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Bangladesh, Factor 5: Climate Volatility

### **Bangladesh: The Next Green Revolution**

Bangladesh, located in southern Asia, borders the Bay of Bengal between Burma and India (CIA). Only a little smaller than Iowa, Bangladesh is the most densely populated country on Earth, containing 160 million people in just 148,460 sq. km of area (CIA). Bangladesh has come a long way in the past decade, after facing many conflicts with the government (CIA). Bengal became separated from Hindu India in a 1947 partition after British rule ended. The mostly Hindu portion of Bengal and Muslim-majority wing of Pakistan had many disputes over borders, eventually causing a war in 1971, taking the lives of 300,000 innocent civilians (CIA). After gaining independence in 1971, power struggles continued to be alternated among different parties until 2008, when democratic rule was established with the election of a new prime minister.

In addition to political instability, as a developing country, Bangladesh has also struggled to deal with food security due to natural disasters caused by climate change. Bangladesh has a tropical monsoon climate, with a warm, rainy summer and a dry winter. January is the coolest month and April is the warmest. The climate is one of the wettest in the world, with most parts getting 1,500 mm of rain or more per year. Unfortunately, the country's tropical climate has become a key cause for a long history of natural disasters. Between 1980 and 2008, Bangladesh has had 219 natural disasters, most of them being cyclones and floods. These events caused storm surge, riverbank erosion, earthquakes, drought, and salinity problems. (ADRC). Most of Bangladesh is located on large deltas of rivers that flow from the Himalayas, while the land is made up of flat alluvial plains. The location, features of the land, plentiful rivers, and monsoon climate make Bangladesh extremely vulnerable to climate volatility. In fact, Bangladesh ranks first in the 2014 Climate Change Vulnerability Index, and it is predicted to be damaged most from climate change by 2025 than any other country (Magnani). Climate change is definitely not a factor Bangladesh can ignore, as it is contributing heavily to food insecurity and stopping Bangladesh from being a stable, successful country.

After becoming an independent country, Bangladesh's economy has grown 6 percent per year on average in the last 2 decades (CIA). Furthermore, more than 15 million Bangladeshis have moved out of poverty since 1992 ("Bangladesh Overview). However, Bangladesh still has about 60 million people living in urban and rural areas that are food insecure, meaning they are not ingesting the minimum amount of food needed to stay healthy. (WFP). Of this population, 47 percent make a living through agriculture, but 60 percent of these people own no land at all (Magnani). A typical rural subsistence farming family has at least 5 members, including the parents and 3 to 4 children. They will farm about 0.4 hectares or less, and they farm only 27 % of the total farmland (Magnani). Rice is the staple crop in Bangladesh, while jute, sugarcane, potato, pulses, wheat, tea and tobacco are also very common ("CAPSA"). Cattle and goats are the most important livestock to own, because farming is very labor intensive (Magnani). Such small areas of arable land, along with drastic variation in climatic factors, make it difficult for farmers to make a living. For instance, rainfall is expected to increase by 10% to 15% during the monsoon seasons by 2030

and 27% by 2075; ...14% more of the country may become extremely prone to floods by 2030; cyclones in the Bay of Bengal will occur more frequently due to increasing temperature, and the peak intensity of cyclones may increase by 5% to 10% (Magnani). Coastal salinity problems will likely worsen as changing rain patterns reduce the amount of dry season water supply from upstream river sources. Overall, crop production could decrease about 30% by the end of the century, rice production could fall by 8%, and wheat production by 32% by 2050 (Magnani). Winter crop production could change a lot because of warmer and drier weather during non-monsoon seasons. When all of these climatic factors are put together with the remaining concerns with food insecurity, it becomes increasingly difficult for subsistence farmers and urban residents to live a healthy, food secure life.

