



## **Thesis**

on

### **Roles of Immigrants on Communities' Livelihood in Sunamganj Area: An Empirical Analysis**

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MDS 699: Research Project

Submitted To

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Date: 14/01/2023

\*This Thesis has been submitted in partial fulfillment of the requirements of Masters in Development Studies

## Letter of Transmittal

Prof. Dr. Muhammad Mahboob Ali, Adjunct Faculty

Department of Economics,

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Dhaka, Bangladesh

January 14, 2023

Dear Sir,

I am submitting my thesis herewith, titled “Roles of Immigrants on Communities’ Livelihood in Sunamganj Area: An Empirical Analysis” as partial fulfillment for the completion of the Master’s Degree in Development Studies.

The purpose of this thesis is to depict my understanding of the interregional migration of Bangladesh and its role in the socio-economic condition of the local community using a mixed research method. I hope the thesis will reflect my understanding of the aforementioned topic and will merit your approval.

Sincerely yours,

Esther Baroi

ID: 2020-3-94-002

## **Acknowledgment**

I would first like to thank my mentor, advisor, and project monograph supervisor, Dr. Muhammad Mahboob Ali, Adjunct Faculty, of the Department of Economics, at East West University for providing me with his precious time, feedback, and support which proved to be instrumental in shaping my research. I would also like to extend my gratitude to Mr. Amith Dutta from the Center for Environmental and Geographic Information Services (CEGIS) who helped me by steering me in the right direction with my research. Without their valuable insight, this study would not have been achievable. Lastly, I would like to extend my gratitude toward my family without whom, I would not have reached where I am today.

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## Abbreviations and Acronyms

ADM	Agricultural Disaster Management
ADPC	Asian Disaster Preparedness Center
BADC	Bangladesh Agricultural Development Corporation
BBS	Bangladesh Bureau of Statistics
DAE	Department of Agricultural Extension
DMB	Disaster Management Bureau
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
Ha	Hectare
LANDSAT	Land Satellite
MoA	Ministry of Agriculture
NCA	Net Cultivable Area
NGO	Non-Government Organizations
SLF	Sustainable Livelihoods Framework
SOD	Standing Orders on Disaster
SRDI	Soil Research Development Institute

## Abstract

Tahirpur Upazila of the Sunamganj District is regarded as one of the high-income regions that might entice various communities for interregional migration. The study included several methodological steps through which primary and secondary data and information were gathered and evaluated to determine the contributions of the immigrant groups to the local communities' quality of life. The study was conducted on the two distinct populations of local agriculture farmers and the immigrant community living in two mouzas (Jamalgar and Niamatpur) of two separate unions. It involved quantitative household surveys, participatory Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), personal interviews, and case studies. I found that farmers require hiring some migrant workers to help them harvesting the standing Boro-Rice sooner for preventing unexpected crop losses due to flash floods. This region also draws other communities to move here as practitioners and entrepreneurs. A whole community has also been attracted to immigrate here for living permanently. The study suggested that the changing flow of labor and capital plays a role in changing the socio-economic landscape of the source region through changing its economic activity, the restructuring of local infrastructure, and economic policies. Mechanization in harvesting Boro-Rice demands more financial resources than some laborers do. It is, thus, concluded that the present financial capital is not compatible with living standards and physical capital of the local agriculture farmers, because they need to spend maximum portions of that capital for climate change adaptation and mechanization process, although the declining immigrant worker flow results in producing more financial capital through increasing capital flows among the workers within Tahirpur Upazila. However, it has been informed that social disputes differ depending on the size and employment of immigrant populations. Compared to migrant employees, migrant entrepreneurs can participate in local community activities more readily. This study also found that migration of an entire population can lead to violence.

**Keywords:** Interregional Migration, Agriculture Farmer, Entrepreneur, Regional Economics, Sustainable Livelihood Framework, Climate Induced Hazards

