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Bangladesh: Ensuring Agricultural Security through Sustainable Practices

Introduction:

Of the world's nearly 7 billion people, nearly a fourth live in the Indian Subcontinent, an area that will soon be the most populous in the world. The region's steady population increase, coupled with the increasing risks posed by climate change, pose serious threats to both food and national security. To truly eradicate starvation, one must also eliminate poverty. Much of this poverty in this struggling area, between 80 and 90 percent, occurs in rural regions. As the demand for food increases and available resources change, policy-makers must enhance capacity building at the local level, empowering sustainable ecosystem management and ensuring continued soil fertility and function while simultaneously providing food and other essential services (Roots).

In this struggling region, no country faces greater challenges than Bangladesh, a nation in the Indian Subcontinent. With roughly 1,603 people per square kilometer and 140 million inhabitants in total (crammed into a land area about the size of Iowa), the government struggles to meet the food needs of its citizens. Many inhabitants can barely afford basic necessities. Another grave threat to food security lies in the specter of rising sea levels due to climate change. Bangladeshi leaders speculate that such changes could destroy one-third of the country and displace some 20 million people (Masum). Even with fears of food scarcity, however, about two-thirds of the country's residents work as farmers. Thus, if farmers learn more sustainable agricultural practices, the nation's food and economic prospects could greatly improve.

Typical family:

Despite recent economic growths, the United Nations' Human Development Index ranked Bangladesh the 147th most developed country out of 179, the worst showing for any country in its region (Bangladesh: Comprehensive). The report takes into account various factors influencing quality of life such as literacy rates, life expectancy, and average income. The average Bengali woman gives birth to about three children, contributing to a relatively young population. In wealthier households, the male to female ratio is 113%, while in poor households it drops to 102%. This indicates that low-income families have, on average, fewer income-earning male members. Children below 14 years old constitute 36% of the population, whereas citizens above 65 make up only 4%. The government requires primary education (kindergarten through eighth grade) for all its citizens, with most quitting after eighth grade. Even with this compulsory education, Bangladesh's 47.9% literacy rate is one of the lowest in South Asia (Rahman).

Bangladesh has a rich food tradition known for its delicious, subtle flavors and sweet desserts. Most meals revolve around the staple of rice, embellished with seasonal vegetables, curries, soups, fish or, on special occasions, meat. Seafood provides the main

source of protein for a typical household, and fish are plentiful in both ponds and the fresh-water rivers of the Ganges delta. Rural people typically eat three meals a day, but the more poverty-stricken families oftentimes eat only two meals. In the summer months prior to harvest, it is not uncommon for a family to eat only one meal a day. A recent study on food scarcity found that 91.8% of chronically poor Bengali families lacked resources to prepare three meals a day. Despite Bangladesh's renowned cuisine, many of its poverty-stricken inhabitants simply cannot afford an adequate diet year-round.

The country's per capita GDP stands at about \$470 USD. While the typical rural family's income varies greatly depending on the season, a 2007 United Nations Development Programme study found that 49.8% of the population lives below the poverty line. The report also found that a startling 41.3% live on less than \$1 USD per day (Bangladesh: Comprehensive).

Of Bangladesh's total GDP, agriculture accounts for 19% (compared to the United States' 1.2%). Over 70% of the land is arable, and the typical farm in this agrarian country measures 0.68 hectares. Much of this area is used for rice production, which accounts for nearly three-fourths of agricultural land use. Another primary crop is jute, but many farmers also grow corn and various other vegetables including potatoes and sweet potatoes. Oilseeds, bananas, mangoes, pineapples, and sugarcane are also grown.

Factors Preventing Agricultural Productivity:

Environmental instability, monoculture farming practices, and rural poverty all work against the agricultural productivity of Bangladesh. Global warming poses the most serious potential risk to national food security if rising sea levels eventually cause millions to flee from their homes and inundate large tracts of prime agricultural land. High-input agro-industrial practices, encouraged by farm policy since the 1960's, have destroyed more diverse, sustainable farming systems and also greatly increased the risks associated with monoculture crop production. Finally, economic barriers deter rural farmers from seeking alternatives to current techniques.