The main causes of food insecurity in Bangladesh besides climate volatility revolve around underemployment, decreasing access to land for cultivation, social marginalization, urban migrations, acute and chronic undernutrition, and gender disparities (WFP). Although the country faces food insecurity, food availability is still sufficient; unequal population and food distribution is the real source of the problem. Lean seasons, or periods of reduced rainfall and cold weather, along with high food prices also have a big impact on food security. During a lean season, a lack of rainfall creates dry periods in which increased salinity intrusion decreases crop yields. This then adds to reduced food availability and a lack of employment opportunities, which drives up the price of food, especially for the rural poor (WFP).

At the root of the socio-economic hurdles preventing Bangladesh from reaching its full potential is the country's extreme gender disparity and lack of opportunity for women. Women and girls, in particular, often face extra challenges that increase food and nutrition insecurity, like having less income earning opportunities and facing gender inequality in the household, especially during pregnancy and after delivery (WFP). "Gender equality concerns women and men, and it involves working with men and boys, women and girls to bring about changes in attitudes, behaviors, roles and responsibilities at home, in the workplace, and in the community. Genuine equality means expanding freedoms and improving overall quality of life so that equality is achieved without sacrificing gains for males or females" ("Gender Equality and Women's Empowerment"). Unfortunately, gender inequality can be seen early on in girls' lives. In Bangladesh most girls have a very early marriage, and adolescent girls are often more malnourished than women older than them, and children born to adolescent mothers are usually malnourished from birth, creating a never ending cycle of malnutrition (Magnani). In fact, Bangladesh has the most widespread presence of underweight children in South Asia (WFP). About one in two children under five are chronically undernourished, and 14 percent have acute undernutrition. Undernutrition then results in higher mortality, or a higher rate of death. In a recent public health study that was conducted, researchers found that the national overall prevalence of Anemia in Bangladesh was approximately 51 % in 2011 (Khan). The anemia in children correlated most strongly with iron deficiency and a lack of micronutrients. Furthermore, most of the mothers of the anemic children were 20-29 years old and 12.4 % were less than 20 years old. Of the households, more than half had 5-8 members, with 1-2 children and one 6-59 month aged child. The proportion of no formal education was higher for fathers than mothers. About 44.1 % of children's mothers were anemic and 30.2 % were malnourished during the time the survey was done. Finally, more than three quarters (78.8 %) respondents lived in rural residences of Bangladesh, and 37.1 % of children lived in households of 'poor' economic class (Khan). In conclusion, this study demonstrates the widespread presence of undernutrition in common rural families, many of which are farming families.

It is also important to remember that even though it is legal, most women do not own property. In 1993, the FAO reported that women in Bangladesh owned only 3.5% of the country's agricultural land. Twenty years later, this amount had decreased even further to 2% (Magnani). In the study it was shown that women were more educated than men on average, but were not given property rights. Empowering more women in agriculture could increase job opportunities and average income in rural areas. This would involve breaking social barriers in communities, which is a large-scale effort that should involve the government. The government of Bangladesh needs to address women's individual involvement in agriculture in their communities. Currently, women spend a lot of time taking care of livestock and crops within their homes, and have no influence on local crop production ("Inspiring Change..."). Biodiversity International, a research organization focused on agricultural development, has been successful in its efforts in enabling women to manage agricultural biodiversity in their communities ("Inspiring Change..."). Biodiversity International visited women in different communities and educated them about what can be done to grow a larger variety of crops, rather than specializing in a single staple crop such as rice or fish. For example, in the village of Akra, Khulna, vegetables were not grown due to salinity intrusion, and the women decided to reintroduce local varieties of vegetables that were not used in the past, along with a more varied selection of vegetables that would be tougher to destroy by the changing conditions of the environment ("Inspiring Change..."). Many factors affecting food security would be positively affected by allowing women to play a part in agricultural biodiversity, one of which could be undernutrition. Women prepare food in the household, and having knowledge of a balanced diet, along with being involved in choosing what makes up the family's diet is instrumental in nutritional development ("Inspiring Change...").

