

ON ITS OWN: BANGLADESH CAN SAVE ITSELF FROM SOME CLIMATE CHANGE

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For almost as long as climate change has been a global issue, Bangladesh has been an international poster child for what can happen if climate change is not somehow contained. The country sits at sea level, is largely flat and laced with rivers, and thus is like a sitting duck for disasters caused by sea levels that continue to rise as the polar ice caps continue to melt. Coupled with this massive flooding are increasingly frequent intense storms, also induced by climate change, which pose a major threat to the 170 million citizens of the world's most densely populated nation.

Climate change projections made by the Intergovernmental Panel on Climate Change (IPCC 2021) in mid-2021 aggravate these worries. Although the panel did not materially change its central projection from earlier reports—that in the absence of substantial change in policies and climate-improving technologies, global temperatures are projected to rise by at least three degrees centigrade above 1900 levels by the end of the century—the 2021 report expressed much less uncertainty about that outcome.

A three-degree increase may not sound like a lot, but in the world of climate change, where changes in weather

and melting ice respond in a highly non-linear fashion to warming temperatures, a temperature increase of that magnitude portends catastrophic effects. When those effects will materialize depends on how quickly that increase occurs. It takes time for ice to melt, and the longer it takes global temperatures to rise—a scenario made more likely by gradual global changes in emissions and carbon-capture technology—the higher the ultimate increase in sea levels will be. Paradoxically, a faster increase in global temperatures that then levels off—a scenario associated with short-run delays in climate change policy and technological

advances but major positive changes thereafter—would restrain the rise in sea levels (“Briefing” 2021, 19).

My thesis here is that, while there is probably no way Bangladesh and other low-lying areas around the world can survive the IPCC’s projected worst-case rise in sea levels—as much as 10 feet by 2100 and more than 16 feet by 2150—it probably can protect itself against a more moderate sea level increase, roughly 2 feet by 2100 in the PPCC’s intermediate emissions scenario projection. Thanks to the major economic advances Bangladesh has achieved over the last two decades (though largely unnoticed outside the country), the country has the resources to do this without substantial official foreign investment. This is due in part to the high rate of domestic savings and the large number of remittances made by Bangladeshis living outside the country.

Leaders in Bangladesh should know they will be largely on their own to deal with the consequences of continuing climate change for at least two important reasons. One, sad to say, is that the developed world, the United States in particular, has thus far shown relatively little regard for the fate of the developing world in climate matters. Had the rich world taken more aggressive steps to mitigate the effects of climate change—for

example, by taxing carbon emissions or implementing national cap-and-trade systems years ago—the climate change crisis would not be as severe now or in the future. Second, the rich world’s response to the COVID-19 pandemic—commendable in making vaccines available, but not as rapidly and as extensively as the situation warranted—only further underscored the fact that developing countries always will be last in line for receiving help. Only by taking matters into their own hands can countries like Bangladesh avoid, or at least mitigate, the potentially catastrophic outcomes expected due to climate change.

To do this, however, the government will need to follow, and ideally strengthen, existing plans for adapting to climate change and be resilient in dealing with its effects. In 2020, the government of Bangladesh released its latest economic planning document, the Vision Plan, which set the national goal of a roughly sixfold increase in real per-capita GDP over the next two decades, from about US\$2,000 in 2020 to US\$12,500 in 2041, coupled with the virtual elimination of extreme poverty over that time span. That planning document recognized the vulnerability of low-lying areas of the country that are the most susceptible to rising sea levels, which not coincidentally are

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also highly impoverished areas, and discussed current plans to address the issue. Those plans must come to fruition if these areas are to be saved and the country's goals for economic growth and poverty reduction are to be met. As important as the fiscal investment that will be needed are the measures the country will need to take to accommodate the increasing migration away from low-lying areas.

In what follows, I first provide a brief background on Bangladesh's exposure to the threats of climate change. I follow with suggestions for how to mitigate those threats, though without the benefit of the more detailed adaptation plans, which are not in the public domain. I close by discussing ways Bangladesh, largely on its own, can finance its investment in the necessary adaptation.

THE CLIMATE CHANGE THREAT TO BANGLADESH

Bangladeshis know all too well why their country is so exposed to the dangers of climate change, especially the rising sea levels that result from the melting of the polar ice caps and other frozen areas of the world, such as Greenland, Siberia, and Northern Canada. That is because the entire country sits at or near sea level, with roughly 65 million people living at an elevation lower than 32 feet. Furthermore, the country is crisscrossed by multiple rivers, most notably the Ganges River (call the Padma River in Bangladesh). As it is now, substantial portions of the country are regularly flooded during the summer monsoon season.

