Policy Brief

A Roadmap for Nature-based Solutions in Bangladesh: Promises and Challenges

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Nature-based solutions (NbS) are receiving international attention for helping us to adapt to and mitigate the effects of climate change, whilst protecting biodiversity and supporting sustainable development. As such, NbS provide a way to enable economic development without ecosystem loss or damage. Bangladesh has a long history of implementing NbS but has faced challenges due to lack of robust design, long-term finance flows, monitoring and evaluation, institutional structure, and evidence of effectiveness. Sound ecosystems stewardship can help Bangladesh develop, whilst also allowing for widespread implementation of NbS across the country. Thus, better evidence, governance, and coordination is needed for NbS to effectively support development goals and economic growth.

Growing momentum for Nature-based Solutions (NbS)

Nature-based Solutions (NbS) involve working with and enhancing nature to help address societal challenges, whilst also supporting the economy and protecting biodiversity. NbS arise from a fundamental relationship between humans and nature that supports human well-being, instead of encouraging unsustainable economic development that is detrimental to both nature and human wellbeing. NbS bring together diverse communities of climate change, biodiversity and development practitioners. According to the 2019 IPCC Climate Change and Land Report, NbS have the potential to reduce net CO_2 emissions by 30% by 2030 and keep global warming to <2 °C. (Seddon et al., 2020). Acknowledging the value of the ecosystem services provided by intact ecosystems is absolutely essential for a sustainable future. NbS have been prioritized in recent major events, such as the UNSG Climate Action Summit, held in New York in 2019, which gave rise to a new outcome, where humans should strive "to match with nature and blend it in the development efforts". Meanwhile, the World Economic Forum's Global Risks Report (2020) specifically recognises the risks posed by biodiversity loss and ecosystem collapse and the need for nature-positive business solutions. NbS are increasingly being viewed as a way to reconcile economic development with the stewardship of ecosystems and, in doing so, effectively enable sustainable development.

What are NbS?

Nature-based Solutions (NbS) are emerging as a trans-disciplinary approach that can be defined as "actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits" (Cohen-Shacham et al., 2016). NbS is an umbrella term that unifies a plethora of actions which involve cooperation between people and ecosystems. NbS cover a wide range of ecosystem-related approaches, including Ecosystem-based Adaptation and Mitigation (EbA & EbM), Ecosystem-based Disaster Risk Reduction (Eco-DRR), and Green Infrastructure (GI). These approaches address socio-environmental challenges, ranging from food and water insecurity, health risks to climate change, and risks from natural disasters. NbS also offer low-cost and low-risk solutions in comparison to traditional expensive grey engineered solutions. NbS protect and restore natural ecosystems and support biodiversity conservation with the use of diverse native species. NbS can play a key role in securing climate change mitigation and adaptation services, while also contributing to cultural ecosystem services. NbS promote a bottom-up approach to protect people and nature from multiple hazards and bring long-term benefits (Seddon et al., 2020).

Bangladesh has the potential to champion NbS as a way to ensure future sustainability, having rich biodiversity and a fast-growing GDP. Article 18.A of the Constitution of Bangladesh encourages the protection and improvement of the environment and biodiversity, as well as highlighting the need to conserve biodiversity for present and future generations. The long-practiced local knowledge of this country also needs to be protected during the country's development. Thus, it is important to work with different communities in a co-creative manner in order to preserve what we have and restore the damage that has been made, so that Bangladesh can be the leading nation on NbS in future. Economic development should not be carried out in isolation from nature. In order to ensure sustainability, economic development should occur hand in hand with the protection of Bangladesh's rich ecosystems.

This policy brief summarises the findings on the current scope and the future role of NbS in Bangladesh, in both the development and climate change fields, explored during the consultation workshop on Nature-based Solutions, high level learning hub event with the Bangladesh Planning Commission, and several other webinars and discussions which brought together a diverse range of stakeholders. These events and discussions are the building blocks of this brief, which aims to enhance the understanding on NbS and to develop a roadmap for increasing their implementation in the region, through the establishment of an NbS network which would be based in Bangladesh.

