

Research Article

Climate Change and Food Security in Bangladesh: A Case Study on Sirajgan Sadar Upazilla

Miraz Rahman Khan^{1**}, Mahfujur Rahman^{2*} and Fairuj Anica^{3***}

¹Assistant Professor, Department of International Relations, Jahangirnagar University, Savar, Dhaka, Bangladesh

²Assistant Professor, Department of Public Administration, Jahangirnagar University, Savar, Dhaka, Bangladesh

³Freelance Researcher, Masters of Public Administration (MPA), Jahangirnagar University, Savar, Dhaka, Bangladesh

(*Corresponding author) email id: *saikatmahfuj@juniv.edu; **mrzu40@gmail.com, ***fairujanicaajupa2014@gmail.com

Date of Submission: 20/08/2022; Date of Acceptance: 25/08/2022

ABSTRACT

Food is considered one of the five elements of basic human needs and to fulfil the dietary deficiency, the developing and less developing states struggle on a regular basis. Bangladesh is one of the countries with lower middle-income status and is engulfed by overpopulation with its current population of 168 million (approx.). To feed the extra mouth, the country not only relies on its domestic production but also on food importation from abroad. However, like man-made issues (food adulteration, illegal stockpiling of food grains, artificial shortage of food supply in the market, high food pricing, etc.) natural causes like flood and river erosion thwarted the overall food production and moreover, affected the food security programme at the micro (household) and macro(national) level. The Sirajganj district of Bangladesh is located in the northern part of Bangladesh and most of the residents earn their livelihood by means of agriculture. Almost every year during the monsoon, thousands of people in this district suffer as both flood and riverbank erosion damages their croplands and livelihoods. Food security is a complex web as it is intertwined with the overall development indicators of human beings and is being affected by adverse climate change. As part of the human security programme, the key objective is to highlight the prime causes which are causing food insecurity in the survey area and moreover, draw a sketch of the overall food security status of the Sirajganj district of Bangladesh.

Keywords: Climate change, Food security, Population, Natural hazards, Public policy

INTRODUCTION

Bangladesh is a country in South Asia and its current population is 168,177,712 (Statistics Time n.d.). And according to United Nations (UN) news, the world population will be 8 billion in November 2022 (UN News, 2022). On the other hand, according to the fifth census 2011, the population of Bangladesh stood at 149 million people, nearly double the country’s 1974 statistic and approximately 19.3 million more than 10 years ago (Bangladesh Bureau of Statistics, 2012). This level of growth is approximately equivalent to an annual population growth rate of 1.34% over the past decade. With the increasing population growth rate, the country needs to import extra food grains to meet up the dietary demand of the people. Despite that, due to the purpose of accommodation of increasing population and the impact of natural calamities like floods, drought and cyclones, the proportion of arable land is shrinking day by day which is shown in Figure 1.

Simultaneously, the lack of nutritious food, lack of food access, and lack of overall monitoring in the agriculture field (especially, in food pricing in the context of income of poor people domestically and internationally) made food security a vulnerable issue for Bangladesh. In 1996’s World Food Summit defined food security as:

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. (Committee on World Food Security, 2012, p. 5; Food and Agriculture Organization [FAO], 2006, p. 1)

