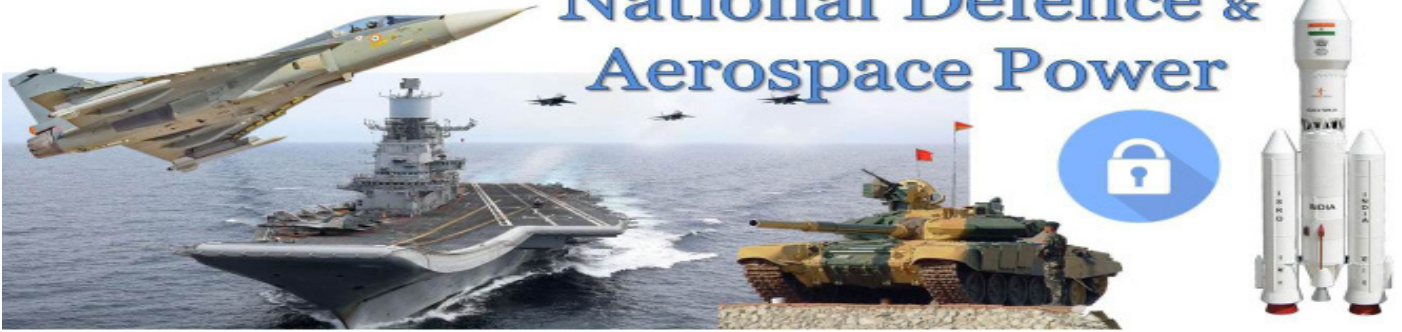




## National Defence & Aerospace Power



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### ASSESSING CHALLENGES OF CLIMATE CHANGE FOR BANGLADESH

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Bangladesh stands out as one of the most exposed countries to the effects of climate change. Being positioned as the seventh most climate-risk-exposed country worldwide, Bangladesh has encountered 185 extreme events and recorded 0.38 fatalities per 100,000 inhabitants in the past two decades.<sup>1</sup> The World Bank Group's Country and Climate Development Report for Bangladesh warns that without immediate action, including enhanced adaptation and resilience measures, the country's promising economic growth could be jeopardised.<sup>2</sup> The most vulnerable and impoverished communities will be the hardest hit by climate change.

Bangladesh, for instance, faces an annual expense of around US \$1 billion due to average tropical cyclones.<sup>3</sup> In fact, by 2050, there is a substantial risk that one-third of the money generated by the agriculture sector could be lost, and about 13 million people may need to relocate within their own country due to climate-related issues. If severe flooding occurs, the economy might contract by as much as 9 per cent.<sup>4</sup> Consequently, Bangladesh must expedite its adaptation to climate change and concurrently embrace cleaner, more efficient technologies. These technologies not only facilitate development but also yield additional benefits, such as improvement in health, air quality, and water quality, while simultaneously curbing emissions. However, despite making significant strides in reducing the human impact of climate-related disasters, Bangladesh still faces severe and growing climate risks.

#### **Assessing Vulnerability to Climate Change in Bangladesh**

Located in a densely populated, river-dominated region along the northern fringes of the Bay of Bengal, Bangladesh is familiar with the challenges posed by climate

fluctuations, natural calamities, and extreme weather-related occurrences. Bangladesh's susceptibility to climate change primarily stems from its geographical factors, which render it highly exposed to natural disasters and the threat of rising sea levels. Even without the influence of climate change, Bangladesh has consistently faced significant vulnerability to naturally occurring threats. This vulnerability is attributed to its low-lying terrain, with over half of its landmass at an elevation of less than two meters above sea level. Geographically situated in the tropical zone along the Bay of Bengal, Bangladesh is located within the delta created by three significant rivers: the Brahmaputra-Jamuna, the Meghna, and the Ganga-Padma.<sup>5</sup> This geographical setting makes the nation particularly prone to coastal and river-based flooding, especially in its central and mid-western areas.

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Moreover, Bangladesh regularly experiences the impact of cyclones, such as the devastating Cyclone Sidr in November 2007, which affected around 2.3 million households and seriously affected around one million.<sup>6</sup> Droughts also pose a significant threat to various segments of the population. This vulnerability is compounded by its densely populated communities, which are heavily reliant on agriculture for their livelihoods, and the country's relatively limited capacity to adapt to the impacts of climate change. As a consequence, Bangladesh is facing mounting environmental pressures. Projections indicate that by 2060, the nation is anticipated to witness temperature increases ranging from 0.5°C to 2.8°C annually, shifts in average annual rainfall with variations of around 14 per cent less to 24 per cent more, and substantial sea level rise.<sup>7</sup> Anticipated consequences include a higher frequency of droughts and floods, greater severity of extreme weather events such as storm surges and cyclones, substantial land erosion, and intensified intrusion of saltwater.