Context of NbS Practice in Bangladesh

NbS have been practiced in Bangladesh for many years so are not a new concept. Different projects undertaken by relevant ministries, government departments, INGOs, and NGOs on diverse ecosystems showed varying degrees of success or failure. This section will highlight some of the practical examples of implementing NbS in different sectors.

When we consider forest ecosystems, we can see that **coastal afforestation** activities started in Bangladesh back in 1965. Since then, the Bangladesh Forest Department (BFD) has continued the practice and has established plantations in 209,140 hectares of coastal area. These plantations prevent coastal erosion and trap sediment by slowing down the current, reducing the loss of lives and damage to properties caused by natural disasters. There are still a number of challenges to this project, such as a lack of full community participation, issues relating to the ownership of the forest, poor selection of the correct species for the area and ineffective policy practice. Additionally, it is hard to value coastal ecosystem services, and therefore hard to quantify the benefits provided by NbS.

In wetland ecosystems, NbS is practiced in the north-eastern part of Bangladesh through **wetland habitat restoration** (Haor ecosystems), **reintroduction** of locally rare/lost species and **watershed management**. These solutions help to increase water availability, support food production and fisheries, enhance wetland biodiversity, and provide livelihood opportunities for communities, meaning they have higher incomes. However, there are limited awareness and policies to integrate NbS into wetland management, a lack of multi-agency coordination, and a shortage of funding that is required to build social-ecological resilience.

Importance of the Sundarbans

Among the unique natural resources of Bangladesh, Sundarbans is the largest area of natural mangrove forest in the world. It is located in the delta of Bay of Bengal, formed by the confluence of the Ganges, Brahmaputra and Meghna rivers. It is also one of the most extensive natural ecosystems in Bangladesh and provides enormous economic and ecological benefits to the country. On the one hand, Sundarbans contributes to climate change mitigation by sequestering more carbon than terrestrial forests, which is why mangroves are described as the "carbon powerhouses" of the planet. On the other hand, the Sundarbans Mangrove Forest provides direct or indirect support to over 3.5 million people with an average annual revenue of US$ 744,000 (Chand et al., 2012; Uddin et al., 2013). This mangrove forest also serves as a coastal defence mechanism against storm surges (Sakib et al., 2015; Dasgupta et al., 2017), with the latest storm surge being the Super Cyclone Amphan which hit the south-west coast of Bangladesh on 20 May 2020. A recent study by Menendez et al. (2020) on the flood protection benefits of mangroves ranked Bangladesh in the top three countries receiving greatest benefits from mangroves, measured in terms of the number of people protected from coastal flood events by mangroves.

Bangladesh was ranked as the 3rd top nation in terms of inland fishery production (The Daily Star, 2018). **NbS in Fisheries** can be introduced in inland freshwater and marine water bodies. Current fisheries management measures are related to spatial and temporal fishing bans, and the introduction of co-management in fisheries. These measures help to improve biodiversity and food security, increase fish production, and enhance livelihood opportunities to the local communities. Despite the benefits of NbS in fisheries, there is no framework for implementing NbS in fisheries in this country and there is a lack of collaboration among stakeholders to encourage the implementation and sustenance of NbS in fisheries.

People's participation is vital for NbS as NbS have been shown to be most successful when the local community are involved in the implementation and management of NbS (Irfanullah, 2020a). Bangladesh Forest Department has initiated the **Protected Area Co-management scheme** in terrestrial forests, located in the central, south, north-eastern and south-western parts of the Sundarbans forest. Co-management is structured into three tiers: Village Conservation Forums, Peoples Forum, and Co-Management Committee, as per the Protected Area Management Rules, 2017. NbS in the Sundarbans forest involve the local community in forest protection, which helps to conserve biodiversity, enhance forest coverage, and provide livelihood opportunities. The NbS in the Sundarbans also provide carbon sequestration services, land stabilization, and protect the local settlements from disasters. Beyond the most well-established projects in Bangladesh, the policy for implementation of NbS is not well articulated and there is an absence of monitoring systems which are vital for determining the effects of NbS.