# Chapter 1. Introduction

## 1.1 Background of the Study

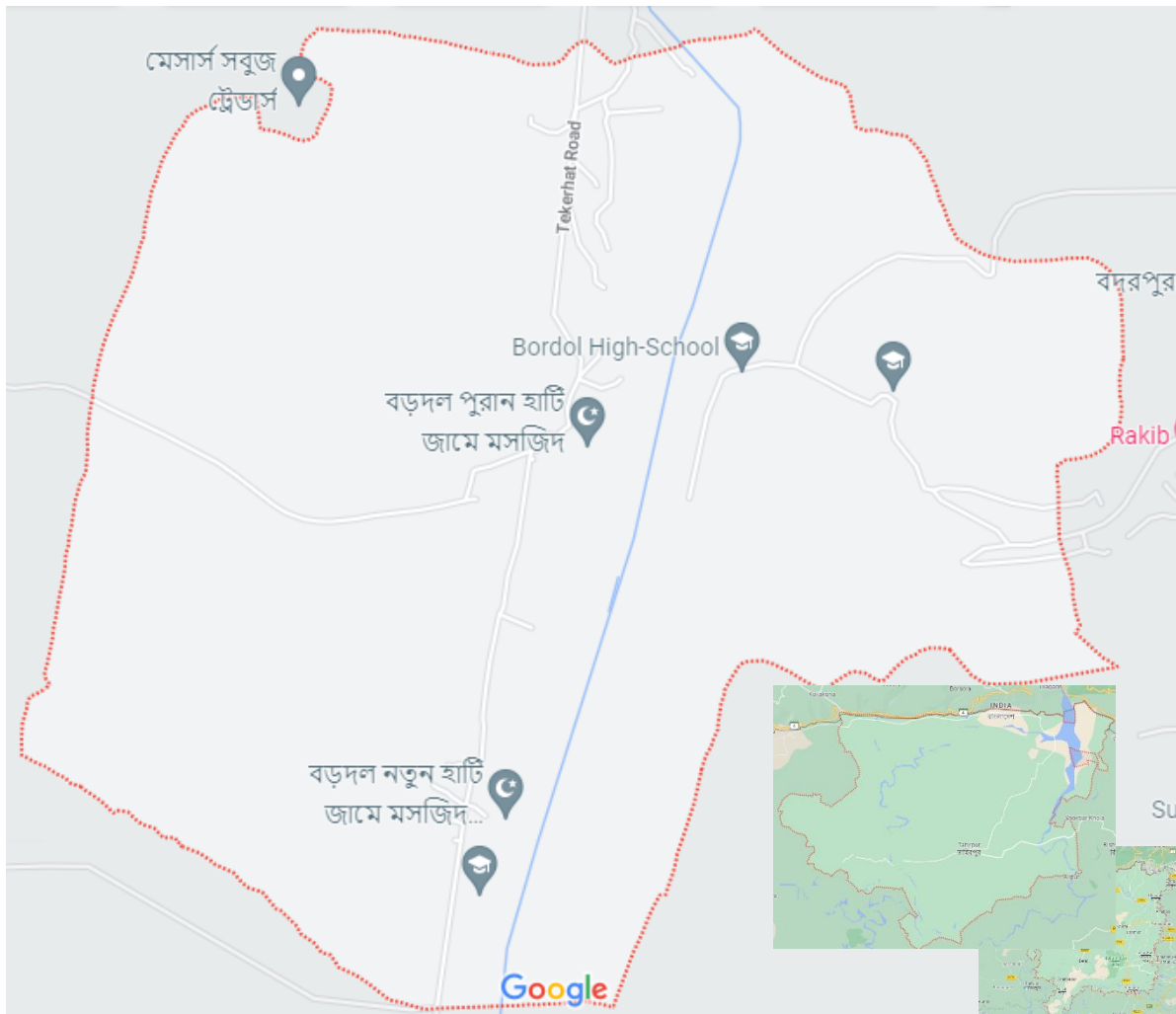
Immigrants are the people who move permanently or temporarily or seasonally from their native place to another and can be executed within the border or across countries for a variety of reasons (J. Burtler and B. Whiting, 2022). Interregional migration, often donated as an essential component of livelihood strategies to shape social changes (I. Rayhan and U. Grote, 2007; Jackson, J. A. 1970), and associated economic policies have been growing in importance since 1990 as a consequence of political liberalization and economic reform in Bangladesh. A livelihood can be defined as a set of capabilities, assets and activities required for a means of living (DFID, 2000).

There are several theories and policies for interregional migration under two contemporary ideas. Some theories believe that migration between two different regions is usually seen as the result of individual decisions (economic approach), but according to other theories it is a response to structural forces (approaches based on microsociology (Rossi 1955; Holm and Oberg 1984), time-geography (Oberg 1979a; Hagerstrand 1970) or empirical generalizations (S. Oberg, 1995)). Theories of the first idea emphasize factor (labor and capital) mobility as an important policy to achieve a higher economy and living standard (S. Ghatak, et al., 1996; S. Oberg, 1995). On the other hand, there are some structural dimensions and policies of economic growth and development that play as the instruments to push the labor migrating from one less productive sector (like agriculture) to another more productive sector (like the manufacturing industry) for economic welfare (S. Ghatak, et al., 1996).

