for sustainable development, adopted at the Earth Summit 1992. Subsequently, the UN Sustainable Development Goals (SDGs) also emphasized on IWRM.

There is no global fixed blueprint of applying the IWRM principles, as it varies from country to country due to the characteristics of water issues, ability of people and the institutions involved in the process, and the cultural and natural scenarios.[24] From analysizing the GWP instruments, it transpires that for an efficient IWRM, water resource is required to be managed at the lowest level; water supply/accessibility should be optimized for managing various water demands;

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[21] IWA Publishing (n 18)

[22] GWP-CEE, 'What is IWRM?' (2011),<https://www.gwp.org/en/GWP-CEE/about/why/what-is-iwrm/> accessed 14 June 2024

[23] UN Library, 'Glossary of Shared Water Resources', (2012) 63<https://www.un-ilibrary.org/content/books/9789210557184/read> accessed 06 September 2024

[24] GWP-TAC, 'Integrated Water Resources Management' (2000) (Technical Background Paper, No.4) 6 <https://www.gwp.org/globalassets/global/toolbox/publications/background-papers/04-integrated-water-resources-management-2000-english.pdf> accessed 06 September 2024

a mechanism comprising an integrated policy, regulatory and institutional frameworks to be established through an inter-sectoral decision-making approach with proper public participation; and the IGG should be practiced while managing resources to get an optimum result. The single action of applying IWRM would bring multiple benefits including the protection of global environment and ecosystem, improvement of human health, progress of economy, secure sustainable agriculture and effective participation in the decision-making process. Hence, IWRM has emerged as a standardized alternate of the sector-by-sector management using the top-bottom approach of management mechanism that was mass practiced earlier around the world.[25] In IWRM, the ecosystem approach gets much focus as a broad perspective than sector-specific water management agenda to attain sustainability through protecting ecosystem and water.[26] Furthermore, the practice of 'environmental democracy', involving transparency, participation and justice, is imperative to be reflected in the environmental decision making process, especially for natural resource management, leading to accommodate equitably the interests of citizens; for which 'access rights' as enumerated in Principle 10 of the Rio Declaration 1992 are to be ensured.[27] The 'access rights' particularly the freedom of expression regarding environmental issues have later reflected in the Aarhus Convention 1998.[28]

Based on the above discussion, it is transparent that there exists a co-relation among EM, WRM and IWRM and all these mechanisms are considered as the dynamic fields of applied research in which new thoughts emerge from time to time to encounter challenges impacting them. Therefore, it is crucial to enhance the multi-disciplinary knowledge base on these fields along with creating/ developing appropriate institutional, legal and policy frameworks. All these may help reverse the ominous degradation of the environmental components and ecosystems and in particular, the aquatic ecosystem. And for these, establishing necessary institutional and infrastructural set-ups and fund allocation are pivotal.

3.0 Common Concerns and Current Setups of EM and WRM in Bangladesh

Before analyzing the mandates under two major water laws of Bangladesh, it is necessary to understand some generalized concerns of EM and WRM as well as the institutional and legal set-ups as prevailed in Bangladesh.

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[25] GWP-SAS, 'About IWRM' (2018) <https://www.gwp.org/en/gwp-SAS/ABOUT-GWP-SAS/WHY/About-IWRM/> accessed 14 June 2024

[26] Kees Leendertse, Steve Mitchell, Joakim Halin (n 5)

[27] CIEL, 'Enviro Democracy and Access Rights' < https://www.ciel.org/issue/environmental-democracy-access-rights/#:~:text=Environmental%20democracy%20is%20based%20on,and%20equitably%20address%20citizens›%20interests> accessed 13 November 2024

[28] Bahreen Khan and Emdadul Haque, 'Linking Right to Water with Freedom of Expression: Bangladesh in Context' (2018) Dhaka University Law Journal, Vol 29, 117-139, 122

3.1 Common Concerns of EM and WRM in Bangladesh

The two-third of Bangladesh is placed in world's biggest delta, namely the Bengal Delta.[29] The country is prone to natural disasters for its geographic positioning which is exacerbated by global climate change phenomena, placing it at the 7th of the 2024 global raking in terms of climate vulnerability.[30] Bangladesh was once blessed with abundance of biodiversity and natural resources but in recent decades its natural environment and ecosystem has significantly degraded. Its environmental vulnerability is evident from the 2024 global list of Environmental Performance Index (EPI) in which out of 180 positions, Bangladesh placed 175 (177 in 2023) for the overall environmental performance and 168 (159 in 2023) for the ecosystem vitality.[31] Plethora of pollution, encroachment of public property, haphazard urbanization, inept developmental actions, loose IGG, isolated decision making, disregarding the value of ecosystem services, poor waste management, ignoring peoples' voice, bypassing the legal requirements are some of the instances, corroborating country's abysmal condition. With insane land-human ratio (1329 per km^2)[32], fueled by the thirst of becoming an upper middle-income country by 2041, its 'environmental needs' often subside by its 'developmental needs'. The sub-standard initiatives in protecting environmental components prove that 'environmental democracy' is yet to be mirrored in country's decision-making process which is necessary to ensure appropriate environmental governance.[33]

The predominant water issues of Bangladesh cover mostly the quantitative, qualitative and management-oriented aspects. Being the lowest downstream country of the Ganges-Brahmaputra-Meghna River basin, Bangladesh has no actual control on the upstream flow and watershed management of all its 57 transboundary rivers, resulting in flood in monsoon and draught in dry season.[34]

