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Bangladesh Adaptation Plan Case Study

Bangladesh is widely known for their vulnerability to climate change impacts. The primary natural disasters they experience include flood, cyclone, storm surge, flash flood, drought, tornado, earthquakes, riverbank erosion, and landslide. According to the Ministry of Environment and Forests of Bangladesh, floods are regular and affect about 80% of the land (MEFB 2009). Floods have increased in frequency and damage over time. Cyclones have followed this trend, and while it is difficult to attribute any specific storm to climate change, the cyclone of 2007 that crashed into the coast is consistent with the projection and prediction of the IPCC (MEFB 2009). Bangladesh faces severe drought about once in every five years. A current severe drought can affect crop yield in 30% of the country, reducing the production yield to 10% (MEFB 2009). Land and soil erosion are of concern, as the river channels of the Ganges, the Jamuna, and the Tista rivers and coastal and offshore regions are experiencing rapid erosion. A study performed by the SAARC Meteorological Resource Council showed an increasing trend in cyclone frequency over the Bay of Bengal during November and May. The council also conducted a study on recent sea-level rise in the Bangladesh coast. They found that sea-level rise during the last 22 years is many times higher than the mean rate of global sea-level rise of the past 100 years (MEFB 2009), creating a strong need for resilient infrastructure in Bangladesh.

Additionally, ground and freshwater are becoming increasingly salinized. Salinity intrusion affects the biophysical system of the coastal area and occurs due to the reduction of freshwater flow from upstream and due to sea-level rise. It affects the freshwater supply by contaminating aquifers, leading to decreased drinking water and irrigation water for agriculture. According to the Ministry of Environment and Forests of Bangladesh (2009), 1.2 million hectares out of 2.85 million farmable lands are affected by soil salinity. The increase of salinity levels leads to further degradation and erosion of the soil.

Bangladesh also faces problems with their water drainage systems. The combined effect of higher seawater levels, subsidence, siltation of estuary branches, higher riverbed levels, and reduced sedimentation in flood-protected areas overwhelms the drainage system. The problem will increase with the continuous development of infrastructure. An excess of water overflow will increase the potential for water-borne disease. Dengue and malaria are expected to increase as rainfall and temperatures fluctuate.

Bangladesh faces water scarcity and drought in the dry season. Groundwater is their primary source of irrigation and domestic supply. Bangladesh's National Adaptation Plan of Action (2009) identifies 25% of the population has been exposed to arsenic levels exceeding the standard limit due to the contamination of a shallow aquifer. When water becomes contaminated, as do the crops. Bangladesh is likely to experience a rise in malnutrition and income poverty as employment rates and income drop due to challenges faced in the agriculture industry. Crop security is influenced by the seasonal variability of climate change and by different disasters. Several studies show that the climate is changing and becoming more unpredictable every year in Bangladesh (MEFB 2009). Increased temperatures, changing

rainfall patterns, increased flooding, rising salinity along the coast, droughts in the Northwest and Southwest, and drainage congestions all work together to increase crop insecurity in Bangladesh.

The 2009 NAPA plan lists “possible adaptation measures.” It breaks them down into categories: research and knowledge management, agriculture, fisheries and livestock, health, building climate-resilient infrastructure, disaster management, livelihood, biodiversity, and policy and institutional capacity building. The objectives include addressing action items in terms of urgency to the degree of adverse effects on critical sectors while keeping a framework of poverty reduction and sustainable development. Prioritization assists execution and implementation. Bangladesh prioritized the following: financial needs assessment to combat climate change, mainstreaming adaptation to climate change into policies and programs among sectors, enhancing resilience of urban infrastructure and industries from particularly floods and cyclones, exploring options for insurance and other emergency preparedness measures, revision of sectoral policies from climate resilience, mainstreaming climate change in national, sectoral and spatial development programs, strengthening human resource capacity, and formulation of land zonation for climate change adaptation. All but the last initiative is listed as short-term projects and the last ranking as a medium-term project.