Bangladesh is a low-lying river delta with more than 230 rivers and tributaries that are located between the Bay of Bengal and the foothills of the Himalayas (I. Rayhan and U. Grote, 2007). Bangladeshi people are particularly susceptible to different climatic hazards and calamities because of the country's geography, population density, and extreme poverty. For instance, previous research indicated that regular floods and riverbank erosion are substantial causes for thousands of people's yearly homelessness, landlessness, and ensuing migration. In 1988, there were floods in over 60 percent of the country, impacting around 45 million people and resulting in more than 2,300 fatalities (FAP, 1993). Over 68 percent of the country was under water in 1998, which led to 2,380 fatalities. Floods impacted almost 20 million people between 2000 and 2002. A disastrous monsoon flood in 2004 swamped two-thirds of the nation; it affected

close to 36 million people, caused 726 fatalities, and left millions homeless. Floods struck various regions of Bangladesh once more in 2005, having a considerable impact on people's means of subsistence, possessions, and activities. Similar losses in human and material capital are being caused by various climate disasters, such as, drought, heat waves, unpredictable rainfall, etc.

However, these disasters vary by hydrological region in Bangladesh. According to the Ministry of Water Resources, Government of the People's Republic of Bangladesh, there are eight (08) hydrological regions under four different climatic hazards. These are drought-prone, flood-prone, salinity-prone, and flash flood-prone areas. These geographically diversified vulnerable landscapes create a geographical and occupational imbalance in Bangladesh. According to S. Oberg (1995), inter-regional migration may be necessary for a perfect long-term equilibrium in the wage level for each occupation.



**Figure 1.1: Map of the Study Area**

Source: Google map Online Portal

## 1.2 Rationale of the Study

Until recently, interregional migration research has focused unilaterally on urban unemployment and rural-urban labor migration. A growing literature suggests that changes in rural-rural labor and capital mobility over time are related to social and economic processes in geographically diverse regions (BRRI, 2020; S. Oberg, 1995). Therefore, it is important to examine the consequences of interregional immigrant mobility on the local community and emerging policy implications.

## 1.3 Research Questions

The research questions are as follows:

- **Question-1:** What are the major community and its socio-economic condition in the study area?
- **Question-2:** What type of community migrated in the study area and their role on the local community?

## 1.4 Research Objectives

Based on the research questions, the objectives of the study are as follows:

1. To identify different types of local community in the study area
2. To assess the socio-economic condition of the local community in the study area
3. To identify the major community and assess its socio-economic condition in the study area
4. To identify different types of immigrant community in the study area
5. To identify the roles of immigrant, play in the study area.

## 1.5 Plan of the Study

The study was divided into several tiers in which both primary and secondary data, and information were collected and analyzed to determine the role of the immigrant community in the livelihood of the local community (**Figure 1.1**). Chapter 1 will discuss introduction including background, rationale, research questions, objectives, research objectives and plan of the study. Chapter 2 will describe the findings of the literature review on the concept of the migration from different economic aspect, and also on the haor areas and developing priorities. This chapter will also describe the research gap and need for research respecting the interregional migration. Chapter 3 will discuss on the climatic risk for the local communities in response to the flash floods, river floods and drought. Chapter 4 will comprise methodology of the study including methodological tools and techniques, types and sources of data, hypothesis and the methodological steps used in the study. Chapter 5 will describe the findings

of conducted Case Studies, which include case for tale of an immigrant entrepreneur, an immigrant homeopathy practitioner, an immigrant community, and immigrant labor. chapter 6 will demonstrate the analysis of the findings featuring socio-economic condition of the tahirpur Upazila and socio-economic condition of the agriculture farmer separately.

Chapter 7 will represent the discussion on the findings of role of immigrants on the local communities' livelihood by providing both consistent and inconsistent findings and ideas with explanations. Finally, Chapter 8 will represent conclusion of the study. this chapter will also provide implications of this study, and future study direction.