[29] Delta Alliance, 'Ganges-Brahmaputra Delta' <http://www.delta-alliance.org/deltas/ganges-brahmaputra-delta#:~:text=The%20Ganges%20Brahmaputra%20Delta%2C%20also,km2%2C%20the%20world's%20largest%20Delta> accessed 26 May 2024

[30] ADB, 'ADB Supports Climate Resilient Water Management in Bangladesh', (2024), <https://www.adb.org/news/adb-supports-climate-resilient-water-management-2024bangladesh#:~:text=News%20from%20Country%20Offices%20%7C%2013%20March%202024&text=Based%20on%20the%20Global%20Climate,and%20slow%2Donset%20climate%20events> accessed 11 November 2024

[31] Yale University, 'EPI Result, Bangladesh' <https://epi.yale.edu/country/2024/BGD> accessed 06 September 2024

[32] Worlometer, 'Bangladesh Population Live' <https://www.worldometers.info/world-population/bangladesh-population/> accessed 26 May 2024

[33] Bahreen Khan, 'Efficacy & Implementation Gaps in the "Core Environmental Laws" of Bangladesh: An Overview' (2022) Dhaka University Law Journal, Vol 33(Issue 1) 73-98, 77

[34] Faisal Ahmed, Abdul Kadir Ibne Kamal, Mohammad Hossain Bin Idrish , 'A Review of Current Water Governance in Bangladesh: A Case Study on Administrative and Performance of Water Policy' (2023) (SCIRJ, Vol, XI, Issue XII), 2, <DOI:10.31364/SCIRJ/v11.i12.2023.P1223973> accessed 26 May 2024

Historically, 770 rivers were found in Bangladesh, of which only 405 are flowing at present.[35] The dying rivers and their lean water flow impact adversely on biodiversity, environment, ecosystems, livelihood and almost on every sectoral development and economy of Bangladesh. Encroachment and siltation result in the shrinkage of water bodies to a large extent. The sharing trend of the flow of transboundary rivers evidences the hydro-hegemony of the upstream neighbouring country, bypassing international laws, which may further aggravate by the impacts of climate change.[36]

Different qualitative and quantitative issues are involved with WRM and EM in Bangladesh. Addressing water pollution is a tough issue in Bangladesh. Persistent water pollution emanates from different point and diffused sources, particularly by the industrial and other hazardous wastes, agricultural and chemical run-offs, oil spillage, micro-plastics, salinity intrusion, arsenic contamination and so on. The 'green revolution' promoted during 1960s for agriculture, using tech-dependent mechanisms, has resulted in lowering the groundwater level. Besides, the massive shift from 'agricultural revolution' to 'industrial revolution' without far-sighted planning has attracted the filling up of wetlands and the shrinkage of croplands at an alarming rate (0.26% annually from 1976 to 2011[37]). Overlapping and/or contradictory actions/projects initiated by different governmental agencies are aggravating the issue. Improper WRM and EM in the past had created problems and may come back with greater intensities and forms, unless due attention is given. The project to supply the water of River Madhumati from the rural area to Khulna city dwellers, ignoring the concerns of the rural people, is one glaring example of contradictory actions.[38] A proper prioritizing and balancing among cross-cutting demands, from planning through evaluation process of an activity/a project has often missed. The continuation of 'business as usual approach' hinders the implementation sound WRM and EM. On top, frequent occurrences of climate induced hazards may likely to intensify water issues in Bangladesh.[39] The frequent

[35] Pavel Partha, 'Dying Rivers in Independent Bangladesh', Daily New Age, 26 March 2024, <https://www.newagebd.net/article/228793/dying-rivers-in-independent-bangladesh#:~:text=Yet%2C%20a%20recent%20report%20by,have%20been%20lost%20since%20independence> accessed 26 May 2024

[36] Syed Hafizur Rahman and Shahriar Rahman, 'Climate Change and Water Resources' (2011), 4, <https://www.researchgate.net/publication/235707918_Climate_Change_and_Water_Resources> accessed 01 September 2024

[37] Hasan, M.N. and others, 'Agricultural land availability in Bangladesh', (2013) SRDI, 5 <https://srdi.portal.gov.bd/sites/default/files/files/srdi.portal.gov.bd/page/cf8c6249_b934_4a40_b1eb_ff3bffe24282/Agricultural%20land%20availability%20in%20Bangladesh-monograph-1%20(2).pdf> accessed 08 June 2024

[38] Sonia Ahmed and Neema Kudva, 'Bangladesh's Water Crisis and the Problem of a "Green" Solution', Aljazeera, 7 May 2023,<https://www.aljazeera.com/opinions/2023/5/7/bangladeshs-water-crisis-and-the-problem-of-a-green-solution> accessed 26 May 2024

[39] Md. Golam Rabbani, Saleemul Huq, Syed Hafizur Rahman, 'Impacts of Climate Change on

incidence of flood, cyclone and drought, may also expose to increased health risks[40] along with the forced migration of people due to water logging and salinity intrusion in the coastal districts.[41]