Bangladesh's southern coast is dominated by a massive fertile delta formed where Asia's two largest rivers, the Ganges and the Bramaputra, meet and empty into the Bay of Bengal. The delta provides a legacy of rich agricultural land, whose soils are continually replenished by silt deposited by the great rivers (Braasch). The land, however, is low and flat and precariously close to the sea. Climates worldwide are changing as CO₂ and other greenhouse gases trap much of the earth's radiated heat. This phenomenon is increasing the earth's land and ocean temperatures. As seawater warms it expands, causing sea levels to rise. Even greater sea level rise can occur from the melting of land-based glaciers, particularly in Western Antarctica and Greenland. A team of Bangladesh government meteorologists and geologists found that, on average, river erosion destroys over seven and a half hectares of land each year. Much of this low-lying land is planted in rice fields, so not only are communities being forced further inland, but production of the country's most important staple crop could take serious blows (Masum). In 2001 the

World Bank reported a 3mm annual rise in the Bay of Bengal. With 15 to 20 percent of Bangladesh within a meter of sea level, 13 to 30 million people are at risk of displacement. The World Bank also warned that the predicted rise will decrease the rice crop by up to 30%.

Many rural farmers grow only one crop, but the earth's soils did not evolve to support a single crop for years on end. Recent studies on the soil in Bangladesh indicate that in biodiversity-rich areas, 40% of the food comes from uncultivated sources. Thus, it is clear that the land possesses a high potential for diverse agricultural yield. Despite these promising statistics, the last 40 years of government policies have encouraged and implemented high-input systems of single-crop farming practices. Although this may have given rise to a temporary increase in food security, it has also destroyed biodiversity-based systems. Rural farmers have essentially put all their eggs in one basket, and if the status of their single crop diminishes, they do not have any sort of economic fallback with other crops.

Economic instability presents a major barrier to food production and security. About 20% of rural households live in extreme poverty, with another 29% considered moderately poor. The poverty-stricken rural families are at high risk of falling even deeper into poverty. For one, many of these people can not afford a diet in which they receive an adequate amount of nutritional elements such as protein. This makes them more susceptible to infectious diseases (Rural Poverty Portal). Natural disasters also pose a particularly high risk to these poor families. When such disasters strike, the economically unstable households will have a much more difficult time regrouping. They are also less able to buffer minor crop failures because their livelihoods depend on each and every dollar they can receive. Poverty also inhibits farmers from expanding their production and makes it difficult to invest in new, more efficient technologies and practices.

Environmental and economic instability and unsustainable farming methods all hinder agricultural production. Although some of these elements are out of human control, policy changes could greatly decrease the risks involved with food production in the area whilst simultaneously increasing the diversity and quality of food grown.

Possible Solutions:

Bangladesh certainly faces tremendous obstacles in improving food security. Despite these dangers, policy-makers can take steps to improve current agricultural conditions and increase farm resilience. By educating rural farmers about findings from agricultural yield and sustainability research and assisting in the implementation of recommended practices, policy makers could increase both food and national security in these insecure times.

Current farming practices in Bangladesh simply are not sustainable. In the past, governmental initiatives encouraged rural farmers to most effectively meet the food needs of the country by growing only one crop, rice. The program not only failed to meet

the food needs of the people, but also acted as an economic hindrance, for farmers now need to spend excessive amounts of money on fertilizers and pesticides in order to continue monocrop production. The rural farming practices encouraged by the government are not sustainable and will become even less beneficial in the coming years.

In recent history, the use of chemical fertilizers in Bangladesh has risen continually. In 1980, the average hectare of land used about 50 kg of fertilizer. Today, this amount stands at nearly 200 kg per hectare today (Agriculture). The amounts of nearly all fertilizers and pesticides used have increased drastically in recent years.

The escalating dependency on fertilizers and other unsustainable methods has had a negative impact on rural farmers. Farmers are finding it increasingly difficult to keep up with rising costs. In the past 20 years, fertilizer price has quadrupled. In this same time, pesticides prices have increased tenfold. Today, rural farmers are not only at the mercy of natural disasters, but they have also created a dependency on external inputs.

If policy-makers promote and help implement sustainable and environmental practices, a multitude of problems addressing food insecurity would be addressed simultaneously. First, rural households would no longer be dependent on a single crop for all of their income. Also, farmers would no longer need to spend large portions of their incomes to purchase excessive amounts of fertilizers and pesticides. This new capital could both provide individual food security and enable farmers to improve practices and production. Environmentally-friendly techniques would help reduce the risks currently posed by climate change. As the pollution of local ecosystems decreases, the stability and productivity of the land is augmented (Roots).