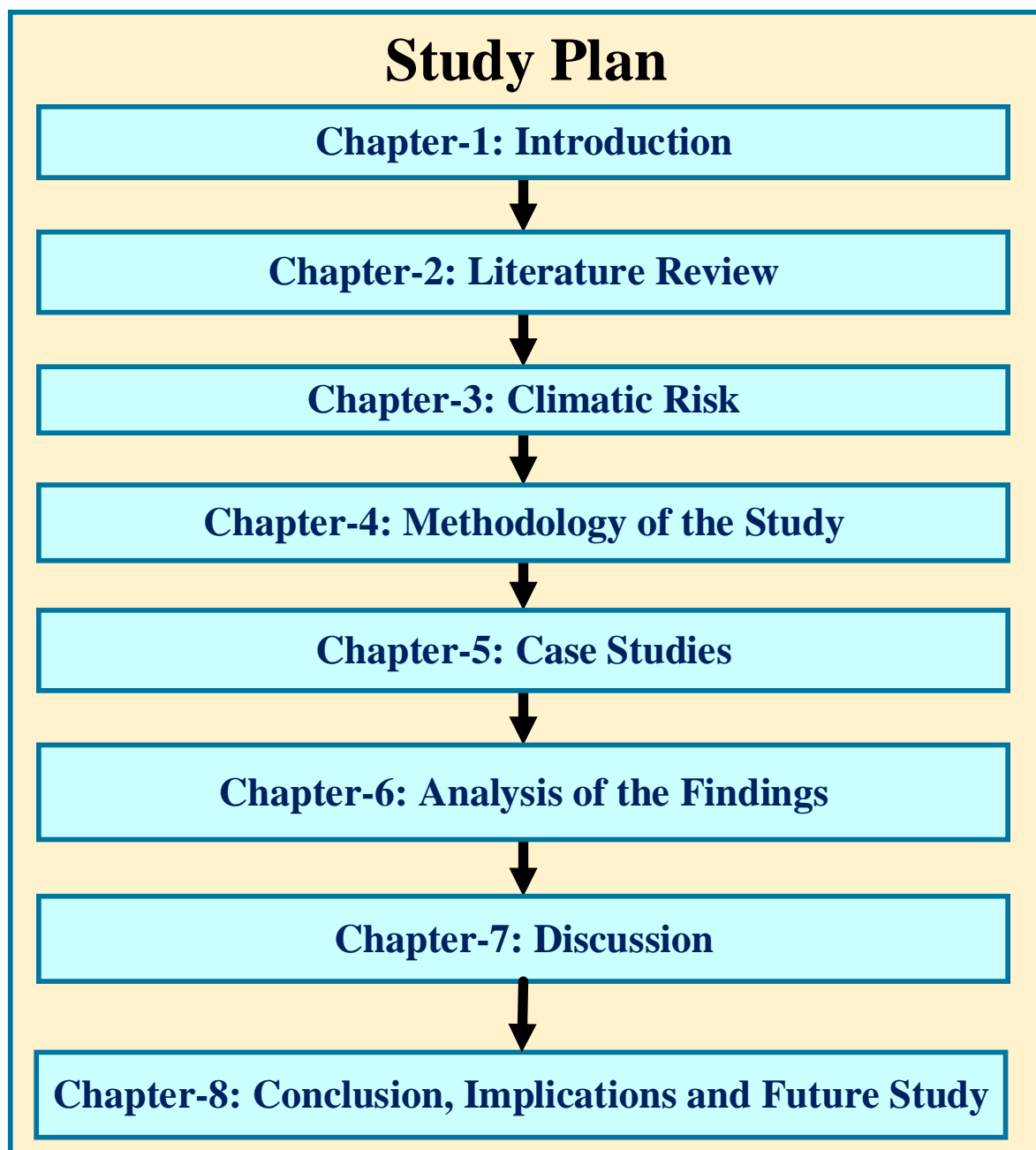


Figure 1.1: Plan of the Study

## Chapter 2. Literature Review

### 2.1 Literature Review

Migration is an "essential component of economic development, social change, and political organization" (Jackson 1970). Moreover, rural-urban migration is the hallmark of the rapid urbanization process in Bangladesh, because along with reclassification of urban rezoning, it has contributed between three-fifths and two-thirds of urban growth in the last 30 years (1960-90). Whether or not it is permanent, migration is primarily a result of economic motives, although it rarely occurs in a completely individualistic manner, as suggested by classical or neoclassical economic theories of migration (Lewis 1954; Fei and Ranis 1961; Todaro 1976). Some studies have concluded that "much of the population mobility results from families' survival and adaptive strategies to maximize family income by using their labor in different places to earn diversified incomes." However, there is no direct research on the role of the immigrant population in the socio-economic condition of the local community. For this reason, this study reviewed various types of literature that can provide insight into the relationship between the immigrant population and the socio-economic condition of the local people in the Tahirpur Upazila. The summary of this literature can be found in the following section.

Oberg, S. (1995) believed that migration between local labor markets is usually seen as either the result of individual decisions or a response to structural forces. The approach in the first part is mainly economic. It usually means that people are defined as rational in the sense that they are loyal to their preferences and maximize place utility functions in well-known market economies, in order to speculate in the outcome of decision processes. Several alternative approaches are possible based on e.g., microsociology (Rossi 1955; Holm and Oberg 1984), time-geography (Hagerstrand 1970; Oberg 1979a) or empirical generalizations. According to S. Oberg (1995), Economic Approaches and the Approaches in Social Geography are briefly discussed in the following sections.