The primary focus on the exploitative uses of water resources for different sector-based developmental activities, surpass the sustainability issue and fail to balance between 'exploitative right-based approach' and 'conservation-based approach'. Despite of the political rhetoric of the duty bearers to conserve environment and different ecosystems through sound EM and WRM, the environmental components including water resources are facing various appalling conditions. EIA, an effective tool for sustainable WRM, is yet to follow strictly in Bangladesh.[42] Necessary financial allocation, to act systematically and sustainably and to build proper institutional capacity and infrastructure, is crucial.[43] The IGG with strong work ethics is rarely found, inviting the vested interest groups to materialize their personal gains. Several public interest litigations (PIL) have been filed to stop the encroachment and contamination of the water bodies of Bangladesh[44] but the rampant violation of the laws is continuing. News reports often written about the massive corruption of water supply authorities, for example, embezzlement of 332 Crore fund by governmental staffs,[45] and filling up of 68

Water Resource and Human Health: Empirical Evidences from a Coastal District (Satkhira) in Bangladesh' (2013) (Chapter 15 of Book, *Impact of Climate Change on Water and Health*) 272-285, 275 <https://www.researchgate.net/publication/258237353_Impacts_of_Climate_Change_on_Water_Resources_and_Human_Health_Empirical_Evidences_from_a_Coastal_District_Satkhira_in_Bangladesh> accessed 02 July 2024

[40] WHO,'Bangladesh,ClimateChangeandWASH',<https://cdn.who.int/media/docs/default-source/climate-change/bangladesh-climate-change-wash.pdf?sfvrsn=dc20a09e_3&download=true> accessed 01 September 2024

[41] Sowmen Rahman and Mohammed Ataur Rahman, 'Climate Extremes and Challenges to Infrastructure Development in Coastal Cities in Bangladesh' (2015), Elsevier, Weather and Climate Extremes, Vol 7, 96-108, <https://doi.org/10.1016/j.wace.2014.07.004> accessed 01 September 2024

[42] SM Zobaidul Kabir and Fazle Rabbi, 'Enhancing Environmental Management in Bangladesh Using Environmental Impact Assessment: Key Policy Recommendations' (2019 Conference paper) 3 <https://www.researchgate.net/publication/330872331_Enhancing_Environmental_Management_in_Bangladesh_Using_Environmental_Impact_Assessment_Key_Policy_Recommendations> accessed 01 August 2024

[43] Local Government Engineering Department, Government of Bangladesh, 'Updated Environmental Management Framework' (2018) 37, 40 <https://oldweb.lged.gov.bd/UploadedDocument/ProjectLibraryGallery/775/EMF%20RTIP-II%20(AF).pdf> accessed 4 July 2024

[44] Metro Makers Developers Limited and Others v Bangladesh Environmental Lawyers Association (BELA) and Others, 65 DLR (2009) AD 181 (Encroachment of Flood Flow Zone); Human Rights and Peace for Bangladesh (HRPB) v Bangladesh and Others, Writ Petition 3676 of 2010 (Buriganga River Pollution)

[45] Editorial, Daily Star, 'Cleanse Dhaka Wasa of Corruption' 22 November 2023 <https://www.thedailystar.net/opinion/editorial/news/cleanse-dhaka-wasa-corruption-3476036> accessed 10

ponds of Dhaka district, using illegal nexus of the vested interest quarters and corrupt government officials.[46] Most importantly, active public consultation in the informed decision-making process, constant monitoring and rigorous evaluation of projects and programs are lightly taken. All the above-mentioned factors affect the exercise of sound EM and WRM in Bangladesh.

3.2 Current Institutional and Legal Set-ups of EM and WRM in Bangladesh

On such backdrop of the existence of abundant environmental and water issues, Bangladesh has been investing its time and resources to establish sound EM and WRM. Ample national institutions, authorities, legal and policy instruments have been created to ensure WRM in Bangladesh. Moreover, Bangladesh is a party to many pertinent international legal instruments and has adopted the SDGs as well. To reflect the international commitments at the country level actions, Bangladesh is working but also facing challenges. 'Principle of wise use'- an internationally recognized cardinal principle, as postulated in the Ramsar Convention 1971, which emphasizes on maintaining the ecological characteristics of wetlands, based on ecosystem approaches within the context of sustainable development[47]; it is entwined with WRM and EM. It is yet to be explicitly mirrored in the policy instruments of Bangladesh and to be executed rigorously.

The Ministry of Environment, Forest and Climate Change (MoEFCC) is the umbrella ministry to accomplish the mandates of EM. Under the MoEFCC, the Department of Environment (DoE) is statutorily responsible to conserve the natural environment of Bangladesh. The Ministry of Water Resources (MoWR) is principally responsible for implementing WRM and particularly IWRM through its various subordinate agencies and institutions, including the BWDB and the WARPO. As EM and IWRM involve cross-cutting actions of different line ministries, several line ministries are also associated with WRM actions as per their own mandates; for example, the Ministry of Local Government, Ministry of Land, Ministry of Navigation, Ministry of Fisheries and Livestock, Ministry of Industries, Ministry of Agriculture. However, the weak institutional capacity and poor regulatory mechanism act as a barrier in promoting sound WRM in Bangladesh.[48]

The country has formulated numerous legal and policy instruments having

September 2024

[46] Editorial, Daily Star, 'Dhaka Needs Its Water Bodies Back' 9 February 2024, <https://www.thedailystar.net/opinion/editorial/news/dhaka-needs-its-water-bodies-back-3540071> accessed 06 September 2024

[47] 'Ramsar Concept of Wise Use', Ramsar Information Paper No. 7 <https://www.ramsar.org/sites/default/files/documents/library/info2007-07-e.pdf> accessed 30 October 2024