It is not an accident that the most flood-prone areas, and thus those most at risk from rising sea levels, are the poorest areas in the country. The Vision Plan notes that the most vulnerable districts of Bangladesh include most of the 15 poorest. It also notes that the Bangladesh Delta Plan 2100 includes measures aimed at

“flood control, water storage, irrigation, land management, agriculture, forestry resource management, and ecological balance,” which also are part of the overarching plan for enhancing growth and reducing extreme poverty (Bangladesh Planning Commission 2020, 46). Clearly, the government must see this effort through.

Of course, Bangladesh is hardly alone in its exposure to rising sea levels. Around the world, nearly 700 million people live in coastal areas that are at risk of permanent submersion as ocean levels continue to rise (Frey 2021). Even rich countries like the United States face major consequences; assuming the country musters the political will to make the required investments, an estimated US\$400 billion will be needed over the next 20 years to protect US eastern and southern coastal areas from rising ocean levels (Litan and Fleming 2021)

Other risks resulting from climate change are unique to Bangladesh and just as worrisome as the rise in sea levels. As the Vision Plan warns (Bangladesh Planning Commission 2020):

Rising temperature [due to climate change] threatens to increase monsoon rains causing river overflow and higher incidence of flooding; temperature rise also threatens to damage crops and contribute to health problems. In parts of the country over-exploitation of groundwater with low rain owing to climate change threatens to weaken the surface aquifers that could create water shortages for irrigation-fed agriculture in the Northwest dry zone of Bangladesh. In the urban areas, the water tables in many parts have already sunk very low owing to over-exploitation of

groundwater and inadequate recharging. Arsenic contamination threatens many water supply sources. Assuring adequate water supply to a growing urban population and expanding industrial and commercial activities will be a major challenge in moving forward.

The Vision Plan follows up these warnings with a single sentence, which seems inconsistent with its otherwise optimistic projects about future GDP growth and poverty alleviation:

Unless these vulnerabilities are managed and addressed comprehensively, Bangladesh faces serious downside risks to [its] food security, growth momentum and poverty reduction efforts.

The plan elsewhere emphasizes the point again by admitting that “the ability to address the environmental challenge will also determine the ability to achieve high-income targets and mostly eliminate the incidence of absolute poverty by FY2041” (Bangladesh Planning Commission 2020, 202). In 2018, a World Bank report validated this concern, projecting that a warmup of just 1.5 degrees centigrade could reduce Bangladesh’s GDP by 6.7% by 2050, *even if preventive measures are taken*. This would adversely affect the living standards of more than three-quarters of the country’s population, relative to a scenario in which the projected temperature increase does not occur (Mani et al. 2018).

MITIGATING THE IMPACT OF CLIMATE CHANGE: WHAT SHOULD BE DONE

The Vision Plan highlights several steps the government has taken or is planning to take to address the challenges of cli-

mate change, and thus to keep any decline in living standards to a minimum. These steps include enacting tougher environmental laws (though enforcement remains a challenge); planning to address the environmental risks to the delta via the Delta Plan 2100; initiating flood-control projects in other areas of the country; and adopting a National Adaptation Plan and a 2010-2015 National Disaster Management Plan. In addition, in cooperation with and with help from other countries, Bangladesh has substantially increased its investment in building shelters to protect its people from periodic cyclones and major rains (“Climate Adaptation” 2021).

However, the government is candid about the fact that implementation of its planned adaptation measures remains a work in progress, due in part to the need for “long term investments in water management” (Bangladesh Planning Commission 2020, 201).

As recently as 2019, Bangladesh was still far from ready to meet its climate change challenges. Tasneem Siddiqui, a political scientist who leads the Refugee and Migratory Movements Research Unit at the University of Dhaka, was quoted then as saying, “Right now the government’s vision is to have no vision. It’s just that everything is in Dhaka, and people are all coming to Dhaka. And Dhaka is collapsing” (McDonnell 2019).

The Vision Plan was published after that statement was made. The plan represents a major step forward, at least on paper, as it commits the country to a substantial increase in water management investment, from 0.8% to 2% of GDP, and in annual operations and maintenance spending on these projects, from essentially zero now to 0.5% of GDP.