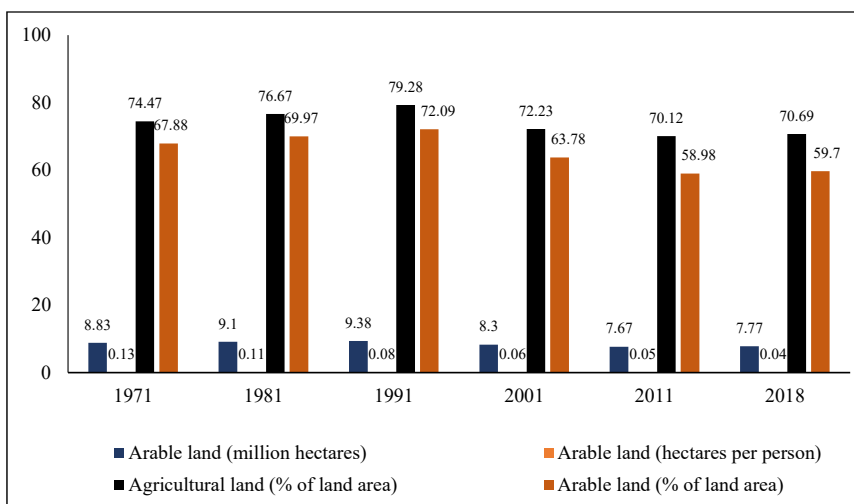


Figure 1: Chronological Change of Percentage and Quantity of Arable and Agricultural Land in Bangladesh from 1971 to 2018 (Selected Years)

Source: Collected from Secondary resources

Poverty plays a very negative role in achieving food security, due to economic disparity 36 million people of Bangladesh still face acute hunger and malnourishment. According to the Global Food Security Index report Bangladesh ranked 84 among 113 countries globally and 23rd in the Asia-Pacific region (Economist Intelligence Unit [EIU], 2021, p. 38). Food insecurity, hunger and malnutrition, etc. are often considered the prime causes of health risks. Primarily, food security is not easily attainable with the potentially catastrophic effects of a rapidly increasing population and natural calamities which are lowering the food production rate. Side by side, the existence of other issues like lack of proper knowledge about food nutrition, food price, access, availability, etc. hinder the food security programme of the Bangladesh government and making more complex to overcome.

LITERATURE REVIEW

The food security issue is included in non-traditional security and has a greater significance in the development of human rights. Again, as this issue has a greater impact on a national and global policy-making level that's why many journal publications and research works have been carried out. Some of the research works are directly related to this research (national and international research published by international organisations like FAO and U.S. Agency for International Development (USAID)).

'Sustainable Food Security for All by 2020' proceedings of an international conference (International Food Policy Research Institute [IFPRI] 2001). The key discussion of this publication is how to attain food sustainability, how to eliminate food insecurity by 2020 and achieve food security both in national and global level, side by side what will be the role of key actors like a global (donors, institutions) international and national level.

'Food Security' policy brief (FAO, 2006). The key features of this publication are the dimensions of food security, the conceptualisation of food security and how food security can be attained. Simultaneously, highlighting the possible reasons which are slowing the pace of the food security programme are mentioned here.

'National Food Policy Plan of Action and Country Investment Plan' Monitoring Report 2020 (Food Planning and Monitoring Unit [FPMU] Food Division, Ministry of Food and Disaster Management Government of the People's Republic of Bangladesh)The report's key discussion evolves around the development initiatives taken by the government of Bangladesh to minimise the threats to food and nutrition security, that is, monitoring overall progress with the prescription of food security concerned institutions like (FAO, IFPRI) along with Foreign donors like USAID, RED CROSS, etc.

METHODOLOGY

This study followed a mixed method, where both the qualitative and quantitative data have been used from the secondary data sources. Based on the content analysis, this paper is both descriptive and analytical. For the Quantitative data study area (residents of most natural hazard-affected areas) considered as a primary source (Sirajganj Sadar Upazilla) and for secondary data books, journals, online documents and newspapers have been used as the key sources to conduct this research paper. A structured questionnaire survey has been conducted to collect primary data from climate change affected families from different socio-economic class backgrounds by using a simple random sampling method while the area has been selected purposively. In addition, formal and informal meetings and interview, focus group discussion and expert opinion has been considered to collect primary data.

Objectives of the Research

1. To find out how and what way climate change affecting the food security of Bangladesh.
2. To identify various factors related to food insecurity and malnutrition of the migrating people.
3. What could be the possible ways to mitigate undernutrition and food insecurity to ensure food security among vulnerable people of the climate change affected region?