[48] Abdullah Al Faruque, *Environmental Law: Global and Bangladesh Context* (1st Edition, New Warsi Book Corporation, Dhaka, 2017), 286

direct/indirect bearing on EM and WRM. The National Environment Policy (NEP) 2018 stresses upon ensuring water security for all and provides 42 sub-policies to implement IWRM for securing EM. For example, environmentally sound use and preservation of water resources, ensuring proper stakeholder consultation; doing EIA for any water development project; keeping the environmental flow of water resources; assessment and prevention of water pollution including of the trans-boundary water; ensuring more use of surface, than ground water; water audit and pricing, based on annual recharge and aquifer capacity; afforestation along the riverbanks and ensuring to conserve swamp forest; doing economic valuation of wetlands; introducing the payment for ecosystem services; addressing the upstream catchment issues. The Bangladesh Environment Conservation Act (BECA) 1995 along with several Rules have been framed to ensure sound EM through preventing pollution and degradation of ecosystem, and initiating remedial measures.[49]

The National Water Policy (NWP) 1999 declared to take all necessary measures to ensure a comprehensive, integrated and equitable WRM, for fulfilling the national goals of economic development, poverty alleviation, food security, public health and safety, decent standard of living for the people and protection of the natural environment. Subsequently, the National Water Management Plan (NWMP) 2004 and the National Strategy for Water Supply and Sanitation 2021 have been adopted to practice a comprehensive WRM. Recently, the Bangladesh Delta Plan (BDP) 2100 has been framed to protect the future of water resources and lessen the probable impacts of climate change and natural disasters. It emphasizes on 'adaptive water management' (ADM) mechanism to secure the goals of BDP which complements the IWRM mechanism. ADM aims to add addressing the uncertainty within the complex management system, adopting a systematic perspective.[50]

The Constitution of the People's Republic of Bangladesh 1972, in article 18A, has recognized the conservation of environment and wetlands as a fundamental principle of state policy which is judicially unenforceable. Though 'right to environment' and 'right to water' are not explicitly declared as fundamental rights but through the judicial interpretation of 'right to life' as enshrined in article 31 and 32, 'right to healthy environment' has been integrated within 'right to life'.[51] Considering the deplorable condition of rivers, the Supreme Court of Bangladesh has declared that all the rivers of Bangladesh are 'living entities', requiring the National Commission for the River Protection to act as their legal parents

[49] Bangladesh Environment Conservation Act 1995, s 4, 5, 6E, 7, 9

[50] The Adaptive Water Resource Management Book (n 15) p 7

[51] Mohiuddin Farooque v Bangladesh and Others, Writ Petition No. 891 of 1994 (Tannery pollution case)

to address the issue.[52] There is plethora of laws which are directly or indirectly connected with water resource management and pollution control but their implementation is not satisfactory.[53] To implement IWRM and to ensure better water governance, two major water laws, namely the Bangladesh Water Act 2013 and the Bangladesh Water Rules 2018 have been framed, through which several authorities at different tires are created to deal the same.

4. Key Mandates Under Two Major Water Laws of Bangladesh

In this head, the statutory obligations under two significant water laws of Bangladesh have been identified. It will help assess the challenges of the various authorities, as created under these two laws, in implementing IWRM as a holistic mechanism of WRM, which may help secure sound EM in Bangladesh.

4.1 Salient Features of Bangladesh Water Act (BLA) 2013

The demand uttered in the NWP 1999 to enact a comprehensive water law for Bangladesh has substantially been materialized through the commencement of the BLA in 2013. Its objective is to ensure the integrated development, management, abstraction, supply, use, protection and conservation of water resources, meaning to ensure better WRM, through IWRM. The BLA declared that the people's ownership of national water is vested upon the State, and the right to potable water and water for hygiene and sanitation is recognized as the top priority right.[54]

From its 47 sections, spreading over 7 chapters, the significant features of this Act are as follows:

Definitions: - Different types of water bodies (e.g. aquifer, ground water, surface water,) are defined in Section 2. Clause 14 defines 'water resource' as the surface water, groundwater, rain or atmospheric water and also includes estuary, aquifer, floodplain, wetland, water reservoir, foreshore, coast or any other place containing water.

Committees: -The National Water Resource Council (NWRC) is created, under section 4, as the apex authority, comprising of the Prime Minister as its Chairperson with 40 plus members representing various ministries, governmental agencies, engineers, members of the Parliament (MP), water resource experts and an NGO. The Executive Committee of NWRC (ECNWRC), consisting of total 24

[52] Nishat Jute Mills Ltd. vs Human Rights and Peace for Bangladesh and Others, Civil Petition for Leave to Appeal No. 3039 of 2009

[53] Mohammad Ershadul Karim, "Bangladesh", in *International Encyclopedia of Laws: Environmental Law*, ed. Kurt Deketelaere and Alphen aan den Rijn, (Kluwer Law International B.V. 2024), 93

[54] Bangladesh Water Act 2013, s 3

members (mostly members of NWRC), is formed, under section 9, to ensure the efficient performance of the functions of the NWRC.

Powers and Functions: - Ample powers and functions are mentioned in the law[55]. The main functions of the NWRC are to: set appropriate policies; give necessary instructions to develop IWRM; approve and implement the NWMP; advise the MoWR to enter into relevant international agreements/treaties and to undertake necessary survey, training on trans-boundary waters.