The sectors include water, agriculture, infrastructure, forestry, marine fishing, human health, human settlement, life and property, and energy. Geographical sectors include the coastal zone, Barind Tract, floodplain, and hilly region. The interrelationship between biophysical, social, economic, and technological characteristics results in Bangladesh’s vulnerability levels (MEFB 2009). The most significant impact is expected to come from the water sector due to extreme weather events, salinity intrusion, water-logging, and sea-level rise. The agriculture sector is directly impacted by all these events and will face significant yield reduction.

The plan takes a particular approach to address vulnerable areas and impacted sectors due to climate-related elements. Temperature rise and drought are vulnerable to the northwest region, affecting the agriculture, water, energy, and health sectors. Floods are most common to the central region, northeast region, and char land and impacts all sectors. Drainage congestion is of concern in the southwest, urban areas, and the coastal region, impacting the water and agriculture sectors. Sea-level rise and salinity intrusion are seen in the coastal and island regions, impacting the agriculture, water, human settlement, energy, and health sectors. Lastly, cyclones and storm surges affect the coastal and marine zones, impacting marine fishing, infrastructure, human settlement, and life and property.

Stakeholders include farmers, fishers, business people, social activists, and representatives of civil society. Together they have held workshops with the local community to point out erratic weather behavior and attribute it to climate change. While much of the remaining community did not necessarily relate any of the weather changes to climate change, they did acknowledge they have noticed weather irregularities with increasing intensity. Aside from meetings, there have been few recorded efforts to create awareness of impacts to engage those who would be affected by the plan implementation. Nowhere under the tasks category in the NAPA document is any type of community outreach program to educate those who are not stakeholders or sectoral representatives, which I believe would be beneficial.

The most vulnerable within poor groups include women, children, the elderly, and the sick. People in Bangladesh are also more susceptible based on where they live. For example, those living along the coast are seen as the most vulnerable in geographic location (MEFB 2009). They will experience higher concentrations of salinized water, brunt exposure to cyclones, sea-level rise, and flooding. The most vulnerable will also be those whose livelihoods and income rely on natural resources.

There is limited information about the current stage of planning and adaptation since NAPA, especially regarding progress at the local level. There have been a handful of assessments completed, although many claim it is too soon to understand the plan's impacts. In one assessment conducted by Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA 2016), two projects are highlighted that were successfully implemented in Bangladesh due to NAPA: Integrating Community-Based Adaptation in Afforestation and Reforestation Programs in Bangladesh, and Community-Based Adaptation to Climate Change through Coastal Afforestation. The ladder project was deemed very successful. It promoted the diversification of livelihoods and income generation. For example, through the rational use of coastal land to produce forest, fruit, and fish resources, it caused income generation, protection against climate hazards, and climate change mitigation (CARIAA 2016).

Local challenges to adaptation include limited participation from local and marginalized people. Due to this disconnect, local projects were not prioritized and often disregarded, causing maladaptation to increase. Elitist perception of climate change by the vulnerable communities may have influenced this outcome and limited participation as they lack the knowledge and resources that officials have access to.

In the 2005 version of the plan, projects were listed in more detail and included their total cost. The Ministry of Environment and Forests decided on fifteen projects among a long list of ideas. Each project is broken down into objectives and activities, inputs and activities, short-term outputs, potential long-term outcomes, implementing agency, implementation risks and barriers, evaluation and monitoring, and financial resources. Among those projects, a few specifically stood out to me for their tangibility and effectiveness. Project 5 focuses on constructing flood shelters and creating information and assistance centers to cope with recurrent flooding in major floodplains. Project 7 includes climate change issues in the curriculum at secondary and tertiary education, which is an essential step to spreading awareness to the community and vulnerable areas. This project will initiate more participation in the conversation and action regarding climate change, as the next generation will experience less elitist dominance in the conversation than the present generation. Eventually, the gap will begin to close of who is seen as responsible for handling climate change and shift the responsibility to the whole community. Lastly, Project 8 entails enhancing the resilience of infrastructure and industries to the impacts of climate change. With the understanding that these projects most likely carried on throughout the 2009 recreation of the plan, the 2005 plan provides far greater insight into direct actions and desired outcomes that would have been beneficial to relist in the 2009 version.