It is due to the poverty faced in rural areas that families move to new locations. Poor urban households reflect the changing demographics of Bangladesh, one that is shifting towards a large, poor, urban slum population. The UN Population Division predicts a 93 % increase in the urban population of Bangladesh between 2000 and 2020, caused mainly from rural to urban migration. When expansion occurs in cities, it creates a struggle to give every resident equal access to public resources, which causes high unemployment rates (Islam). In addition, because there is such a high demands for resources, goods become more expensive, causing unusually high food prices. With all of this going on, poor urban families count on social services and protection to ensure they are provided with the minimum resources they need to survive, but often this kind of help is not offered in urban centers due to a lack of basic infrastructure, and families are left to fend for themselves (Magnani). The government should ensure that civilians have access to social protection programs, starting with women in rural and urban areas. Otherwise, difficulties in reaching migrant women to offer reproductive health services could become a barrier in the country's progress towards the Millennium Development Goals (Islam). The best way to do this is to have women at the forefront of the efforts to educate people in Bangladesh on how to follow their civic duties to create a more food secure community.

In the past decade, poverty in Bangladesh has decreased by one third, yet 47 million people continue to live under the poverty line ("Bangladesh Overview"). In order to become a food secure country, Bangladesh will have to maintain economic stability, improve overall infrastructure, improve education and labor skills, increase government involvement with the people, and adapt to climate change.

Bangladesh has already begun its journey to becoming a food secure country, with the assistance from organizations such as the World Food Programme. It would be very beneficial to continue the World Food Programme's efforts to battle climate change on a larger scale, in partnership with the Bangladeshi government. Over the past 3 decades, the World Food Programme has reconstructed 25,000 km. of roads in order to accommodate for rising flood levels, and built 4,000 km. of drainage and irrigation canals (WFP). In order to help to farm during floods, farmers could use flood tolerant rice varieties, and integrated farming to increase the productivity with limited resources. A simple way to define integrated farming is a "mixed farming system that combines crop and livestock in a complementary manner" (Mamun). Based on uses of this practice in parts of neighboring India such as Tamil Nadu, these systems are mixed animal crop systems where the animal component is often raised on agricultural waste products while the animal waste is used to cultivate the soil and create manure for fertilizer and fuel. This would be very beneficial for Bangladesh because it would help provide a stable soil supply when floods cause major soil erosion.

To help with availability to land, the government should provide subsistence farmers with credit, so that if they do not own land, farmers can buy land on credit so that they are not forced into sharecropping (Magnaani). In *Betting on Famine*, Jean Ziegler suggests the World Bank's recommendation of market-assisted land reform, or MALR as an effective way to help small farmers and tenant farmers avoid the negative outcomes of sharecropping (Zeigler). In MALR, the landowner would be required to give a tenant part of their land, but the tenant would buy the land from the landowners using credit from the World Bank, rather than giving the landowner a portion of the crops that are produced as compensation for farming on the landowner's property (Zeigler). Colombia, Guatemala, the Philippines, Malawi, Honduras, Mexico, and El Salvador have all used MALR, and it was very successful, especially in Latin America. Market-assisted land reform was successful because it allowed for bargaining between the landholder and the tenant, and it did not put the landholder at a disadvantage. Since prices and land size could be bargained, there was less disagreement after the deal was made, and because the payment was made in advance to the landholder, there were no legal disputes or cases involving no profit or returns from the tenant ("The World Bank's..."). Finally, MALR encouraged economic development for poor farmers, because it required planning before the purchase, meaning farmers had no debt and therefore would be qualified for bank loans or other financial assistance in the future ("The World Bank's...").

Since Bangladesh has a very labor-intensive work force, it can boost its economy and GDP by increasing the export of goods to other countries, especially food items. The Bangladeshi government had attempted to increase imports in the past, but was unable to partly because India had banned rice exports in 2007 ("UNU-WIDER : Research Brief"). Bangladesh and India have similar geography and food security problems, and could have a very beneficial partnership in solving the problems of food security. Although this is quite a challenge for two countries which may have faced political tensions in the past, Bangladesh must rise to the challenge.

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