Diverse functions of the ECNWRC include: ensure inter-sector/ministerial coordination, discussion and dispute settlement on planning and development; submit the draft NWMP to the NWRC for approval and monitor its application; issue, suspend, reject, publish and circulate the compliance order, removal order, protection order, project clearance certificate (PCC); do survey and take public opinion at Water Stress Area (WSA); fix safe yield for groundwater abstraction; demarcate boundary of water bodies as potable water source, bird sanctuary, water zones; impose restrictions to ensure the smooth waterflow in any declared flood control zone; enter anywhere for enquiry, investigation, sample collection, survey; realize compensation from and request to freeze the bank account of the violator.

The MoWR is obliged to: enter into international agreements on trans-boundary water; formulate and adopt the NWP, conducting public hearings and taking opinions of communities and relevant organizations; declare a WSA.

The WARPO is directed to: provide all administrative/secretarial support to the ECNWRC; implement the policies and strategies adopted by the NWRC/ ECNWRC; prepare relevant proposals for submission to the NWRC; inspect any site/project area; take steps for public awareness; prepare a NWMP to exercise IWRM. It is empowered to seek assistance from any organization for performing its functions.

Prohibitions: - Unless otherwise approved, it is prohibited to: stop or hinder the natural water flow, constructing any structure or filling up with earth or extracting sand/mud therefrom; build any flood control structure; store water from any natural/artificial water source; abstract/drain water completely from any public water source.[56]

Punishment: - The maximum punishment is fine of Taka 10,000 or imprisonment for 5 years or both. For violating the compliance order or protection order for the first time, the offender and the abettor may be exonerated from the charge, upon paying such compensation and on such grounds and manner, as

[55] ibid, s 5, 7, 8, 10, 12-19, 22, 23, 25, 27, 40-43

[56] ibid, s 20, 21, 24, 26

mentioned in the BWR 2018.[57]

Enforcement: - The offences are non-cognizable and bailable in nature with the power of summery trial, following the Code of Criminal Procedure (CrPC), 1898; but a written complaint from the Director General (DG) or the authorized officer (AO) of WARPO, is essential for taking the cognizance of an offence by the court.[58]

It entails to apply the BECA 1995 to deal water pollution; and the Information and Communication Technology Act, 2006 and the Right to Information Act, 2009, to collect necessary information. It allows the delegation of authority to any organization, as and when necessary; consequently, the WARPO is delegated as such.[59]

4.2 Vital Provisions of Bangladesh Water Rules (BWR), 2018

For the proper implementation of the BWA 2013, the BWR 2018 elaborates various aspects of IWRM in 14 chapters- containing 52 rules and 48 forms. The vital provisions are mentioned below:

Definitions: - It has some necessary definitions. It incorporates IWRM through the term 'integrated water resources development' (IWRD) which is the process of attaining the optimum level of economic and social welfare without damaging the natural equilibrium, through proliferating the integrated development and management of water, land and their related resources; and it defines 'overall plan' as the short/medium/long term plans, adopted for integrated development of water resources.[60]

Committees: - Few committees and an authority have been created to perform various functions, requiring them to meet in at least in every three months.[61] To represent the ECNWRC, the Project Clearance Issuance Authority (PCIA) is formed, comprising of the DG, WARPO, the District Administrator of the concerned District Integrated Water Management Committee (DIWMC), the *Upazila Nirbahi* Officer (UNO) (Sub-district level administrative officer) of the concerned Upazila Integrated Water Management Committee (UIWMC) and the Chairman of concerned Union Parishad Integrated Water Management Committee (UPIWMC).

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[57] ibid, s 29-31, 34, 35

[58] ibid, s 32, 33, 36

[59] ibid, s 28, 38, 44

[60] Bangladesh Water Rules 2018, r 2 cl 21, 31

[61] ibid, r 13-18

Each DIWMC, UIWMC and UPIWMC consist of 20, 17 and 13 members respectively, representing different governmental institutions, including agriculture, fishery, water resource, public health, local government, navigation, industry, trade and commerce, development authority, environment, disaster prevention, etc. The local MP may advise the DIWMC and additional members may also be co-opted, if necessary. Moreover, there are the Technical Committee (TC) of the WARPO and the designated TC for each district, upazila and union parishad for doing various technical assessments, comprising of 3 to 5 persons.

Powers and Functions of Committees: - The PCIA[62] may: issue/reject the PCC to initiate, formulate and implement any 'water resource development project' or 'similar activity, program or initiative' or to construct any work for hydraulic infrastructure, river bank protection, dredging, etc.; assist the WARPO; preserve all necessary reports, records and registers as public documents or destroy those after expiration of a certain period of time as directed by the MoWR, unless it requires the permanent preservation; record, preserve and make correction in the register book regarding the PCC application and other additional documents, if necessary; supply a signed attested copy of any issued PCC, within the time as prescribed by the WARPO; establish and preserve a reliable and computerized database of water resources.

The prime functions of DIWMC, UIWMC and UPIWMC include to: recommend the issuing/cancelling of a PCC, compliance order, removal order, protection order; approve any water resource development project; assist, coordinate, guide and monitor any such activities undertaken by other agency; comply the directions of and submit necessary reports to the WARPO; follow any government guidelines to implement the IWRD and its sustainable management; initiate PCC applications; preserve a database and share necessary data and information with others.