Food Security in Bangladesh

Food security is one of the current issues which is related to human security as well as basic human needs, though the journey of this idea started during the 70s. With the passage of time, the concept and its definition changed to meet the chronological demand and perspective. Thomas Malthus (1766–1834), an 18th-century political economist showed that the world population is increasing at a geometric rate and the world food production increasing at an arithmetic rate (Malthus, 1798, pp. 7–8). The present population is about 7.9 billion and by 2050 would be near about 9 billion which has been assumed by social scientists (Flynn, 2009, p. 39). This may create severe poverty, hunger and social chaos. People will suffer food shortages and nutrition levels will be depleted, as a result growth of people will be hampered. This gradual population growth might lead to food insecurity. Globally, near about 820 million people are malnourished and about 2 billion suffer from food insecurity (FAO *et al.*, 2020, p. 22; World Health Organization, 2019). Considering to current world poverty scenario that still 1.3 billion people are poverty-stricken and regularly about 690 million people go

to be hungry (Kathryn, 2020; United Nations Development Programme [UNDP], 2020). In Bangladesh, the present population is near about 162.7 million and by the year 2050, this population will rise up to 225 million (Bangladesh Bureau of Statistics [BBS], 2017, p. 9). Now, a developing country with limited resources and an increasing population might find itself in a vulnerable position and food security would hard be to achieve. Basically, food security is an issue which has complex ties with the above dimensions and appropriately explains the dynamics of hunger.

Climate Change and Food Security in Sirajganj Sadar District of Bangladesh

The Committee of World Food Security (CFS) 2005 assessment of the world food security situation asserts that, while chronic hunger is a consequence of structural insufficiencies, transitory hunger is a result mainly of shocks to food security. Any visible strategy to eradicate hunger and ensure food security must take account of and find solutions to a range of shocks like natural disasters, HIV and conflict (Dodds and Pippard, 2007, p. 154). Climate change is regarded as one of the key reasons behind food insecurity in Bangladesh, as Bangladesh is located in one of the disaster-prone regions in the world. Due to climate change, natural hazards like cyclones, floods and moreover, and prolonged and irregular monsoon destabilises the croplands and agrarian economy. This further affects the lives of millions directly or indirectly and destabilises the overall well-being of the people.

Sirajganj district is located in the northern part of Bangladesh. The latitude of the Sirajganj district is 24°00'–24°40' west and the longitude is 89°20'–89°50'. The district is surrounded by Pabna (South), Bogra (north), Tangail and Jamalpur districts (east) and Pabna, Natore and Bogra districts in the west. The area of this district is 2497.92 Square kilometres. Sirajganj district is comprised of a total of nine Upzillas, namely Sirajganj Sadar, Ullahpara, Belkuchi, Kazipur, Shahzadpur, Chouhali, Raiganj, Kamarkhand and Tarash.

The land structure of Sirajganj district is plain land. There are also some low-lying lands found in this district. During the rainy season, most of the portion of this district remains submerged. The total amount of arable land in this district is 183,220 hectares. According to the 5th census (2011) of Bangladesh total population of Sirajganj district is 3,097,489 (Bangladesh Bureau of Statistics, 2012, p. 23), which was 2,693,814 during the 4th census (2001). The population density of Sirajganj district is 1289.5 (according to the 5th census)/square kilometres. The average literacy rate of this district is 68% (Government of Bangladesh, 2021) and the poverty rate of Sirajganj is 30.5 (BBS, 2020, p. 43), which indicates that the unemployment rate is moderate. Again, due to various natural calamities like tornados, floods and riverbank erosion the food security status of this district is in danger. Thousands of people in this district lose their property

and become homeless. They migrate to different parts of the district to seek shelter and jobs. Side by side the population of this district is higher than in the previous census, that's why the food security status of this zone is at an alarming state. The case study is to find out the food security status of this district. The principal occupation of the people of Sirajganj district is agriculture, near about 51.14% of working people in this district are engaged in agriculture (Banglapedia, 2021b). Almost every year, people of this district because of flood and river erosion lose their settlements, and cultivable land side by side they become homeless. As the victims are rural farmers and their livelihood depends on agriculture, natural hazards like flood and river erosion are responsible for increasing poverty, unemployment, illiteracy, migration, less food crops, etc. and further lead to food insecurity.