### **Climate-Induced Risks to Human Security in Bangladesh**

Bangladesh faces a higher risk from climate change, with approximately 290 deaths per 1,000 individuals, encompassing both fatalities and injuries.<sup>8</sup> According to a report from the German Advisory Council on Global Change, without determined efforts to counteract it, climate change is poised to exceed the adaptive capabilities of numerous societies in the upcoming decades.<sup>9</sup> This could lead to increased instability and violence, posing a heightened threat to both national and global security. Similarly, International Alert has found that there is a genuine concern that climate change may exacerbate the potential for violent conflicts, ultimately leaving communities in a state of increased poverty, reduced resilience, and diminished capacity to deal with the repercussions of

climate change.<sup>10</sup> Five notable changes are already in progress due to climate change and are expected to persist in the near future. These include rising temperatures, river and coastal flooding along with erosion, increasing sea levels, elevated levels of salinity, and a heightened frequency and intensity of severe weather events. These alterations are likely to pose significant security threats to the inhabitants of Bangladesh, such as food insecurity, health insecurity, and migration.

**Bangladesh is anticipated to face the most significant loss of fertile land globally due to rising sea levels. This is projected to lead to a substantial reduction of approximately 8 per cent in rice production and a substantial 32 per cent decline in wheat production by the year 2050.**

### *Food insecurity*

According to the findings of the Intergovernmental Panel on Climate Change (IPCC), Bangladesh is anticipated to face the most significant loss of fertile land globally due to rising sea levels. This is projected to lead to a substantial reduction of approximately 8 per cent in rice production and a substantial 32 per cent decline in wheat production by the year 2050.<sup>11</sup> Integrated Regional Information Networks (IRIN) has unveiled that the increasing sea levels in the Bay of Bengal is encroaching upon extensive flat agricultural areas in the southern regions of Satkhira, Magura, Khulna, Jessore, and Bagerhat.<sup>12</sup> This encroachment is leading to heightened levels of soil salinity and other environmental risks, significantly compromising agricultural production and the livelihoods of the local population. According to Golam Mohammad Sanaullah, a soil scientist and former Research Director at the Bangladesh Rice Research Institute (BRRI), it is estimated that, among the 37 million residents residing in 12 coastal districts, roughly 20 million people have suffered negative consequences due to the advancing sea levels.<sup>13</sup>

In fact, around 47 per cent of Bangladesh's labour force is engaged in the agricultural sector, contributing to approximately 11 per cent of the country's Gross Domestic Product (GDP).<sup>14</sup> Agriculture is a crucial source of livelihood for numerous rural communities, yet it grapples with substantial challenges brought about by climate change. Bangladesh faces food security issues stemming from various factors, including increasing temperatures, unpredictable rainfall patterns, and a surge in the frequency of natural disasters like floods, cyclones, and droughts. Recent research indicates that Bangladesh's evolving climate and the increasing occurrence of extreme weather events significantly affect crop production, particularly the vital rice crop. The southern coastal region and the northern areas of Bangladesh are experiencing the most substantial impact.<sup>15</sup> The reduced crop yields resulting from floods and the infiltration of saltwater into fields have an adverse effect on food availability and accessibility. The Bangladeshi government's 2017 evaluation reported a 7-10 per cent decline in agricultural yields due to climate change, incurring significant financial losses for farmers.<sup>16</sup>

Beyond reduced yields, climate change is also influencing food safety and quality. Rising temperatures and shifting rainfall patterns are contributing to increased outbreaks of pests and diseases, posing a threat to food safety and diminishing crop quality. Moreover, severe weather patterns have the potential to harm the food transportation and storage infrastructure, resulting in food spoilage and wastage. These combined elements add to the growing food security concerns in Bangladesh, which are predicted to deteriorate with the increasing impact of climate change.<sup>17</sup>

Even the fishing sector in Bangladesh has been profoundly affected by climate change. As per a study from 2018, there is a substantial risk that climate change could lead to a considerable reduction in the country's fish resources, thereby affecting the livelihoods of millions of individuals reliant on fisheries.<sup>18</sup> Changes in sea levels and water temperatures brought about by climate change have a direct impact on fish breeding and survival, resulting in diminished fish productivity.<sup>19</sup>