PCC Requirements: - Projects which require a PCC include: flood control and management; surface and ground water abstraction, supply and use; irrigation through surface water; hydraulic infrastructure construction; water conservation; flood flow zone development; surface water uses for industry; conservation of river bank and river training; river dredging and river or canal excavation/re-excavation; fishery development in surface water; or for any other project which the DG thinks necessary. PCC applications must mention the estimated project costs and the remedial plan of any adverse effect. Depending on the estimated costs, the relevant committee or the TC-WARPO or the particular TC may take appropriate actions[63].

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[62] ibid, r 47, 49-52

[63] ibid, r 19-25

As per rule 22, the TC must verify whether the proposed project is in conformity with the NWMP and peruse the documents submitted. It must check whether the project will: involve the use of surface water; impede the flow of or close the connection between any river/canal with the floodplain, and its remedial measures; create any water-logging in any place; drain the water completely from any water reservoir; contradict with any existing rights of water use; obstruct the flow of any coast, foreshore, etc.; pollute any surface water; ensure public participation and people's ownership while planning the project. The TC has to prepare a reliable technical report, assessing the positive or negative impacts of the proposed project on water resource, following the directions/guidelines of the NWMP/other documents, and by the NWRC/ECNWRC/WARPO. It may: seek advice from the WARPO/other professionals; arrange hearing; enter any place to collect samples; ask for any additional document; or may recommend rejecting the application.

Various Responsibilities of WARPO, MoWR, NWRC, and ECNWRC: - Though the BLR mostly obligates the WARPO to perform various functions but the MoWR, NWRC and ECNWRC also have some functions. Their key functions[64] are summarized below:

i. **Scientific Assessment on Water Demand: -** To fix peoples' daily water demand and availability limit for drinking and domestic uses, it entails doing necessary scientific assessment of the geographical position and the distance of water sources.

ii. **Scientific Assessment, Survey & Remedial Plan for WSA: -** Scientific assessment reports to be made, based on the survey of the socio-economic and environmental impacts and the actual cause of water stress in an area for declaring as a WSA by the MOWR (with a list of priority water uses and restrictions). It should consider whether: the safe yield limit of surface/ground water has exceeded in that area, based on the published survey report; there exists an excessive level of water pollution or any transformation of the water source or any other scientific, socio-economic or environmental factors. It also requires taking appropriate remedial steps, consulting local people; developing an immediate and long-term plan of remediation; initiating monitoring mechanism; and imposing necessary restrictions.

iii. **Inspection & Detention: -** It obligates to prepare an inspection report, upon inspecting any premise/project, at least twice a year and for detaining necessary documents/records, tools, and for taking legal action, following the CrPC (unauthorized things removal costs to be borne by the guilty person).

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[64] ibid, r 3-12, 17, 26-45, 48

iv. **Capacity Building & Database: -** Preserve all the data of trans-boundary rivers and water resource in the National Water Resource Database (NWRD); assist the Joint River Commission (JRC) of Bangladesh in the scientific research and survey; provide water data (except classified ones) to any person/organization; arrange/participate in relevant training, workshop, research, etc. for capacity building.

v. **Formulate/Update NWP & Guidelines:** - It directs to conduct relevant stakeholder consultations and public hearing; publish the draft NWP; fix the water price, upon considering the drinking water conditions, ecosystem services, equity, pollution, water availability and scarcity, quantity of water use, cost of water treatment, water users' economic ability, the cost of water supply, etc. Moreover, necessary guidelines may be framed for ensuring IWRM for each committee.

vi. **Hearings & Public Notices:** - Appropriate hearings should be arranged before issuing the compliance order, removal order and protection order; publicize these orders and decision of WSA through public notices in the print and electronic news media, for public awareness. These orders must mention the time limit and necessary directions on permitted and prohibited activities.

vii. **No Objection Certificate (NOC) Requirements:** - NOC is required for installing a tube well to extract groundwater for agricultural purpose, using 'suction/force mode' method, upon satisfying that the proposed installation would benefit the area without adversely impacting the environment, underground water storage and water quality. For this, a site inspection report must be prepared mentioning: the aquifer condition of the site; nearest distance from an existing tube well and its impacts on water extraction; short description of the probable sites to be benefitted by such installation; probable impacts on tube wells used for drinking and domestic use; feasibility of the site for installation; and the conditions to be imposed. A NOC may be suspended temporarily for maximum 45 days for violating its conditions and be cancelled, hearing the accused, if it was suspended for 3 or more times in the previous year. However, a NOC is not required for tube wells used for drinking and domestic purposes or to extract up to 0.5 cusec of groundwater by a shallow tube well for any agricultural purpose. The purpose as mentioned in the NOC should not be altered. Tube wells which were installed before the enforcement of the BWR also need to obtain the NOC.

A project to extract, supply and use groundwater also requires a NOC from the WARPO, upon submitting the relevant papers and the remedial plan against any adverse impact. The NOC is not transferable, unless the WARPO permits. Before that, the TC must review whether the proposed project will: be implementable, using the surface water instead of groundwater; involve lowering the aquifer level and be remedied; adversely impact any existing similar project,

nearby; involve extracting groundwater, crossing the safe yield level; be used otherwise than its declared objective; contradict any existing water right; provide a way of water recharge after extraction; adversely impact the surface water or environment through its released water; likely to interfere any public interest, if implemented. The applicant must give an undertaking to follow all conditions of the NOC.