Jussibaliyeva, A. K., (2021) argued that migration through crossing borders and within nations affect not only the lives of the migrants, but also the chances for growth and prosperity in the places that are moved to and attained. They thought that lack of sufficient incentives at the source and the availability of superior opportunities at the destination, the strength of necessity in some cases, or other causes are the same driving forces behind both domestic and international migration. Bakth, N., & Hasanuzzaman, S. (2022) stated that parental temporary



migration may be an effective cope-up strategy to reduce domestic enemies brought on by environmental shocks, while its impact on children's education may be dubious. Pavel, T., et al., (2022) found that households are moved by both transitory and permanent shocks, although the latter has a greater impact in increasing migrants' income and expenditure rise in comparison to their counterparts, suggesting that enabling migration may boost wellbeing in nations with a high risk of disaster. Mukhopadhyay, U. (2022) demonstrated that although cross-border movement of people is not a recent phenomenon in the area, its causes and characteristics have experienced a significant transformation in recent years. Afsar, R. (2003, June) stated that the most frequent type of migration in Bangladesh is from rural to urban regions. He found that the bulk of economic migrants to metropolitan areas are young men, however, this has lately changed as more women are required in the ready-to-wear sector. For migrants, concerns including physical insecurity, inadequate housing, negative treatment by authorities, and development attempts are frequent. Afsar, R. (1994) indicated that a significant portion of population mobility results from the family's survival and adaptive strategies to maximize family income by allocating their labor to a number of locations involved in diversified income-earning activities. According to Harris, J. R., & Todaro, M. P. (1970) migration is prompted by variations in expected incomes between urban and rural areas, with the urban employment rate serving as an equilibrium force on such movement.

Chowdhury, Q., et al., (2004) found that communities in the haor region have higher incomes than other areas in Bangladesh. Chowdhury, R. B., & Moore, G. A. (2017) found one unique indigenous floating agriculture has sufficient potential to help farming communities in the flood-prone regions of Bangladesh to sustain their lives and livelihoods during floods and long-term inundation. This technique has the unique characteristic of providing a wide range of agricultural, environmental, economic, social, and cultural benefits that ultimately make it an environmentally sustainable, economically feasible, and socially viable practice. Rayhan, I., & Grote, U. (2007) indicated that during floods, landless or poor people incur informal debts to moneylenders, which in turn are accumulated through successive years of flooding, leaving a shadow of insolvency and liquidation over many vulnerable households. Rural-urban migration allows potentially vulnerable households to avoid a cycle of debt. Abedin, J., & Khatun, H. (2019) a vicious cycle of debt, resource loss, and poverty acts as a dynamic force leading to long-lasting impoverishment and vulnerability that limits haor-based communities' ability to prepare for, act against, and recover from subsequent floods and other disasters. They suggested that the government should formulate and implement a combined and effective

policy for haor management and flood management accordingly to protect the lives and livelihoods of haor residents. Islam, M. S., et al., (2014) reported that the main employment is fishing (30.1%), followed by farming (12.9%), livestock husbandry (8.6%), and business (8.6%). They also found that more than half of the inhabitants in the haor region utilized hanging latrines (22.6% of them) and drank shallow tube well water (74.2%), with the remaining 17.2% of individuals choosing to drink water from rivers or streams. In this region, flash floods are a frequent occurrence brought on by extreme rainfall and climate change. As a result, people frequently suffer from diseases such as diarrhea, cholera, typhoid, fever, and cold during the flood (54.8%), after the flood (22.6%), and before the flood (17.2%) due to agricultural loss, housing damage, animal infections, and health issues.

Brouwer, R., et al., (2007) demonstrated that households with lower incomes and fewer access to useful natural resources are more susceptible to floods. Additionally, at greater risk exposure levels, disparity in income and asset distribution at the community level tends to be larger, suggesting that vulnerable families individually are also collectively more vulnerable. They discovered, somewhat ironically, that those who are most at danger from floods are also the least prepared, both in terms of ex ante home preparation and ex post communal flood aid. Rahman, S. U. (2014) identified several factors for vulnerability due to flooding, which include building infrastructure like roads and culverts as well as inadequate drainage brought on by crowded communities. In addition to fertile agricultural land and cattle, floods have also damaged physical infrastructures including homes, schools, sub-health posts, hand pumps, and culverts. Seeley, J. (2003) believed that in order to maintain their familial subsistence with what their adult members earn irregularly, the *uthuli* (sheltered after displacement by others without payment) and *chukani* (sheltered after displacement by others with payment) households had to endure intolerable economic hardship.

