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Bangladesh, Factor 13: Demographics

Bangladesh: Utilizing Urbanization for Sustainable Development

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Food security continues to be one of the largest problems facing modern societies. It is the culmination of a variety of factors, from changing populations, such as in countries like Bangladesh, to fraudulent governments to climate change. However, the problem does not lie in simply producing enough food. A food-secure country also supplies nutritionally sufficient food. Bangladesh has made large strides, especially in poverty reduction, since its independence from Pakistan in 1971. However, it has not made as much progress concerning food security. Although caloric intake has increased, nutritional intake has not increased proportionally. Additionally, the country is undergoing rapid urbanization, decreasing the amount of arable land. Considering the small size of the country and its large population, this poses the challenge of producing enough food, even if it is not nutritionally dense. If population demographics are used to sustainably produce food, they can be utilized to provide solutions to nourish an ever-growing and dense population. Through employing sustainable urban farming, Bangladesh will be able to effectively feed its population.

With an estimated population of 162,650,853, The People's Republic of Bangladesh stands as the eighth most populated country in the world ("South Asia," n.d.). The most prominent ethnic group is Bengali, consisting of 27 various tribes, although this number has been estimated to be higher. Bengali is the national and most-spoken language, with 98% of the population speaking it. To accompany this, 89.1% of the country practices Islam with a 10% minority practicing Hinduism. 40.2% of the population is within 25 and 42 years of age. The Bangladeshi administration is centered in the capital city of Dhaka, which is also the largest city at 21.006 million people. 26.48% of the population is between 0 and 14 years old, indicating that the population is rather young and will continue to grow ("South Asia," n.d.).

Bangladesh, with 148,460 km of territory, lies between latitudes 20°N and 27°N. The terrain is a flat alluvial plain, which makes it some of the most fertile soil in the world. The country routinely experiences droughts, cyclones, and summer monsoons. Its most abundant natural resources include arable land, natural gas, and timber, with agriculture assuming 70.1% of land use ("South Asia," n.d.). Because of its flat terrain and network of waterways, Bangladesh is vulnerable to droughts and flooding. It is even more vulnerable due to the dense population and lack of infrastructure ("Climate Change," 2019). The loss of land to urbanization is not currently being used to sustainably develop Bangladesh's population. Many people live on flood-prone land due to landlessness. Water pollution and diseases are also common, especially in fishing areas. The economic impacts of climate change are immense, with the Bangladeshi government spending \$1.46 billion USD on climate change annually. Bangladeshi citizens spend an estimate of nearly \$2 billion USD on improvements to combat effects of climate change, including replanting destroyed crops or replacing lost animals (*Bangladesh Rural*, 2019).

The state of a nation's government determines the state of the nation as a whole and Bangladesh is no exception. Its government is notoriously unscrupulous. Its history has consisted of several military coups and voter fraud incidents. Recently, Bangladesh has cracked down on the ability of the media and private citizens to criticize the government through speech and press ("Bangladesh: Events," 2019). This poses a challenge to new Bangladeshi initiatives because governmental approval is needed not only for the security of the program, but for the safety of those involved. Despite the political trauma of the last few decades, Bangladesh has made remarkable progress. The poverty rate (based on the poverty line of \$1.90)

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has declined from 44.2% in 1991 to 14.8% in 2017 (“The World,” 2020). Since 2005, the \$261.5 billion economy has grown by about 6% per year (“South Asia,” n.d.). The country reached the lower middle-income eligibility status in 2015 and will likely be removed from the UN’s Least Developed Countries list by 2024 (“The World,” 2020). Although other industries, particularly the garment industry, produce more exports, agriculture employs nearly half of the workforce. Exports include garments, knitwear, leather, and some agricultural products. Imports include cotton, machinery, chemicals, and foodstuffs (“South Asia,” n.d.). The textile industry possesses a \$41 billion export value while foodstuff and animal products are only worth \$779 million export value combined (“Bangladesh,” n.d.). The most important agricultural exports are rice, prepared crustaceans, and legumes. While Bangladesh has made great progress, it still struggles to further reduce poverty. Infrastructure development and agile policies are needed to alleviate challenges related to urbanization, climate change, and population growth (“The World,” 2020).