The key to food and financial security for the rural people of Bangladesh is building resilience. This ability to adapt and thrive in the face of challenge will be increasingly important in this region especially as it feels the immediate and direct results of environmental changes.

One means for increasing security and resilience is a focus on building up and working with local ecosystems. Education on sustainable, efficient ecosystems management holds promising prospects for rural farmers. For one, natural ecosystems are already used extensively and serve as primary assets of these households. Because farmers already have access to ecosystem services, it is only a matter of educating them on better management of these resources and giving them the tools to implement sustainable practices. Creating learning networks and cooperatives among local communities could prove tremendously successful in increasing the security of food production.

An initiative in northern Bangladesh has shown just how successful sustainable ecosystems management can be. Nearly a decade ago, villagers on the shores of Hail Haor wetland were starving, their fishing nets turning up empty. Households fiercely competed to buy fishing rights from local businessman. Then, after the implementation of a grass-roots effort aimed at working with local ecosystems and promoting community

self-interest, fish catches in the area rose by 140%, consumption increased by 52%, and the average household incomes rose by 33%. The initiative even saw two locally extinct species re-enter the habitat. Villagers now patrol no-fishing reservations and work to restore degraded habitats. This people-led wetland management program has been drawing attention from organizations all across the Indian Subcontinent, where the idea of the co-management of ecosystems is gathering steam. In total, three fisheries in the area have been revived and 184,000 poor Bengali citizens have seen an improvement in living conditions as a direct result of the program. Encouraging and facilitating cooperation among local communities to maintain healthy ecosystems and sustain themselves on the services these ecosystems provide is essential to building resilience in the region (Roots).

Another step necessary to increase future food security in Bangladesh is a fundamental shift away from the monocrop system. With high-tech agriculture, the farmer is at the end of a long supply chain and totally dependent on inputs that are produced upstream. If these inputs are cut off, the farmer is left without the means for crop production and sustenance. Rural farmers should be encouraged to combine newly gained knowledge with traditional, diverse farming practices where rice is grown alongside potatoes, corn, and mangoes. In agriculture, just as in most endeavors, diversification spreads out risk. Rather than hoping for the continued prosperity of a single crop, it is essential that farmers begin growing a wide variety of crops (Peters). This mimicry of nature would not only prove more secure in the long run, but it would also provide economic relief to poverty-stricken farmers. With many crop grown together, expenditures on pesticides and fertilizers would be greatly reduced, if not eliminated. The soil in this region certainly possesses the ability to support such diversification. For thousands of years, farmers successfully grew a wide array of essential crops on the fertile soil (Rahman, Laskar). Now, it is a matter of educating farmers on the risks of current practices and giving them the means to make the initial change back to more secure agricultural practices.

The government of Bangladesh must take it upon itself to educate its rural farmers on issues of food security as well as methods to become more resilient (Roots). Ultimately, the problems facing rural farmers are problems facing the whole country. Education is the first step in arming the population with the tools needed to combat future problems.

To improve farming conditions in the poverty stricken rural farmlands, more established, affluent communities must offer assistance. The nature of rural poverty prohibits the households from accumulating enough capital to invest in improvements. Funds must be allocated for the initial transitions into safer, more sustainable community practices. In the long run, the environmental benefits and decrease in poverty will pay for themselves.

Conclusion:

In the coming age of economic, environmental, and political uncertainty, Bangladesh certainly faces major threats to its food security, which in turn threaten its national security. Increased demand, coupled with environmental instability pose major obstacles to this nation. The net of poverty that envelops many rural farmers creates yet another obstacle that the nation must overcome. Despite the grave situation, there exist great possibilities for success.

If local communities, with the aid of national and international entities, can work together to share and discover new and more sustainable methods, the current and coming obstacles could be greatly reduced in magnitude. With proper practices, rural families could satisfy their needs as well as the needs of their neighbors while simultaneously improving their own economic prospects, not just for a year or a decade, but on an ongoing, sustainable basis.

The problems faced today are not unsolvable. However, as is the case with any other obstacle, it will require human ingenuity and a fundamental shift in the current way of thinking. If the people of Bangladesh can successfully meet these challenges, they could provide an invaluable example for other countries, both in the Indian Subcontinent and worldwide, as they face similar barriers to future prosperity.

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