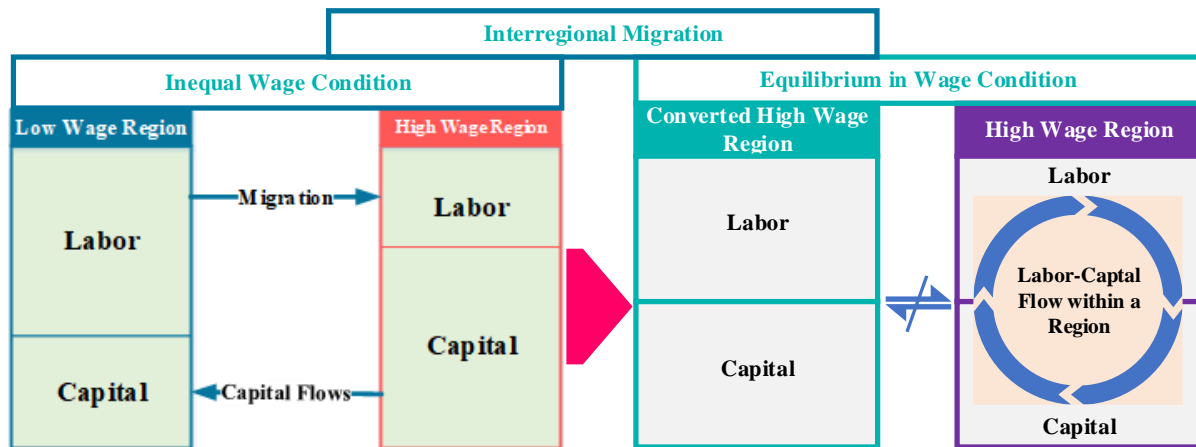
### *Economic Approaches*

#### **Wage Differences**

Individuals use migration as a means to increase their standard of living or utility function. According to theory people migrate (net) to areas with a higher wage level. This is the basic "law" of migration in regional economics.

The macro interpretation of this law is that a state of equilibrium tends to emerge. Migration is one of the processes to reach this equilibrium. There can be either a push-effect in areas with

low wages, a pull-effect in areas with high wages, or a combined effect due to the difference. The larger the difference, the more wage earners will migrate.



**Figure 2.1: The basic law of migration in regional economics: different wage levels, due to e.g., different labor/capital ratios, cause interregional migration flows. In the long run, if mobility of capital and labor is allowed, market forces tend to create a new equilibrium where wages have the same levels in all regions**

*Source: Adopted from S. Oberg (1995)*

However, Oberg (1994) think that the distinction between push and pull factors is usually unclear from a scientific point of view. According to him, high income in one region can be a pull factor attracting migrants from a less wealthy region, but the same phenomenon--lack of high income--could also be described as a push factor in the sending region. A researcher's choice to label a wage gap, or any other regional difference, as a push or pull factor is a matter of taste, not a choice based in theory or differentiating against the alternative.

Also, when efforts are made to define a push factor in a region in relation only to internal changes over time, like a period of specific high demand for labor, it is difficult to distinguish between push and pull factors. A larger flow of migrants to a region during a period of high demand for labor in the receiving region is not necessarily an effect of that demand. It could also be the result of an earlier low demand for labor in the sending region. From a technical point of view, delayed effects are difficult to sort out. Depending on how researchers treat the time lags, they can conclude that either push or pull factors are more important, basing their conclusions on the same time series of data.

On the micro scale the decision to migrate will depend on the size of the wage increase and how long it will last. With a neoclassical approach (Becker 1993), the expected difference over time will be discounted to a present value and compared with the costs involved. Since young people can gain a higher salary during a longer time than people closer to retirement age, this

will "explain" why young people migrate more often. This theory can be extended from individuals to households, where the man and the woman can have different wage functions over space and time, and the decision to migrate is a joint process on the household level.

According to conventional theory in case of wage differences between regions, they may be seen as disturbances in the equilibrium due to changes in e.g., technology or demand functions. Restructuring in the production system will cause imbalance between supply and demand for labor on different local labor markets and thus to different wage levels.

A disruption in an equilibrium would, still according to theory, normally lead to some adjustments and then a new equilibrium. If, for example, a large factory closes down on a local labor market, the first effects will be a surplus of labor which in turn will lower wages and thus create some net outmigration and attract some new firms. A new equilibrium will soon emerge. The disruption could also have very different consequences. If the closure of the factory leads to lower demand for services in the region, perhaps also this part of the labor market will have bankruptcies and closed firms. Still more people will have to outmigrate. Still more units will have to close down, until the whole region is empty. This spiral effect (Myrdal 1968) will emerge when a large proportion of the local production is dependent on local demand, and when there are many threshold effects due to indivisibilities and economics of scale in the service production.

### **Using wage differences to stimulate regional development**

Micro theory tells us that a wage difference will stimulate individuals to move. One could argue that the actual wage differences are too small for an efficient spatial relocation of labor between regions. The idea behind this measure is to influence the behaviour of people, to encourage them to migrate through increased regional production of service facilities in successful regions. It could be argued that the actual wage differences are too large for an efficient spatial relocation of labor (Oberg 1989). If the firms in expanding regions paid less for labor than they were actually able, they would get higher profits, increase their ability to invest, and expand faster.

Following this idea, governments should then try to raise minimum wage levels and force local authorities in poor regions to increase their public sector to the same standard as the rich regions. This would increase local taxes and force more people to migrate to rich regions where there are more occupational opportunities and where they could contribute better to economic growth.