NbS do not only acknowledge modern techniques, but also **promote traditional practices** to protect the human-environmental relationship. One such example is floating gardening, which is practiced in coastal freshwater, north-eastern wetlands, and the northern riverine floodplains of Bangladesh. It is a traditional agricultural practice which uses plant materials to make floating rafts in waterlogged areas, enabling people to raise seedlings and grow vegetables in monsoon months. Farmers start cropping on this extra "piece of land" in monsoon season, as soon as

floodwater recedes. Floating agriculture has been helping people adapt to disaster risks since 2000, ensuring livelihood opportunities during the wet months and alleviating poverty. Nonetheless, challenges remain relating to the effectiveness of water hyacinth-based traditional floating agriculture under changing climate and technological innovation is needed to make it more resilient.

NbS in Policy and Planning

Bangladesh has several medium-term and short-term plans along with long-term visions for development planning, addressing climate change, protecting the environment, and conserving biodiversity. This section considers how NbS are addressed in different relevant policies and planning instruments.

The Bangladesh Delta Plan (BDP) 2100 envisions a long-term, integrated and holistic plan towards environmental sustainability for Bangladesh. The goals of BDP 2100 advocate for climate change resilience, disaster risk reduction, water security and environmental development, as well as protection and conservation of wetland and ecosystems. It also outlines strategies for restoration and conservation of natural reservoirs, river and flood management infrastructure and improving the management of ecosystem services (Bangladesh Planning Commission, 2018). **Bangladesh's 7th Five Year Plan (2016–2020)** aimed to develop strategies, policies and institutions to allow Bangladesh to accelerate and comply with new commitments to meet SDGs. It highlights strategies for water resources management and distribution, environmental and climate change issues, green growth, and disaster management plans, which are essential sectors for NbS implementation (General Economics Division, 2015)

Intended Nationally Determined Contributions (INDC) to the UNFCCC, submitted by the Ministry of Environment, Forest and Climate Change of Bangladesh, have identified Ecosystem-based Adaptation and Community-based Conservation of wetlands and coastal areas as key areas for future intervention, in order to address the adverse impacts of climate change. Furthermore, biodiversity, ecosystem conservation and adaptation from local-level perspectives have also been highlighted as adaptation priorities for Bangladesh. Mangrove plantation, reforestation and afforestation, and social and homestead forestry have been emphasized as vital actions for climate change mitigation in the forestry sector. The **Bangladesh Climate Change Strategy and Action Plan (BCCSAP, 2009)** has addressed multiple programmes related to natural resources, aiming to provide food security, disaster management, infrastructure development, mitigation efforts, and low carbon development. Additionally, these programmes aim to develop capacity and strengthen institutions through knowledge management and research. However, the BCCSAP is under revision and it has much potential to incorporate NbS under its broader themes of actions (Irfanullah, 2020b).

The Sustainable Development Goals (2015) shared a blueprint for interactions between people and the planet. All the goals address different societal challenges, but they are also all interconnected. Hence, some of these goals (6, 13, 14 & 15) are directly linked with NbS; some are moderately connected to NbS, and for some other goals, there is opportunity to integrate NbS (Figure 1).

Source: https://www.youtube.com/watch?v=paVTJtqGFFU

Figure 1: Interconnected SDGs and their linkages to NbS adopted from the framework of Stockholm Resilience Centre (SRC), 2017

Other than the national plans stated above, Bangladesh also has action plans for biodiversity conservation, for example the National Biodiversity Strategy and Action Plan along with several legal instruments (Bangladesh Biodiversity Act 2017; Ecologically Critical Area Management Rules, 2016; and Protected Area Management Rules 2017).

Knowledge status on NbS

When examining the state of knowledge of NbS in Bangladesh, we find that there is a low level of knowledge, meaning the practices, interventions, and case studies are often poorly documented. Looking at a global scale, the Nature-based Solutions Initiative (NbSI), based at the University of Oxford, is an interdisciplinary programme of research, policy advice and practice. The online portal maps the linkages between NbS and climate change adaptation, and was developed using a systematic review of the peer-reviewed publications. This resource highlights the importance of NbS to mitigation and adapting to climate change and has impacted global policy. If we search this resource with Bangladesh, only two papers appear in the list. Hence, on a national level, ICCCAD and NBSI have launched the Nature-based Solutions (NbS) Bangladesh portal on the International Day for Biological Diversity (22 May 2020) to collate the evidence of the effectiveness of NbS projects from across Bangladesh. It is an effort to bring together the community of researchers, practitioners, and policy makers to gather the best possible evidence.