Major Natural Hazards influencing the Food Security

River Erosion

River erosion is a natural phenomenon for the people of Sirajganj. Each year because of riverbank erosion thousands of people become homeless, landless and jobless, as a result, they migrate to urban areas for better living. The rate of river erosion is increasing and the key reason is none but climate change. Bangladesh is a riverine country and the district Sirajganj is located at the Bank of the Jamuna river. Each year during monsoon the river embankment faces serious threats due to river erosion. The key upzillas which experience regular river erosion are Sirajganj Sadar, Belkuchi, Chouhali, Kazipur. The average erosion rate of the Jamuna river from 1970 to 1990s was about 3,300 hectares on both sides of river banks. However, the rate dropped in the late 1990s ranging from 1,000 to 2,500 hectares annually (The New Humanitarian, 2007). In 2018 Enayetpur of Chouhali upazilla in Sirajganj district experienced a serious threat due to river erosion. Numbers of houses were engulfed by the river, damaged infrastructures like roads, markets, mosques, educational institutions, and river embankments not only that, a large portion of cropland of Brahminnagar, Arkandichar, Jalalpur and Noyapara villages fell into the prey of the Jamuna river erosion (The Financial Express, 2018). In 2019 in the month of April, Enayetpur of Chouhali upazilla was again affected by river erosion. During this time croplands, houses and river embankments were devoured by the river which panicked the local people (Rana, 2019). Recently, because of river bank erosion, 70 meters of town embankment of Sirajganj Sadar upazilla was devoured by the mighty Jamuna river (The Daily Star, 2021). Despite that, the other erosion-prone areas as mentioned earlier (Shahjadpur, Enayetpur, Chouhali) were affected by erosion. A total of 315 houses, 2 schools, 30 bigha land and 50 trees disappeared and a total of 15 villages were affected by erosion (NIRAPAD, 2017, p. 9). People from these affected areas severely suffered from food insecurity.

Flood

Flood is another natural disaster which also makes the life of poor people vulnerable. Because of floods almost every year people have to migrate from rural areas to urban areas to continue their livelihood. Sirajganj district had almost experienced every major and minor flood that occurred in Bangladesh. People who live in the char areas have experienced floods at a greater rate in the Sirajganj district. The char areas are mostly seen or risen up in the Jamuna river bed during the winter season when the water flow of the Jamuna River remains low. The people of Char continue their livelihood through agriculture. The Chars are mostly formed of alluvial soil and the siltation rate in the Jamuna River is very high. The soil of chars is very fertile and during the dry season, the char people build a home there and cultivate in the chars. But the problem arises in the rainy season because in the rainy season the char areas remain submerged by river water. The char people then move to the nearby land areas. As they migrate, the problem with the local people rises, and because of them, the daily wage rate becomes low. The place they migrate, the number of labourers becomes high and then the unemployment rate increases. The Char people are also affected by poverty during that time and because of poverty, they can't even meet their dietary needs. In this regard, women and children become more vulnerable to malnutrition, waterborne diseases, etc. But when the flood occurs on a large scale, with the char people the local people also become affected. The notable floods of Bangladesh (1988, 1998, 2004, 2007, 2016, 2017 and 2020) that occurred in Bangladesh also affected the Sirajganj district. Almost in all cases, the floods inundated the low-lying lands and damaged settlements, property, and food grains especially crops (Aus and Aman) along with vegetables (brinjal, cucumber, etc.) (BBS, 2019, pp. 344–348). Three upazillas of Sirajganj Belkuchi, Shahjadpur and kazipur are more flood-prone than upazillas (Reliefweb, 2004, p. 29). The flood of 2007 inundated all the nine upazillas of Sirajganj district and communication was blocked due to the flood. More than 200,000 were affected (Reliefweb, 2007, p. 1). In 2016, a total of 99,765 people from Sirajganj Sadar, Shahjadpur, Belkuchi, Kazipur and Chauhali upazilla were affected by flood and not only that entirely 112 km and partially 215 km of roads were damaged. At the same time, partial and complete damage was experienced in 413 and 63 educational institutions (Reliefweb, 2016, p. 5). In the following year 2017, the flood also affected Sirajganj district's total of six upazillas. Partially, a total of 413,491 people were affected, 17,520 were displaced and accounted for six deaths. Simultaneously, a river embankment of 0.3 km was destroyed due to a flood. Number of educational institutions, roads, bridges and were affected by 4,886 Tube wells (NIRAPAD, 2017, p. 3). The recent flood of 2020 has also affected the Sirajganj district both partially and completely, in terms of damage to property, destabilising the lives of thousands. In total 338,455 people from six upazillas were affected by the flood (Needs