Will these admittedly substantial investments, assuming they are made, be enough to keep the country from being flooded as sea levels rise and damaging

storms become more frequent? It is difficult to say, because the government plans still do not reveal precisely what investments are contemplated. It presumably includes more and higher seawalls, in addition to those that already protect approximately 60% of the country's coastline. The plan also fails to indicate what increase in sea level these investments will protect against.

In any event, higher seawalls may not be the only answer to Bangladesh's climate challenge. Ecological seawalls, such as the oyster reefs off Kutubdia Island, one of the country's low-lying districts, help break the force of incoming water, which limits beach erosion. These reefs consist of oysters that attach themselves to concrete structures along the coast and grow to form barriers that help blunt the force of higher sea levels. Further experimentation with and investment in this technique merit consideration (Imtiaz 2021).

Creative solutions are also needed to sustain agriculture in a country that faces increasing loss of arable land as sea levels rise. One answer, of course, is increased productivity in existing land plots. Another potential solution is hydronic agriculture, which uses a floating body of greenery in lieu of soil. This can serve as the base for growing various crops, including okra, gourds, spinach, and many herbs and spices ("Bangladesh's Floating Gardens" 2021). Another innovation, pioneered by ICCO, a Netherlands-based NGO, is spreading technology that enables Bangladesh's small farmers to grow salt-tolerant crops, which will be able to thrive as saline-concentrated sea waters rise. ICCO has partnered with Bangladesh-based academics and private-sector partners to apply these techniques with 5,000 small farmers, with another 5,000 scheduled to benefit by 2024 (Ahmed 2021). This is the kind of innovation that outside philanthropists

and/or the Bangladeshi government should encourage.

Many Bangladeshis, especially those living in the most flood-prone areas, will not wait—and are not waiting—for climate adaptation measures to be fully implemented. Sensibly, they are already moving and will continue to relocate to higher ground. This movement initially crowded the capital city, Dhaka, but then began to disperse throughout the country. A World Bank study projected in its "pessimistic" climate change scenario that the migration figure in Bangladesh would top 13 million by 2050, in contrast to just under 4 million in a more climate-friendly scenario (Rigaud et al. 2018, 144, 148).

Of course, like other developing countries, Bangladesh has a long history of rural-to-urban migration. The cities have so far accommodated it, even as its economy has grown rapidly. However, climate-induced migration from the coastal areas inward, even under optimistic assumptions, is likely to add further stress. Some additional out-migration, especially of Bangladeshi men, the source of the country's substantial foreign remittances, may act as a safety valve. Still, the government will face the additional challenges of improving infrastructure and sustaining employment, especially in the urban areas to which migrants historically have been attracted.

FINANCING CLIMATE CHANGE ADAPTATION

An obvious question about any future government efforts to thwart the effects of climate change is how they will be financed.

The government sensibly says that "beneficiaries" will pay for all local water projects and the associated operations and maintenance expenses to maintain them, but that they will do so only "over time," so that all the costs will be "largely

beneficiary managed and financed and therefore fully sustainable” (Bangladesh Planning Commission 2020, 203). The plan is honest about the fact that higher taxes equivalent to an additional 2% of GDP will be required, a substantial amount even in developed economies, let alone in developing countries where the tax burden tends to be much lower.

Raising taxes will be politically challenging, even if citizens are told that the higher taxes are necessary to preserve their way of life—or even life itself. Nonetheless, there are some reasons for cautious optimism.

First, the fact that the government implemented a variation of a carbon tax in FY 2020 (Bangladesh Planning Commission 2020, 204) as part of the country’s climate change mitigation policies, along with direct regulation of sources of carbon emissions, provides some encouragement that citizens will be persuaded to accept paying higher taxes in order to implement literally life-saving climate change adaptation.

Second, the taxes in Bangladesh are currently among the lowest in the world, thus the government believes there is room for citizens to pay additional taxes, along with cost-sharing by the affected communities, although this will require some combination of higher local taxes and utility rates (Bangladesh Planning Commission 2020, 204).

It also is possible that Bangladesh will receive some foreign financing for its adaptation efforts. One source is the Global Climate Fund established by developed countries, which had US\$6 billion in its coffers in 2016. In principle, if the government of Bangladesh can meet all the relevant criteria, it should be eligible to receive at least some of these monies. The Vision Plan also mentions other global funds that could contribute to these efforts (Bangladesh Planning Commission 2020, 208).