With family being a vital part of Bangladeshi society, it is crucial to understand the challenges the average family faces. The average woman bears 2.11 children, which is near the level of many “developed” countries (“South Asia,” n.d.). The mean age for a woman’s first birth is 18.5 years. Depending on the area one lives in, dwellings vary greatly. An urban family would likely live in a slum, which the Bangladesh Bureau of Statistics defines as a residence made of the cheapest materials and built ad lib. They are often situated near roads or businesses (MDG Achievement Fund, 2015, p.2). These buildings are notoriously unsanitary due to crowded residence, poor sanitation, and insufficient waste management. A rural family likely lives on a smallholder farm, of which the average size is 0.24 hectares (Rapsomanikis 2015). Most jobs are located in agriculture, but there is an increasing number of jobs in factories and service centers due to mass urbanization. The unemployment rate is 4.4%, however it is realistically around 40% because many people work for only a few hours at a low wage (“South Asia,” n.d.). Income is an important determinant of diet. In Bangladesh, the wealthiest 20 percent of households consume an average of 6.9 food groups, but the poorest 20 percent only consume 4.9 groups. Additionally, an increase in income correlates to an increase of vegetable, meat, and fish consumption, all of which are more nutritionally dense than grains, a prominent component of many Bangladeshi diets (Dizon et al., 2019, p.19-20). However, food prices are rising more quickly than non-food items and the price per calorie for nutritionally dense foods is higher than energy-dense foods such as grains (Dizon et al., 2019, p. 22-23).

Among the challenges Bangladesh faces, rapid urbanization is one of the largest. Urban dwellers compose 38.2% of the population, with that number growing by about 3.19% annually (World Bank, 2018). Major cities include Dhaka (21.006 million), Chittagong (5.02 million) and Khulna (954,000) (“South Asia,” n.d.). The urban population totals over 59 million people (World Bank, 2018). Urbanization has occurred in tandem with industrialization, as many people migrate to cities for better working opportunities in factories and the service sector. There are fears that urbanization will decrease the amount of arable land and the agricultural workforce. Bangladesh had 9.39 million hectares of cultivable land in 1976; by 2011, there were only 8.52 million (Miah, Bari, Hossain, & Islam, 2013, p. 4). This trend decreases the production capacity of agriculture, leaving less land to feed more people with less smallholder farmers, endangering the nutritional stability of Bangladesh.

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Population growth is another colossal problem for Bangladesh. 40.72% of the population is within the ages of 25 and 54. Lower percentages are seen for the 0-14 and 15-24 age brackets, suggesting that Bangladesh is transitioning to a more “developed” state, according to a standard age structure diagram. The median age is 27.9 years old. The population growth rate is 0.98%. Not only is the population growing; it is also becoming denser. There are approximately 1240 people per square kilometer. For comparison, there are approximately 90 in the same area in the United States (“South Asia,” n.d.). It was the second fastest growing country in the world in 2016 (Chowdhury & Hossain, 2019). There are fears that population growth and population density will limit food production capacity. 31.67% of the children under the age of five years are underweight, which is largely credited to the lack of maternal education (Chowdhury et al., 2018). This is especially concerning given the large percentage of the population that is 0 to 14 years old.

With the amount of rural land decreasing and urbanized land increasing, Bangladesh faces a challenge to provide a sufficient amount of nutritious food to its population. Specifically, land space is a challenge due to the population density. Bangladesh loses 1.75% of its arable land each year, indicating that the definition of a cultivable environment needs to adapt to encompass the necessities and abilities of the modern world (“Making Bangladesh’s,” 2012). Urban agriculture is a viable solution to growing nutritious food in the face of urbanization. There are no current sizable projects to advance urban agriculture in Bangladesh, however, the Food and Agriculture Organization (FAO) and the World Food Programme (WFP) have funded projects across the world. Urban agriculture has many benefits. It has been demonstrated to improve air quality through the reduction of excess atmospheric carbon dioxide. It can help regulate stormwater, which is especially valuable to Bangladesh because it regularly experiences monstrous monsoons (Safayet, Arefin, & Hasan, 2017). Additionally, it can shorten and simplify food transport from cultivation to consumption, making it a valuable asset to an urbanizing country (van der Meulen, van Oostrom, Verzandvoort, & Mol, 2014, p.6). It can also supply families with a sufficient provision of produce, saving a significant amount of money. In eating more fresh produce, the nutritional density of the urban diet increases dramatically (Hagey, Rice, & Flournoy, 2012). In allowing private citizens to cultivate fresh food plentifully, urban agriculture saves money in the long term while providing ample nutrition.