viii. **Grant/Rejection of Approval for Construction:** - An approval is required to construct any infrastructure, fill up or extract soil/sand, which may obstruct or divert the natural flow of any wetland; and to hold water in any natural/ artificial reservoir. For these, the TC must check whether it will: be compatible with legal provisions; close the connection between a river/canal with the floodplain and be remedied; impede the natural flow of any river/canal; create water-logging in the adjoining floodplain; pollute the adjoining wetland or surface water; provide the remedial measures for an identified adverse impact; drain out water totally from any adjoining water reservoir; contradict with any already existing right of water use; increase salinity of any coast, reservoir or place; pollute any adjoining surface water; ensures public participation. However, to regulate water storage, conditions may be imposed, issuing a protection order.

ix. **Flood Flow Zone:** - Wetlands may be declared and published as flood flow zones, doing necessary investigation, survey or technical assessment to identify the boundaries of rivers, canals and the catchment areas, as classified in different governmental records. The structural construction is allowed in the flood flow zone, if the WARPO gives prior approval. It may prohibit/restrict any activity that obstructs the flood water flow in any area or diverts the flow of any reservoir. The water pollution data may be collected from the DoE or any other reliable source for assessment and report submission.

x. **Complaint Settlement Procedure:** - A complaint against an accused should be investigated by an investigation officer (IO), ensuring natural justice. The investigation report must mention, whether the accused is guilty or not, the amount of pecuniary damage if proved guilty for the first time. But if the accused disagrees to pay the fine, a formal written complaint may be lodged as per CrPC. If it is proved, the fine will be recovered as a public demand under the Public Demands Recovery Act 1913. The fine may be double the amount of the damage done or Taka 50,000,00, whichever is less, for violating the compliance/protection order and with power to freeze the bank account of the defaulter/accused. These investigation proceedings are confidential and requires keeping the records as the evidentiary proofs. An aggrieved person may prefer an appeal to different appellate authorities (UIWMC, DIWMC, WARPO, and ECNWRC) within 30 days of the issuance of any decision/order or the rejection/cancellation of a PCC/ approval/NOC. It is to be disposed of within 60 days and be treated as final; and

the PCIA will take necessary steps based on the decision of the appeal.

5. Findings & Gaps to Implement IWRM under the BWA and BWR

5.1 Findings: - As the foundation of IWRM was laid through the adoption of the Dublin Principles 1992, it is necessary to analyse to what extent, the BWA 2013 and BWR 2018 have integrated the Dublin Principles, i.e. recognizing the necessity of water resource, though finite, for the sustenance of life and environment; ensuring participatory actions for WRM; acknowledging the role of women for water safeguarding; and recognizing water resource as an economic good for its diverse use. The essence of IWRM, as postulated by the GWP, is practicing harmonized development of various natural resources and particularly water and land, allowing the economic and social welfare without making the vital ecosystems and environment unsustainable.

It is clear from the perusal of the core provisions of the BWA and BWR that both the laws envisage and are framed to ensure the exercise of the IWRM. Both the legal instruments have numerous provisions which match mostly with the globally prescribed requirements of IWRM, though not all. Both legal instruments have created specific authorities at different tiers, from local to central, to do IWRD, which supports IWRM. As these authorities comprise representations from different governmental agencies, it surely complements to consider and incorporate different perspectives. The laws elaborate the specific roles and responsibilities of these authorities, indicating to practice holistic water governance. These laws enumerate enough provisions to check and verify various socio-environmental and economic factors, necessary to issue the PCC, NOC and other approvals; obligate assessing the groundwater aquifer condition, considering water as a finite resource which is recognized in the Dublin Principles. Both laws direct ensuring public participation in the decision-making process through consulting local people; enhance capacity building of the duty bearers for effective WRM; and create awareness through publishing notices. All such provisions reflect the participatory actions as prescribed in the Dublin Principles.

Adopting required plans and doing various assessments, inspection and survey as entailed in these two legal instruments are helpful for the sustenance of life, development and environment as mentioned in the Dublin Principles. To conserve the standards of water resources, other environmental components as well as ecosystems, these laws prescribe different regulatory mechanisms, including taking PCC, NOC, approvals and orders along with prohibitions on doing acts which will damage ecosystem and obstruct the natural flow of water. The BWR provides huge fine for the wrong-doers, as the water resource of Bangladesh is already becoming vulnerable, requiring the application of IWRM. Hence, if these legal provisions are truly applied by pertinent stakeholders, it is

possible to implement the IWRM which may ultimately help securing sound EM in Bangladesh.

5.2 Gaps: - Despite the incorporation of some good provisions in the BWA and BWR, the most important challenge is to notice their adequate and timely reflections on ground. Bangladesh has made many good laws with adequate provisions but having those been implemented, the position of the country would have been placed upper in the EPI ranking; but sadly not. In Bangladesh context, the IGG is seldom practiced or loosely applied in almost every administrative set-up. The abuse and/or misuse of power and resource are commonly found. Negligence in performing the statutory duties and functions invites extra sufferings for the stakeholders. No significant change in exercising the IGG is visible. Corruption is another common national issue which is found in every sectoral endeavours.

While issuing any order, PCC, NOC or approval under these laws, the vested interest groups often provoke/offer the government officials to accept 'gifts' either in cash or kind for evading the statutory requirements of obtaining those orders. The 'development-environment' nexus often turns down by the corrupt 'politician-industrialist' nexus. The honest duty bearers may encounter coercion for not nodding to a disqualified application or may receive a transfer letter to be posted at remote places. The monitoring mechanisms of any project/ programme do not work properly. All these are the result of missing transparency and accountability of the duty bearers. No solid evidence is seen so far in taking any strong departmental actions against the corrupt officials. The massive politicization of the governmental institutions by the local political goons is a substantial threat to ensure sound environmental and water governance.