Of course, it is possible, some might say likely, that the government’s ambitious climate change adaptation policies will not be fully paid for by taxes, service charges, and funding from one or more global funds. This means that some portion may have to be deficit financed. Still, an increase in the government’s annual deficit, even one as large as 1% of GDP, for perhaps a decade or more still should be manageable, for several reasons.

For one thing, the government deficits already fall in the 5% of GDP range, so an increase of even one full percentage point of GDP, which may be the worst case, is not especially alarming, given the low government-to-GDP debt ratio of just 32% in 2020.¹ Admittedly, this figure has risen in recent years, but it is no higher than a decade ago and is well below government-to-debt ratios in many rich countries.

Second, Bangladesh’s economic output per person has grown more than six-fold over the past three decades (1990-2020), an annual growth rate of roughly 6%—a remarkable record.² This rapid growth has improved the economic circumstances of many of the country’s citizens, and many of them have been able to save, rather than merely living at a subsistence level. Thanks to the country’s ongoing growth and the saving habits of the country’s citizenry, Bangladesh’s gross savings rate over the past decade has continuously hovered in the 30% range.³ Savings rates of this magnitude more than cover the government’s deficits, even with another one percentage point of GDP increase. Bangladesh’s rapid GDP growth also keeps its government debt-to-GDP ratio at a relatively low, stable level.

Bangladesh also benefits enormously from remittances sent home by its natives working abroad—at this writing they run at about \$20 billion annually, or approximately 6% of GDP (a figure comparable to the government’s deficit-to-GDP

ratio). The annual flow of remittances ensures that the country has ample foreign exchange reserves, which have kept its currency relatively stable.

Bangladesh's planned efforts to adapt to climate change are not written on a blank slate. The government has been working on the matter for more than three decades. In September 2008, Bangladesh launched its first Climate Change Strategy and Action Plan at the UK-Bangladesh Climate Change Conference in London. That led the conference participants to propose a multi-donor trust fund for climate change, which in turn led to the formation of the Bangladesh Climate Change Resilience Fund in 2010. The fund has disbursed about \$170 million to Bangladesh for climate-resilience investments. The World Bank has provided technical assistance on these matters.

More broadly, the World Bank proudly reports that it has provided US\$30 billion to Bangladesh since 1972.⁴ For reasons stated earlier, Bangladesh does not and should not count on anything like this level of support in the future, especially if only targeted toward a major policy area, such as climate adaptation.

WORST-CASE PLANNING: NOT TOO EARLY TO BEGIN

It is plausible that the additional domestic investments in climate change adaptation currently contemplated by the government of Bangladesh will be sufficient to address the country's climate-related challenges under the IPCC's moderate scenario, which envisions a two-foot rise in sea levels by 2100. However, all would have more confidence in this projection if the government were to release studies or data establishing that the planned investments would achieve this result.

However, it is unrealistic to expect

that Bangladesh alone could insulate itself from a worst-case, climate change-induced outcome: namely, a rise in sea levels exceeding 10 feet. In that event, a combination of constructing much higher seawalls and imaginative ecological seawalls, buildings on stilts where possible, and relocating a substantial portion of the country's population to higher ground would be required. It is beyond the scope of this essay to estimate how much all of this would cost, except to say it would be far more than 2 percent of GDP over the next few decades.

It would be a mistake to simply ignore the worst-case possibilities, however nightmarish they may be. The global COVID-19 pandemic, if nothing else, underscores that lesson.

The good news, if there is any in a worst-case climate scenario, is that unlike the pandemic, which happened suddenly, the worst-case effects of climate change will manifest themselves gradually. This gives policymakers and citizens enough time not only to develop and begin to implement contingency plans but to press the rest of the world for more unconventional mitigation measures, such as geo-engineering, which is far less expensive than conventional mitigation, although it also poses untested and unknown risks of its own. In a worst-case scenario, however, geoengineering, or perhaps other unorthodox inexpensive innovations with fewer potential side-effects, will look more attractive than the permanent flooding of hundreds of millions of people around the world, many of them in Bangladesh.

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1. See <https://tradingeconomics.com/bangladesh/government-debt-to-gdp>.
 2. Calculated from data at <https://www.macrotrends.net/countries/BGD/bangladesh/economic-growth-rate>.
 3. See <https://www.ceicdata.com/en/indicator/bangladesh/gross-savings-rate>.
 4. See <https://www.worldbank.org/en/country/bangladesh>.