## **Unemployment and Migration**

Unemployment due to an uneven regional slow-down in business cycles will cause migration. Available jobs in one region and few chances of employment in another could be seen as a special case of wage differences with 0 wage in one region and a wage in the other. The growth of cities during the recent history is a physical expression of a decline in rural-based agriculture, and a growth in urban-based industry and service. Another factor slowing down the migration effect of economic restructuring is a higher daily geographical mobility. Cars and public transportation make the urbanization process slower because a growing number of alternative jobs can be reached within a reasonable commuting time also from remote places in the countryside. Interregional commuting as a substitute for interregional migration is also becoming more common.

## **Occupational Restructuring**

Unemployment due to an uneven regional occupational restructuring will also cause migration. Contemporary structural changes of the production system result in new stages which have been given many names, like post-fordism, flexible production systems, economics of scope, the post-modern era, and the information society. The old division has its roots in the 1930s, became popular in the 1950s, and is still used in modified versions in statistical offices all over the world. All production activities could be divided into three groups labelled agriculture, industry or service. The employment in agriculture has decreased from a large majority a hundred years ago to a small minority today. Industry had its peak some years or decades ago in most developed countries. Today we are living in service economies. The general pattern in several West European countries and the development during the last century in one country is shown in Figure 2 of Appendix-3. Changes in economic sectors affect the occupational structure and thus the demand for people with different skills. Specific occupations change even more drastically over time. Further structural changes within and between regions are necessary and constantly occurring, and they will always lead to migration.

The imbalances within the regions in labor markets demarcated by occupations, create two types of gaps--occupational gaps within each occupation and a gap between total supply and demand for labor (**Figure 3 of Appendix-3**). The former, where occupations are included in the theory, influences migration but enlarges the flows. It will also create flows between regions, with a balance between supply and demand on the aggregated level.

### **Balance on occupational submarkets but still migration**

With a perfect long-term balance in the geographical and occupational dimensions, and the same wage level for each occupation, migration can be a necessity. If we consider that there are barriers between occupations and small labor markets, we will still get migration with a conventional neoclassic regional economic approach. The first, because there are costs involved when people change occupations and many of us thus have to change jobs within the same occupations. The second, because local labor market softens are small. The third, because there is a time dimension which complicates the allocation process between supply and demand.

A seldom-discussed mechanism behind migration is the unplanned occurrence of new jobs and newly educated job-seekers. If a hundred people apply for jobs as teachers of mathematics on a small local labor market during a period of ten years, and a hundred vacancies of this kind occur in the same period, one's first inclination might be to suppose that none of the applicants would fail to obtain employment as a teacher. But the odds are that the vacancies will occur at irregular intervals throughout the period, and the people concerned may apply for jobs more or less randomly during the period. As a result of these random variations, there will sometimes be a queue of teachers looking for employment, while at other times there will be a shortage. Sometimes the line of applicants will be so long that a person looking for employment as a teacher will not be able to expect such a job to come his way until quite a long time has passed.

Added to these actual imbalances is lack of information, seldom considered or modelled in migration theory. People searching for jobs cannot possibly judge how long it will be before a vacancy occurs, and therefore they cannot wait for one. They can choose between staying unemployed for a while, getting a different kind of job in the locality, or moving to another locality where there is an available job in the occupation they are trained for.

### **Human Capital Theory**

This capital will increase for individuals with the length of their education and experience in working life. Several ideas would be deducted from this theory and this age group being more valuable on the labor market. One is that one part of the changes in economic growth over time has to do with demography and age structure. Another idea is that if employers believe in the human capital theory, they are prepared to pay more for the older laborers and their knowledge. When the population becomes older, there will be a tendency toward lower mobility because of this effect of the human capital theory. The human capital theory is not self-evident.

However, more and more occupations are white-collar ones, where experience has an increased value over time.

### **Physical Capital Theory**

A most interesting characteristic of rapid population changes due to interregional migration is that, in the short and medium run, the new demand for physical infrastructure must be satisfied within an already given amount of supply. Most of our physical infrastructure is thus developed earlier for a population with another production system, another lifestyle, and another demographic composition. In addition, the changes we try to implement today, often based on a present need or demand, will imprison future generations in a physical structure, limiting their choice of location. The one-percent rule of increasing the number of new dwellings with the existing stock limits the interregional reallocation process, making regional development time consuming. It is, thus, concluded that the higher the value of the physical infrastructure, the lower the net migration.

### *Approaches in Social Geography*

Since human geography is a relatively new and limited field, it is only logical that while studying the spatial and contextual factors that influence behaviour, geographers will draw on a number of concepts and methodologies from economics as well as from other social science disciplines. When economists conduct migration studies, they frequently apply theory to net flows between two.

### **Development Phases**

Comparing social changes in one society to similar historical or contemporary developments in other societies is a popular strategy for understanding social change and restructuring processes. The mobility transition is the same strategy used for interregional migration (see **Figure 5 of Appendix-3**). The mobility transition, with its stages of development, is a descriptive model with limited explanatory ability, similar to the demographic transition.