Assessment Working Group [NAWG] Bangladesh, 2020, pp. 19–20). The poor and the char people suffer more as the flood destabilise and damage their lives and property. Flood-affected poor people suffer from multiple both communicable and non-communicable diseases, hunger, shelter, malnutrition, poverty, etc., their basic human rights are not fulfilled and their lives become more vulnerable. Food insecurity becomes a part of their daily life.

Factors Related to Food Insecurity and Nutrition of Migrated People of Sirajganj District

There are other reasons which cause food insecurity in an area. To identify various factors related to food insecurity and malnutrition of the people a field survey had been carried out in 50 households of Sirajganj Sadar upazila (Hossainpur area and its surroundings). The data collected from the people are mostly migrated from the different char areas of sirajganj district. For this survey, people of several char areas are taken into account, they are, Char Malsa para, Barakona Char, Boro Paikpara Char, Kata Wapda Char, Gaitar Char, Chowdhury Para-Char.

Economic Condition

The victims are mostly involved with different economic activities like rickshaw pulling, fishing, CNG driving, tea stall business, farming, day labouring, etc. another important thing is found from the survey, that women in most of the households are not economically empowered. Side by side, each household consists of an average of five members. The children of these households for studying purposes go to the madrasa and primary school. Most of the households are provided with electricity, but in case of safe drinking water, are river and tube well water. Income is one of the prime factors in their daily life.

From Figure 2, it was found that the average highest income of the selected areas was 550 tk. and the lowest average income of the selected area was found 350 tk. on the daily basis. If we compare the upper poverty line and lower poverty line then we shall find that 161.87 tk. equals 1.9 \$ US dollars, which is the baseline of the lower poverty line. The food habit of the selected areas found was not satisfactory. Most of the households were found to have the ability to consume animal-based (meat or fish) protein once or twice a week. As they have five members (average) in the family and all of them depend on rice, pulse and vegetables (potato smash common) in their diet. High-caloric foods like meat, egg, milk, and fish were absent and more dependency on rice, and pulse was prevalent, which are less caloric and less nutritious food. From a nutritious food consumption perspective, the people of the study area suffer from malnutrition which is represented by Figure 3.

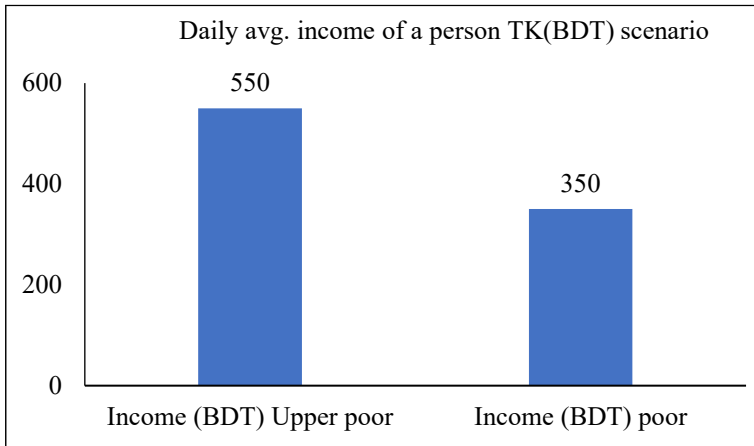


Figure 2: Income Status of the Earning Person per Day (Based on Field Survey)
Source: Collected from Secondary resources