The plan does pay special attention to vulnerable communities but does not elaborate on distributive and procedural justice. The plan states that impact and vulnerabilities can be looked at from several overlapping angles, sectoral or regional perspectives, or in terms of loss of life, livelihood, or income (MEFB 2009). In Bangladesh, it is more rational to gauge vulnerabilities

and multiple stresses on the lives and livelihoods of the poor. The plan acknowledges that any attempt to adapt to the adverse impacts of climate change will require particular emphasis on protecting the most vulnerable groups. One of the possible adaptation measures listed in the plan describes a research initiative to study the linkages between climate change, poverty, and health to identify potential actions they could take to intervene with this cycle. Specifically, the research would center around disease incidence, nutrition, water, and sanitation. In the 2005 plan, vulnerability is addressed through project 4 to disseminate climate change and adaptation-related information to vulnerable communities for emergency preparedness and awareness-raising on intensifying climatic disasters.

Ideally, everyone is impacted by the plan beneficially; however, the plan may not impact everyone in the same way. Although there is an emphasis on taking care of vulnerable communities, there are still limited resources offered in vulnerable regions, making plan implementations fewer and far between in those areas. For example, access to drinking water, medical support, and inadequate infrastructure remain issues unaddressed by the NAPA plan regarding the vulnerable.

I would recommend implementing some long-term projects, as the plan only implemented short-term and medium-term projects. Additionally, the plan leaves out the specifics regarding their plan to handle their water supply, yet it is projected to be the most impacted sector. I would suggest a written-out plan of how to manage water irrigation systems for agriculture, an in-depth outline of how to fix the drainage systems to prevent waterlogging and potential disease, and a specific solution of how to provide all areas with uncontaminated water. All the above would be highly beneficial to this plan and address how to involve the community beyond meetings due to the lack of attendance by local and vulnerable people.
I believe that the adaptation plan will have satisfactory results. As it is the first national document regarding climate change adaptation, it truly paved the way for other plans to flourish globally. NAPA focuses heavily on funding research, while several other plans expand on initiatives and detail more in-depth, long-term projects, which I believe NAPA lacks. For example, Bangladesh Climate Change Strategy and Action Plan is a long-term climate change strategy to take place over ten years. Written into NAPA is a need to ensure compatibility with pre-existing and future plans like BCCSAP. This will create further success for NAPA, as they are prepared to collaborate with other projects that may be more driven on initiatives and would benefit from the research conducted. Additionally, cost-effectiveness can be increased by collaborations on projects with other organizations.

Several barriers were reported after implementing NAPA. Those barriers are limited participation of local and marginalized people, corruption, and dominance of elites. A study conducted interviewing 27 organizations in Bangladesh (Ishtiaque, Stock, Vij, Eakin, and Chhetri 2021) showed that limited participation and dominance of elites at local levels were found as an explanation for corruption. Local elites are often supported by a ruling political party and are involved in some extent of money exploitation and influencing organizations in favor of their objectives. Corruption can occur in the realm of climate change when political leaders with limited knowledge of the issue obtain climate funds because of their affiliations with ruling political parties and abuse the fund; this could be a potential explanation for the reported corruption in Bangladesh.

Additionally, the top-down approach of knowledge flow was found as a barrier. Knowledge at the national level is limited compared to the local level. People at the local level likely have ways they have begun adapting to the changing climate, and sharing their successes and failures would prove incredibly beneficial to the conversation and inclusion surrounding climate change. Organizational conflict was identified as a barrier as well. Institutional design and approach may cause this conflict (Ishtiaque, Stock, Vij, Eakin, and Chhetri 2021). Other barriers reported include limited access to resources, collaboration, and poor coordination at the local level.

To explain the reason behind these barriers, Ishtiaque, Stock, Vij, Eakin, and Chhetri (2021) concluded that five mechanisms could explain barriers in adaptation governance in Bangladesh. Enclosure and exclusion cause limited participation. Boundary control emerges when organizations have limited access to resources that they control, resulting in a lack of collaboration and limited access to information. Organization inertia highlights how organizations exhibit an unwillingness to invest in new ventures or change patterns of work. It results in barriers such as poor coordination at the local level. Belief formation can cause trust to form, or in this instance, to be prevented, causing a lack of collaboration and increased corruption. Lastly, frame polarization occurs when others try to push their perspectives onto others, causing framing differences. Together, these mechanisms all combine to create the barriers faced in Bangladesh.

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