Bangladesh also has a portal called Gobeshona where more than 2,500 publications on climate change have been uploaded. Additionally, a yearly international conference is held in January, gathering a diverse range of researchers and practitioners. In the 7th Gobeshona International Conference, to be held in January 2021, NbS will be a major theme to collate information and gather knowledge across multiple levels and various sectors in Bangladesh. ICCCAD has also begun to establish an NbS Bangladesh Network with relevant stakeholders to advocate for and sustain these NbS initiatives in the long run. Hence, it is evident that there are several scopes to enhance the knowledge generation on NbS in Bangladesh, and thus it is important to work collaboratively across sectors and with a variety of stakeholders.

Key Challenges to scaling up NbS in Bangladesh

This section highlights the key challenges to scaling up NbS interventions in Bangladesh. From the above discussions, it is highlighted that several NbS initiatives have been taken across practice level, policy level and knowledge generation, but mostly in a scattered and non-coordinated manner. Some of the major challenges are discussed below.

Practicing and Financing NbS

Scaling-up NbS faces several challenges with regards to the project design, planning and implementation. These include institutionalisation of projects where planning should be built-in and a lack of understanding of short-term and long-term trade-offs and benefits. Furthermore, in many projects, there is a lack of information for the local communities about long-term planning (stewardship of nature) and there is an absence of project intervention at the household level. With these issues, project longevity and sustainability can be a concern, as we can often see a lack of willingness of the stakeholders to think beyond the project period, and there can be a lack of imposition of land rights and therefore, the "tragedy of the commons" can occur. With the low level of investment available, there remain challenges to upscaling the NbS and covering wider areas. Though climate change poses a great risk to human wellbeing and the global economy, less than 5% of climate finance goes towards dealing with climate impacts, and less than 1% goes to coastal protection, infrastructure and disaster risk management, including NbS (Seddon et al., 2020). For the practitioners and the local communities, the lack of financial incentives act as a barrier to the implementation and ongoing monitoring of NbS.

Governing NbS

NbS require multiple actions by different levels of stakeholders over broad ecosystems, so breakdown in the cooperation and collaboration between these stakeholders can lead to conflict. Without strong legislative framework, law and enforcement, local stewardship of the lands, and proper institutional planning, it is very difficult to carry forward the actions when conflicts arise. There is also an absence of proper Private-Public Partnership, community participation with gender and social inclusions, stable political economy, and policy makers' awareness regarding the benefits of NbS. These issues make it hard to scale up NbS to a country-wide level.

Understanding NbS and Measuring Effectiveness

There have been knowledge gaps among stakeholders. Unplanned and grey infrastructures, along with narrow projects which have focused on specific species, often destroy natural ecosystems and the biodiversity they contain. In Bangladesh, data accessibility and availability have always been as issue. Low quality data, biased data and poorly maintained data, along with lack of incentive, awards or rewards for the experts to create publications act as a hindrance to the overall planning and implementation of NbS projects. Without a set of indicators to govern the

network of actors and integrating lessons learned from the past projects, it is not possible to evaluate the effectiveness of NbS, which will delay the upscaling of NbS.

Next steps

If we summarize the overall practice, policy and knowledge areas in Bangladesh, we can map the issues and challenges, as shown in Figure 2. Thus, we need better monitoring and evaluations to measure the effectiveness of NbS, better governance and accountability to implement NbS actions and we need to generate a strong evidence base to promote NbS.