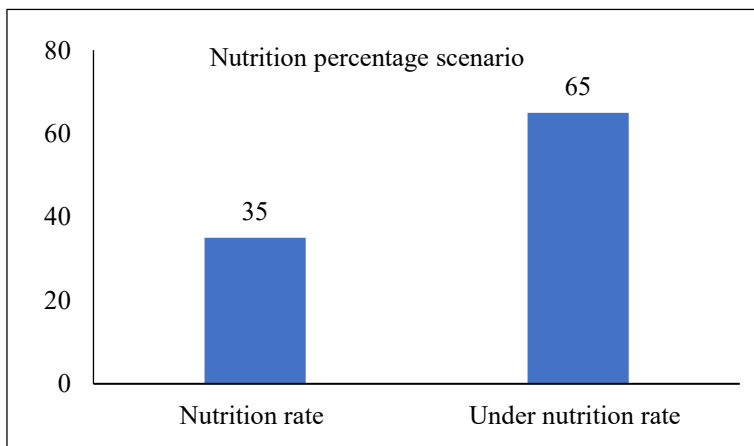


Figure 3: Nutrition Status of the Study Area at the Household Level (Based on Field Survey)
Source: Collected from Secondary resources

Literacy Rate

One of the significant development indicators in any nation is the literacy rate. If people are not well educated enough, they will not understand the proper nutrition level in the diet. Side by side if the literacy rate at the household level especially among women is low, they will suffer from malnutrition and the children along with them also suffer from malnutrition because of a lack of knowledge.

From Figure 4, we can see that the basic literacy level is satisfactory which is 60%. Because of various night school programmes, the literacy level with regards to reading

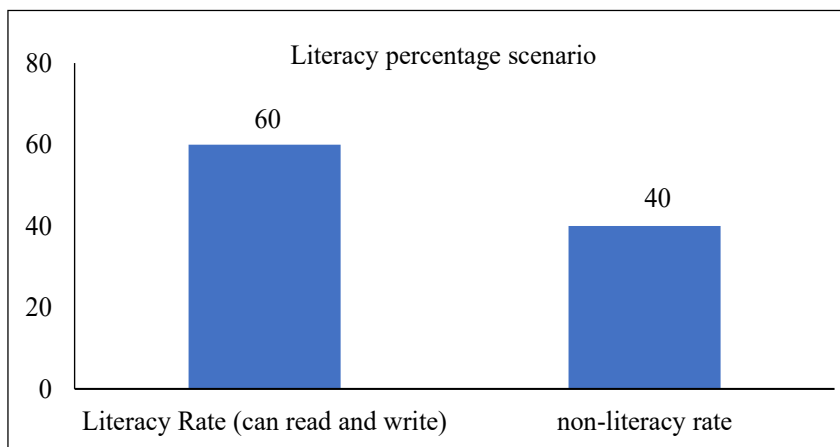


Figure 4: Literacy Rate of the Earning Persons of the Study Area
Source: Collected from Secondary resources

and writing among the employed members and their household level has been increased. Different development programmes have been going on in this area at the government level and N.G.O level to elevate the life status of these char people. So, it can be said that the selected people of Sirajganj Sadar Upazila have the necessary knowledge regarding food security.

High Population Growth

It was also found in the study, almost every year the people of the study area had been affected by both flood and river erosion but surprisingly the population growth of those areas is really high. High population growth is an alarming factor in ensuring food security in an area. High population growth significantly reduces the cultivable land in an area which slows down the production of food.

FINDINGS

Sirajganj Sadar Upazila is a disaster-prone area and this city is highly affected by natural calamities like floods and river erosions. These calamities have direct impacts on declining food security in this area. Though having a good literacy rate people here are taking low calories than expected because of low income. The income level of the people here is lower than expected. This low income is highly affected by the above-mentioned natural disasters as people are bound to migrate from one place to another for these calamities. Migration decreases the regular income which results in taking insufficient calories and thus food insecurity.