Bangladesh possesses many of the factors necessary for urban agriculture. First, and most importantly, it has a growing amount of urbanized land. Agricultural land comprised 78.79% of land area in 1990; in 2018 it comprised just 70.63% (World Bank, n.d.). This drop may not seem significant, but this conversion involves more than just not cultivating the land; it involves development and infrastructure as well. Secondly, Bangladesh possesses an estimated 1,000 to 10,000 hectares of rooftop space. This amount of land could yield an additional 10,000 to 100,000 tonnes of food annually (Clinton et al., 2018). Lastly, Bangladeshi buildings are suitable for rooftop farming. Many urban dwellers live in ‘pucca’ houses: structures made of brick and reinforced cement or concrete. A 2017 study analyzing the prospect of rooftop farming in Dhaka hypothesized ‘pucca’ houses to be sufficient for this practice (Safayet, Arefin, & Hasan, 2017).

Urban agriculture is not a new concept, but many international organizations had been slow to offer funding for it, but that is changing. The World Bank has recently provided grants to various countries to support agribusiness development. For example, they contributed \$25 million to the Central African

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Republic in order to strengthen agricultural resilience. It heavily focused on developing productive infrastructure and the project benefited the peri-urban areas of Bangui. It also carried provisions to provide, effective responses to an environmental or economic crisis both of which Bangladesh is likely to experience. A grant like this, with more of a focus on urban areas, would be an exceptional way to catalyze urban food production (World Bank, 2019).

Urban agriculture, as with any other type of agriculture, requires a consistent level of maintenance. It is critical to consider certain inputs and the quality of those inputs in order to perpetuate an urban farm long-term. One key element is water, as urban industrial wastewater can be rather polluted and unsafe, however, nonindustrial wastewater is suitable. Ideally, water systems would be rerouted for urban food systems, but that is neither plausible nor possible in Bangladesh currently (Clinton et al., 2018). One way to combat this is using simple hydroponics as a form of low-cost water recycling. Additionally, utilizing water efficiently is key. This can be accomplished through tactics such as drip irrigation (*Water Use and Reuse*, n.d.). However, this may not be as much of a concern due to the prevalence of storms and monsoons in Bangladesh. Additionally, looking at the structure of a particular building is important. The slope will determine how much weight the building can bear. For many of the poorly built residences, this may limit how and what the residents can cultivate (Safayet, Arefin, & Hasan, 2017). One must also take into account the weight of stormwater, as Bangladesh will have a large amount. Furthermore, the crops must be chosen based on root depth to mitigate the weight of planting infrastructure. A suitable root depth would be 0.3 to 0.61 meters (one to two feet), which applies to plants such as kale, cabbage, spinach, and squash (*Vegetable Root*, 2011, p.1). Another key question is the role of pesticides, as they may pose a danger if used without regulation. The specific steps should be addressed on a case-by-case basis, however, there is an overarching method that has seen success: Integrated Pest Management (IPM). IPM is not an official process, rather more of a logical series of steps to take when implement. It begins with setting action thresholds and “ends” in control, although this process is not finite (*Integrated Pest*, n.d.). However, it requires vigilance and consistent engagement.

However, there are difficulties to overcome. The most prominent is the lack of education among Bangladeshi citizens. Civic education would need to be a primary focus of the initiative, as there is a lack of technical training and awareness. The safety measures alone demonstrate the necessity for an outreach organization, similar to cooperative extension programs in United States land-grant universities. This would also be a ground-up concept. There are currently no solid urban agriculture projects in Bangladesh from the government or outside organizations. Proper cooperation is needed between government, intergovernmental, and civic factions not only to propagate urban agriculture but incentivize it as well. Much of the work would be done by the citizens. Incentivization will encourage more people to take on the management of urban farms (Safayet, Arefin, & Hasan, 2017). Subsidies or other forms of financial assistance are effective incentives, as the prospect of more nutritious food alone is usually not enough to convince urban dwellers to sacrifice time and energy.