Moreover, the BWA and BWR contain few gaps which obstruct in applying the IWRM to some extent. For example: the NWRC and ECNWRC are loaded with the representatives of various governmental agencies with negligible numbers of civil society or NGO representation. It means, voice of private entity may overturn by majority votes of the government officials. People's right to get direct access to justice is denied, as a written report from the concerned governmental authority is required for courts to entertain cases. Besides, the offences under these laws are to be tried by the regular courts only and cannot be tried under the Environment Courts for securing speedy trial. Even, these laws have no mention of forming a Water Tribunal to provide speedy trial. The punishment spelt out in the BLA have no minimum limit which is totally frustrating and not acceptable, leading to impose any amount which the influential offenders seem negligible. It otherwise invites to commit offences and most importantly the offences are bailable in nature, giving a wrong signal to the offenders. On the contrary, the gravity of water related offences are profound in causing huge harm to natural environment, ecosystem and biodiversity as well as may impede the sustainable

development pathways.

Water pollution is a grave concern for Bangladesh but none of these two legal instruments have any clear guideline to address it and by what time, except sending a report to the ECNWRC upon collecting the information from the DoE and to follow the BECA 1995. These laws nominally deal with the preservation of aquatic biodiversity and habitat. The degradation of aquatic ecosystem and living resources through micro-plastic is a massive threat, requiring specific provisions in these laws. The huge responsibilities of the ECNWRC are delegated to the WARPO, whereas the WARPO has its own statutory responsibilities under the WARPO Act 1992 to perform, which may hamper in producing its performance efficiently and in right time.

As per the BWR, the PCIA is responsible for granting a PCC, but it has no member representation from the DoE, leading to less prioritizing the environmental and ecosystem related issues. Besides, there is no clear timeline for obtaining PCC, NOC, approvals, orders and to complete the investigation by the IO. This may bring frustrations among the applicants and also invites a scope for doing corruption or bypassing the laws. The BWR also left open in fixing the fees for obtaining various services from different appropriate authorities. This creates a possibility of gaining unfair advantage from the applicants. No procedure for doing public consultation or public hearing is mentioned in the BWR which also leave a scope for an eye-wash of this crucial requirement of the IWRM.

The requirements of the Dublin Principles in recognizing water resource as a finite and vulnerable resource is not clearly spelt in these laws. Moreover, none of these two instruments recognize and incorporate any provision particularly on the role of women in safeguarding water resource.

Therefore, it can be said that the aspects related with the IWRM are much recognized in these two legal instruments. But the principal challenge is to implement those on ground. For that, focus should be given to rigorously implement the IGG so that the duty bearers remain accountable at all time. Justice needs to be given promptly whenever attempts to infringe or bypass the laws are detected. An impartial execution of these laws along with other legal provisions is necessary for better resource management and water governance. The sub-policies as mentioned in the NEP 2018 match with the core requirements of the IWRM. The reflections of these policies in the BWA and BWR may help secure sound EM. Suitable mechanisms require to be chosen for its best implementation, ensuring stakeholder consultation. As monitoring is a big part of prudent WRM and EM, the ‘carrot and stick’ approach can be a good option to start with. Most importantly, the gaps as identified in this head need to be considered for better execution.

6. Concluding Remarks

The importance of EM and WRM is felt globally and also has been exercised around the world. Water resource, as an integral part of nature and environment, has been degrading rapidly, both in quantity and quality. The water footprints are increasing alarmingly throughout the globe; hence, a comprehensive WRM is looking for by every nation. So far, IWRM is the most recognized management mechanism and is applied by many countries. The precise exercise of the IWRM may help secure the sound EM in countries, including Bangladesh.

Bangladesh, as a climate vulnerable country with poor environmental performance, needs to take systematic programmes to lower down the environmental perils. All the environmental components, including water resources should be conserved for their sustainable use by the posterity. The country has numerous legal and policy instruments to apply effective EM and WRM. The BWA and BWR are the two most significant legal instruments which have adopted the IWRM as the term IWRD, though they do not accommodated all the principles of Dublin Principles. There are many governmental agencies and NGOs working in these fields, requiring a proper coordination among the stakeholders. For sound EM and WRM, it is pivotal to engage local people in the management mechanism as it will give them a sense of belonging with the actions which are implementing in their localities. Empowered and informed peoples' participation is to be ensured to get better results. Country's environmental governance and water governance should complement each other so as to ensure sustainable natural resource management. Moreover, the myopic view towards gaining instant cash return through the so-called economic development should be broadened to appreciate and value the services derived from natural environment, ecosystem and every natural resources. The economic valuation of the services provided by these natural resources should be accounted for. Different adaptive management mechanism should be explored to cope with natural adversities. Designing robust and resilient strategies to achieve and secure sound EM, through the adoption of the IWRM, ADM and 'wise use concept' should be reflected in the relevant legal and policy instruments of Bangladesh. Unless the environmental standards are not conserved, the people of Bangladesh will struggle more, especially by the frequent occurrence of climate and non-climate vulnerabilities. For that, appropriate capacity building, funding allocation and practicing the environmental democracy and IGG should be stressed into by the decision makers. Ensuring sustainable use and management of resources may help Bangladesh become economically and socially stable and be followed as a learning example for countries having similar socio-economic set-ups.