CONCLUSION AND RECOMMENDATIONS

Food security and nature are interconnected in so many ways that we cannot think of influencing one and having no impact on another. Similarly, food security also depends on several factors like income and literacy rate and so on in an area. In Sirajganj Sadar Upazilla, it is seen that the food security here is very low as the climate is not that stable. Natural calamities like river erosion and floods heavily influence food production and food intake. On the other hand, people here have low income and that is why they have been taking fewer calories than needed though having a standard literacy rate. It can be concluded that the food security in Sirajganj Sadar is not secure at all.

Natural hazards are inevitable and if we can ensure proper disaster management procedures in Sirajganj Sadar Upazilla then it will be easy to minimise the rate of losses. Proper disaster management would lower the rate of migration and increase the income of people. Both the government and the non-government organisations should work cooperatively to elevate people's living standards and uphold their human rights. The government should ensure nutritious food for people who are more vulnerable to disaster through different programmes. Furthermore, the government should rehabilitate the people migrating regularly and provide proper jobs based on their skills. The non-government organisations should also come forward and increase their development projects for these vulnerable people.

REFERENCES

- Bangladesh Bureau of Statistics (2012) *Population & Housing Census: Preliminary Results*. July, 1–19. http://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/7b7b171a_731a_4854_8e0a_f8f7dede4a4a/PHC2011PreliminaryReport.pdf
- Bangladesh Bureau of Statistics (2019) *Yearbook of Agricultural Statistics-2018 30*. 30(May), 607. http://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/1b1eb817_9325_4354_a756_3d18412203e2/Agriculture1 Year Book 2017-18.pdf
- Bangladesh Bureau of Statistics (2020a) Bangladesh Statistics 2020. *Bangladesh Bureau of Statistics*, 2, 494. https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/a1d32f13_8553_44f1_92e6_8ff80a4ff82e/2021-05-14-06-22-47723b0e1476ed905d1c121f8f07d935.pdf
- Bangladesh Bureau of Statistics (BBS) (2020b) *Poverty Maps of Bangladesh 2016*. http://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/5695ab85_1403_483a_afb4_26dfd767df18/2021-02-22-16-57-c64fb3d272175e7efea0b02de6a23eaa.pdf
- Banglapedia (2021a) Drought. <https://en.banglapedia.org/index.php/Drought>
- Bangladesh Local Consultative Group (2004) *Monsoon Floods 2004, Post-flood Needs Assessment Summary Report*. 2004 (October), 1–39. <https://reliefweb.int/report/bangladesh/bangladesh-monsoon-floods-2004-post-flood-needs-assessment-summary-report>
- Committee on World Food Security (2012) 'Coming to terms with terminology: food security, nutrition security, food security and nutrition & food and nutrition security', *Proceedings of the 39th*