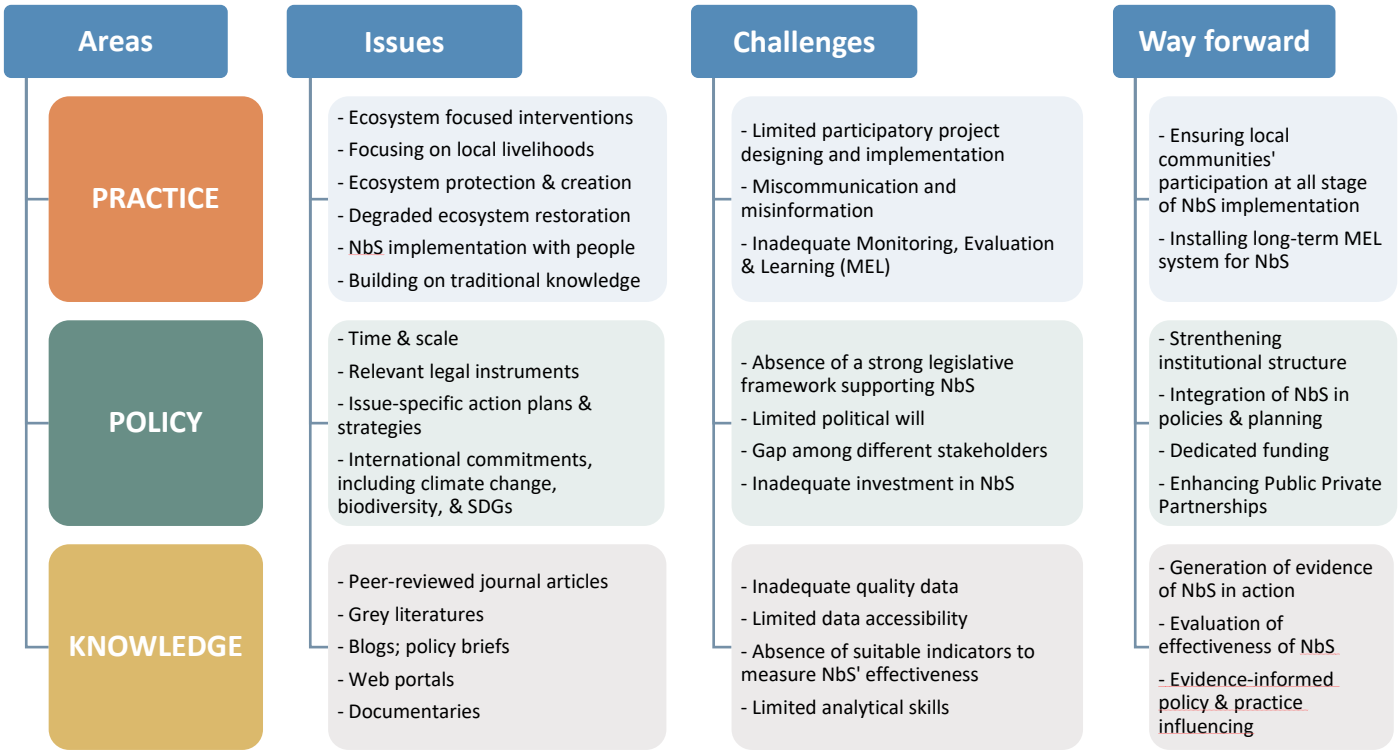

Figure 2: Proposed roadmap for NbS in Bangladesh

- Practitioners need to **scale-up monitoring and evaluation** of NbS projects through dialogues on what makes NbS effective in benefiting nature and society. This can be possible by collaborating with communities to embed the local knowledge in the design and implementation phases. In addition, **knowledge exchange** can help practitioners to avoid duplication, to identify the targets and to know the best available evidence.
- There is opportunity to **integrate NbS in different planning and policy documents** of the country to promote NbS implementation. There is scope to integrate NbS into the adaptation and mitigation interventions of NDC Bangladesh. The 8th Five Year Plan also has the opportunity to accelerate nature-based development strategies for environment, biodiversity, urban areas, and water resource management. Adopting NbS within the BDP 2100 would promote sustainable infrastructure, protecting water bodies, biodiversity hotspots and saving Bangladesh from the rising trend of natural hazards. We also need to **assist further research programmes** and develop initiatives to promote NbS for the overarching adaptation and mitigation plans of the upcoming revised BCCSAP. Although several of the SDGs highlight the need to protect environment and biodiversity, there is further scope to **advocate for NbS integration into the SDGs** at a global level. Adapting NbS terminology as a priority action among relevant policies would promote the pathway NbS implementation through a range of national and local projects.
- As financial instruments are crucial for sustainably implementing NbS, there is an immense need to **explore investment mechanisms** as well to enhance resilience, considering the limited access to finance for applying and scaling up NbS in Bangladesh (Roe, 2019). It is always important to analyze how much investment is required, and other benefits can be offered to encourage people to protect nature alongside development activities. Also, the **public-private partnerships** can be explored for accessing financial assistance to promote NbS. Thus, we need strong institutional and planning structure to ensure benefits across different ecosystems.
- **More evidence-based research** including policy and the community's perception is required to evaluate how different ecosystem-based interventions can be applied as NbS. Thus, it is crucial to address the social, economic