### *Health Insecurity*

Climate change gives rise to malnutrition, food and water-related diseases, infectious illnesses, and elevated air pollution.<sup>20</sup> The primary sources of harm and health issues are heatwaves and floods triggered by rising temperatures, excessive rainfall, and oceanic thermal expansion. Greenhouse gas emissions are a key contributor to the challenges concerning food and health security. Climate change is significantly impacting public health in Bangladesh, compounding existing issues related to hunger, infectious diseases, and maternal and infant mortality. These pre-existing challenges are being exacerbated by climate change through various mechanisms.<sup>21</sup> For example, heightened exposure to heatwaves and extreme weather conditions increases the susceptibility to infectious diseases like diarrhoea and respiratory ailments.<sup>22</sup>

Variations in temperature and rainfall can create conditions conducive to the outbreak of infectious diseases, increasing the likelihood of transmitting vector-borne illnesses like dengue fever and malaria.<sup>23</sup> The heightened risk of communicable diseases is strongly associated with extreme weather events and flooding. For instance, overcrowding in temporary shelters following a devastating storm often leads to outbreaks of diarrheal diseases due to the lack of access to safe food and clean drinking water.<sup>24</sup> As mentioned earlier, water insecurity poses a significant public health concern, particularly for the millions of people living along Bangladesh's coastline who rely on groundwater as their primary water source. Presently, approximately 20 million individuals in coastal Bangladesh are already experiencing the adverse health effects of saltwater contamination in freshwater sources and soil, a consequence of rising sea levels.<sup>25</sup> High levels of saltwater ingestion have been linked to increased rates of health problems such as hypertension, miscarriage among pregnant women, skin diseases, acute respiratory infections, and diarrheal diseases.

Additionally, the rising frequency of floods, attributed to climate change, is contributing to outbreaks of waterborne diseases as people come into contact with contaminated water sources. Research from 2016 indicates that climate change has already led to increased malnutrition rates in Bangladesh, particularly among children under the age of five.<sup>26</sup> In short, there is a complex interplay between climate change, food security, and public health in Bangladesh.

**With nearly 700,000 Bangladeshis displaced by natural disasters annually, it is projected that by 2050, the number of climate change-induced displacements in Bangladesh could surge to approximately 13.3 million.**

### *Migration*

With nearly 700,000 Bangladeshis displaced by natural disasters annually, it is projected that by 2050, the number of climate change-induced displacements in Bangladesh could surge to approximately 13.3 million.<sup>27</sup> Each year, an average of 300,000 houses in Bangladesh are either completely destroyed or severely damaged due to natural calamities. This number escalates during years marked by severe extreme weather events.<sup>28</sup> As an illustrative example, as of May 19, 2023, Cyclone Mocha wreaked havoc in Bangladesh, impacting around 2.3 million individuals, resulting in the destruction of over 2,000 homes, and causing damage to more than 10,000 houses within the Chattogram division.<sup>29</sup> Reports indicating the potential occurrence of a cyclone with a 10-year return period in 2050 suggest that approximately 9.7 million people could be exposed to a 3-meter inundation.<sup>30</sup> As climate change persists, it compels people to migrate and leads to internal displacement, thereby escalating the challenges to the human security of both migrants and internally displaced individuals. This is particularly evident in densely populated urban areas where inadequate shelters magnify vulnerabilities. In the context of rapid urbanization, competition for resources may exacerbate tensions within these settlements. Moreover, there is a growing concern over competition for access to land, which is expected to become an increasingly prominent issue.

In conclusion, Bangladesh stands as a critical example of a nation profoundly impacted by the far-reaching consequences of climate change. Climate change has engendered a multifaceted web of challenges encompassing food insecurity, health insecurity, and mass migration, each intertwined with human security issues. To address these challenges effectively, comprehensive and proactive measures are imperative, spanning adaptation and resilience strategies, technology adoption, and mitigation of emissions. Moreover, international cooperation is pivotal, given the global nature of climate change and its consequences. Bangladesh, despite the hurdles it faces, provides a poignant case study for the broader discourse on climate change and human security, underlining the urgent need for a sustainable, multifaceted response to safeguard both the well-being of its population and its economic development.

## Notes:

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<sup>5</sup> “Climate Change and Security in Bangladesh: A Case Study”, *Bangladesh Institute of International and Strategic Studies and Saferworld*, June, 2009, [https://www.files.ethz.ch/isn/103629/Bangladesh\\_climat\\_change\\_June09.pdf](https://www.files.ethz.ch/isn/103629/Bangladesh_climat_change_June09.pdf) . Accessed on October 11, 2023.

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<sup>30</sup> Internal Displacement Monitoring Centre, n. 27.



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