- Session of the Committee on World Food Security, September 1–14.* <http://www.fao.org/docrep/meeting/026/MD776E.pdf>
- Dodds, F. and Pippard, T. (Eds.) (2007) *Human & Environmental Security: An Agenda for Change (First)*. Earthscan. www.earthscan.co.uk
- EIU (2021) *Global food security index 2020; addressing structural inequalities to build strong and sustainable food systems.* <https://s1238138546.t.eloqua.com/e/f2?LP=1421>
- FAO (2006) 'Food Security', *FAO Policy Brief*, Vol. 2, pp. 1–4. http://www.fao.org/fileadmin/templates/faoitally/documents/pdf/pdf_Food_Security_Cocept_Note.pdf
- Economist Intelligence Unit (2021) *Global Food Security Index 2020; Addressing structural inequalities to build strong and sustainable food systems.* <https://s1238138546.t.eloqua.com/e/f2?LP=1421>
- FAO, IFAD, UNICEF, WFP and WHO (2020) *The State of Food Security and Nutrition in the World 2020. Transforming Food Systems for Affordable Healthy Diets.* In FAO. <http://www.fao.org/3/ca9692en/online/ca9692en.html>
- Flynn MO (2009) 'Food Crises and the Ghost of Malthus', *New Proposals: Journal of Marxism and Interdisciplinary Inquiry*, Vol. 3, No. 1, pp. 33–41. <http://sarkoups.free.fr/oflynn09.pdf>
- Food Planning and Monitoring Unit [FPMU] Food Division, M. of F. and D. M. G. of the P. R. of B. (2020) *Monitoring Report 2020: Summary.* <http://fpmu.gov.bd/agridrupal/sites/default/files/file/MR-2020/Summary-MonitoringReport2020.pdf>
- Government of Bangladesh (2021) *Sirajganj at a glance.* <http://www.sirajganj.gov.bd/>
- International Food Policy Research Institute (2002) *Sustainable food security for all by 2020.* <https://www.ifpri.org/publication/sustainable-food-security-all-2020>
- Kathryn, R. (2020) 5 World Hunger Facts You Need to Know. <https://www.worldvision.org/hunger-news-stories/world-hunger-facts>
- Malthus, T. (1798) *An Essay on the Principle of Population.* <http://www.esp.org/books/malthus/population/malthus.pdf>
- Needs Assessment Working Group (NAWG) Bangladesh (2020) *Monsoon Floods 2020: Coordinated Preliminary Impact and Needs Assessment Bangladesh Needs Assessment Working Group. July, 3371.* https://www.researchgate.net/publication/323747305_A_study_on_River_Bank_Erosion_of_Jamuna_River_using_GIS_and_Remote_Sensing_Technology
- NIRAPAD (2017) *Flood Situation Updated on August 22, 2017. August, 1–12.* <https://reliefweb.int/report/bangladesh/bangladesh-flood-situation-august-22-2017>
- Rana AI (2019) Jamuna River Erosion Strikes Sirajganj. *Dhaka Tribune.* <https://www.dhakatribune.com/bangladesh/nation/2019/04/16/jamuna-river-erosion-strikes-sirajganj>
- Reliefweb (2007) *Bangladesh Flood 2007. 2007(09)*, pp. 1–3. https://reliefweb.int/sites/reliefweb.int/files/resources/957021ABD1074225492573520025D75A-Full_Report.pdf
- Reliefweb (2016) *Flood Situation Analysis, August 02, 2016. 7.* https://reliefweb.int/sites/reliefweb.int/files/resources/Flood_Situation_Analysis_02_August_2016.pdf
- The Daily Star (2021, June 29). *Embankment around Sirajganj Town Collapses into Jamuna River.* <https://www.thedailystar.net/environment/climate-crisis/climate-loss/news/embankment-around-sirajganj-town-collapses-jamuna-river-2120605>
- The Financial Express (2018, June 25) *River Erosion Takes Serious Turn in Sirajganj, Faridpur Dists.* <https://today.thefinancialexpress.com.bd/print/river-erosion-takes-serious-turn-in-sirajganj-faridpur-dists-1529853579>

The New Humanitarian (2007) *River Bank Erosion Affects Economy*. <https://www.thenewhumanitarian.org/fr/node/238535>

United Nations Development Programme (2020). *The 2020 Global Multidimensional Poverty Index (MPI)*. <http://hdr.undp.org/en/2020-MPI#fn1>

UN News (2022) *World Population to Reach 8 Billion This Year, as Growth Rate Slows*. <https://news.un.org/en/story/2022/07/1122272>

World Health Organization (2019) *World Hunger Is Still Not Going Down after Three Years and Obesity Is Still Growing – UN Report*. <https://www.who.int/news/item/15-07-2019-world-hunger-is-still-not-going-down-after-three-years-and-obesity-is-still-growing-un-report>

How to cite this article: Khan, M.R., Rahman, M. and Anica, F. (2022) 'Climate Change and Food Security in Bangladesh: A Case Study on Sirajgan Sadar Upazilla', *Journal of Exclusion Studies*, Vol. 12, No. 2, pp. 221-233.