Because of its potential, urban food systems have gained attention from international organizations. The FAO recently conducted a project called The NADHALI Project, which aimed to cultivate better supply chains and food systems to adequately nourish urban populations. It lasted from December 2016 to May 2018. It was created with the idea that urbanization can indeed be done sustainably and can even encourage sustainable development. The project began in three pilot cities: Nairobi, Dhaka, and Lima.

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This project was the first one designed to support the New Urban Agenda, passed in Quito in 2016 (Food and Agriculture, 2019). This project focused on local governments and using municipalities to enact change. It includes firms from the public and private sectors. It aimed to bring food distribution from a sectoral nature to a systemic one. The project relied on the creation of a Food Liaison Advisory Group (FLAG). It included any entity that could have a stake in government actions, such as the healthcare system and the commerce industry. FLAG collected perspectives from various religious, cultural, social, and geographic factions (Fonseca, Marocchino, Batt, Wanjiru, & Neven, 2018, p. [Page 10]). Another component was the development of a Rapid Urban Food Systems Appraisal Tool (RUFSA) to identify specific problems and prioritize holistic interventions. This would be akin to food councils that are seen in North American and European cities. With this research, it was found that supply chains became less organized during the distribution stage. It concluded that Bangladesh faced a large challenge with post-harvest systems rather than agriculture itself. The project even mobilized the Netherlands to fund a five-year, \$12.5 million USD project in Bangladesh (U.N. Food and Agriculture Organization, 2019). This project is incredibly promising due to the success of intersectoral cooperation, which is not easily conceivable in Bangladesh. Although the project is no longer running, it sets an astute example of how entities from different sectors should collaborate. Unfortunately, Dhaka did not adopt many measures in city government. Feeding the urban population, which is rapidly growing, is a challenge that requires input from every entity and a project emulating the NADHALI project's tenets can yield effective, lasting, and comprehensive change.

There are additional examples where urban agriculture has been successful. There are a number of urban agriculture projects that have been done or are continuing in disadvantaged urban areas globally. It receives keen interest from the United Nations and the World Bank because of rapid urbanization. One such case is in Bangalore. The World Bank conducted a case study of the presence of urban agriculture in Bangalore, since it already had a thriving urban farming community. Bangalore faces similar challenges to Bangladesh, such as in much of its land being converted to non-agricultural uses. Additionally, the main reasons for participation included extra income and additional food sources, which are both applicable to Bangladeshi cities. Bangalore also instituted green areas as protected zones in the Master Plan 2015, which is conducted through the Bangalore Development Authority. Agricultural land is protected, which shows Bangalore's commitment to protecting urban (and peri-urban) areas. Additionally, 33% of the crops grown is a grain called ragi and 18.5% were vegetables. What differs in Bangalore, however, is that many of the producers are urban farmers by occupation, although there is still a sizable number of casual laborers. A lot of income comes from raising livestock; however, this is not necessarily feasible for Bangladesh considering there is no current infrastructure. 56% of participants in a survey said that engaging in urban agriculture to at least some degree saved them money. They commonly cited rice, wheat, vegetables, meat, and milk as items they purchased because of that. 15.2% of respondents in peri-urban to urban areas stated they had a more diverse diet because of participation (World Bank, 2013, p. 49). Bangalore exemplifies cooperation and involvement, which are necessary for urban agriculture to function well. Government recognition also plays a crucial role, which sets an example for how the Bangladeshi government should participate to make this successful (World Bank, 2013)

As increased urban populations continue to alter Bangladeshi demographics, it becomes increasingly critical to use this as a tool for sustainable development and to increase food security. Supporting urban agriculture will make the transition to a more nutritious Bangladesh not only possible, but plausible. This transition will not be easy. The challenges are plentiful, for it essentially is a ground-up initiative.

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Government support is crucial, both financial and political, to both start and maintain urban agriculture. It is an enormous shift under the current food production system. However, urban problems need to be addressed as more of the population shifts to urban areas. This strains the entire country, and frankly, Bangladesh needs to evolve to adequately provide for its changing dynamics. The challenges of incentivizing and improving urban agriculture are minuscule compared to the issues Bangladesh will face if it does not sufficiently adapt to the changing population.

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