and environmental impacts of different NbS under a changing climate. For that, there is need for evidence gathering, data availability and access and designing indicators. Lastly, it is crucial to **evaluate the value of NbS** and incentivise the communities to make them sustainable and viable.

References

Bangladesh Planning Commission. (2018). *Bangladesh Delta Plan 2100.* Ministry of Planning Government of the People's Republic of Bangladesh, 55, 1–442.

Chand, B. K., Trivedi, R. K., Dubey, S. K. & Beg, M. M. (2012). *Aquaculture in of Changing Climate Sundarban Survey Report on Climate Change Vulnerabilities, Aquaculture Practices & Coping Measures in Sagar and Basanti Blocks of Indian Sundarban.*

Cohen-Shacham, E Walters, G., Maginnis, S., & Lamarque, P. (eds). (2016). *Nature-based Solutions to address global societal challenges.* xiii+ 97pp. Gland, Switzerland: IUCN. https://doi.org/10.2305/IUCN.CH.2016.13.en

Dasgupta, S., Islam, M. S., Huq, M., Khan, Z. H. & Hasib, M. R. (2017). Mangroves as Protection from Storm Surges in Bangladesh. *Policy Research Working Paper.* World Bank, Washington, DC.

GED. (2018). *Bangladesh Delta Plan 2100: Baseline Studies on Water Resources Management.* 1.

General Economics Division. (2015). *The Seventh Five Year Plan FY 2016-2020.*

Irfanullah, H. Md. (2020a). *Nature-based Solutions: Is it a new concept for Bangladesh?* The Daily Star. Retreived from https://www.thedailystar.net/opinion/environment/news/it-new-concept-bangladesh-1851772

Irfanullah, H. Md. (2020b). *Nature-based Solutions (NbS) for Development Planning in Bangladesh*. doi:10.13140/RG.2.2.30431.61602

Menéndez, P., Losada, I.J., Torres-Ortega, S. (2020). The Global Flood Protection Benefits of Mangroves. *Sci Rep 10, 4404*. https://doi.org/10.1038/s41598-020-61136-6

Roe, D., Seddon, N. & Elliott, J. (2019). *Biodiversity loss, development crisis?* IIED Brief. Pap.

Sakib, M., Nihal, F., Haque, A., Rahman, M. & Ali, M. (2015). Sundarban as a Buffer against Storm Surge Flooding. doi:10.4236/wjet.2015.33C009

Seddon, N., Chausson, A., Berry, P., Girardin, C.A.J., Smith, A., Turner, B. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges. *Phil. Trans. R. Soc. B 375: 20190120*. http://dx.doi.org/10.1098/rstb.2019.0120

SRC. *Stockholm Resilience Centre's (SRC) contribution to the 2016 Swedish 2030 Agenda HLPF report*. www.stockholmresilience.su.se/SDG2016 (2017).

The Daily Star. (2018). *Bangladesh now world's 3rd inland fish producer*. Retreived from https://www.thedailystar.net/city/bangladesh-now-worlds-3rd-inland-fish-producer-1607770. Accessed on 19 July 2020.

Uddin, S., Aminur, M., Shah, R., Khanom, S. & Nesha, M. K. (2013). Climate change impacts on the Sundarbans mangrove ecosystem services and dependent livelihoods in Bangladesh. *Asian J. Conserv. Biol.* **2**, 152–156.

World Economic Forum. (2020). *The Global Risks Report 2020*. http://www3.weforum.org/docs/WEF_Global_Risk_Report_2020.pdf

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Figure 3: Swamp Forest, Tanguar Haor in the Sunamganj district of Bangladesh. Swamp forest restoration by locally raised seedlings is used for managing wetland by involving local communities.

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