### **Empirical Generalization**

Finding empirical data on past or present migration flows is a major focus of many migration studies. There are numerous indirect methods to try to estimate the numbers because most countries lack information on migratory flows. In some nations, scholars focus more on these projections than on other interregional migration-related issues. Making empirical generalizations is a frequent strategy in geography as well as other social sciences to examine stable relationships between data. The Figure 6 of Appendix-3 illustrates the relationship

between interregional migration and the availability of jobs. It is possible to formulate models that are more or less closely related to theory using empirical and quantitative data. In the latter scenario, social sciences can still gain a lot from natural sciences because numerous study domains have successfully exploited so-called data mining in natural sciences. After successful data mining, many new theories and vast domains of knowledge have been developed. The latter two focuses on the notion that aggregated behaviour exhibits a consistent pattern. There are numerous approaches to forecast interregional migration using econometric techniques as a result of local labor market restructuring processes, however when the models are described, gravitational theories are frequently used by geographers.

### **Gravitation Models**

The spatial gravitation model is one of applied geography's most robust hypotheses. A German geographer working in London more than a century ago named Ravenstein made the claim that the volume of migration is inversely correlated to distance. Stouffer (1940) asserted that the number of people traveling a given distance is directly proportional to the number of opportunities that arise in between, Hagerstrand (1957), who used gravitational theory and Monte Carlo principles to model migration, Lee (1966), who expanded the theory from the idea that migration is solely influenced by distance and (economic) opportunities, and Wilson (1974), who generalized and developed it. Whether spatial gravity is a theory, a law, a model, an empirical generalization, or some other kind of thought is constantly up for discussion.

### **Systems Approaches**

Mabogunje conducts an early, well-known migration research on rural-urban migrations using a systems approach (1972). A systems approach's fundamental tenet is that it does not see migration in terms of "oversimplified" cause and effect. Changes in one element of a system may have a cascading impact on other sections of the system and ultimately on the entire system because to feedback effects, circular effects, interdependent processes, and self-modifying processes. When someone is hired, they frequently leave a job that has to be filled by a new employee.

If the migrant's spouse or wife is also changing jobs, there are even more persons affected by both employment mobility and spatial mobility. The study's findings showed that, despite the fact that just a small portion of the civil employees migrated with their positions, the transfer of 11,000 public jobs from the Swedish capital to other cities resulted in 10,000 migrations between local labor markets and 30,000 job changes overall.



## **Time-Geography**

A collection of concepts known as "time-geography" was primarily created by Hagerstrand (1954, 1970). They have been used in a variety of contexts, including migration (Hagerstrand 1947, 1969; see **Figure 7 of Appendix-3**). In fact, a time-geographic approach on bigger systems and other applications of applied social sciences, where theory and descriptions employ complicated relationships and work with concurrent processes, require computer resources and object-oriented languages. In his Monte Carlo approach to spatial innovation processes, Hagerstrand (1957) developed modelling methods for time-geographic approaches. Before the method to represent dynamic interactive parallel processes was created to match the theoretical approach, it took thirty years; see, for example, Oberg (1979a) or Holm et al (1989). In dynamic models that employ parallel processes, concepts from Hagerstrand (1947, 1970), Simmons (1968), Rossi (1955), and others can now be applied.

### **2.1.1 Haor Areas and Developing Priorities**

Normally haors are almost round shaped tectonically depressed and marshy lands. Originally the word "haor" is derived from the Sanskrit word "Shagor" which means sea. The main characteristics of haors are flooding by normal flood during the rainy season every year. For more than six months haors remain submerged and with the passing of the rainy season some deep beel areas at the deepest point of the haor region remain submerged. Under the Ramsar International Wetland Conservation Treaty, wetlands are defined as follows: Article 1.1: "...wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters." Article 2.1: "[Wetlands] may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six meters at low tide lying within the wetlands". Haors of the North East region of Bangladesh can be divided into three categories depending on the geographical location and flooding characteristics of the area: Foothill and near hill haors, Floodplain area haors, and deeply flooded haors. The haor areas of Sylhet and Maulvibazaar districts are situated near hills or at foothills. The haor areas of Netrokona, Kishorganj and Brahmanbaria are floodplain haors while those of Sunamganj, Netrokona and Habiganj are deeply flooded haors. Out of the seven haor districts Sunamganj may be termed as the mother of the haor region. Different sub-sectors which have potential for development in the haor region are considered as Development Areas (DAs) under the Haor Master Plan. Tentative

priorities of these DAs include water resources, agriculture, fisheries, pearl culture, livestock, forest, education, health, transportation & communication, housing & settlement, water supply & sanitation, industry, energy & power, mineral resources, biodiversity & wetland management, tourism, social services & facilities and institutions.

## **2.2 Research Gap and Need for Research**

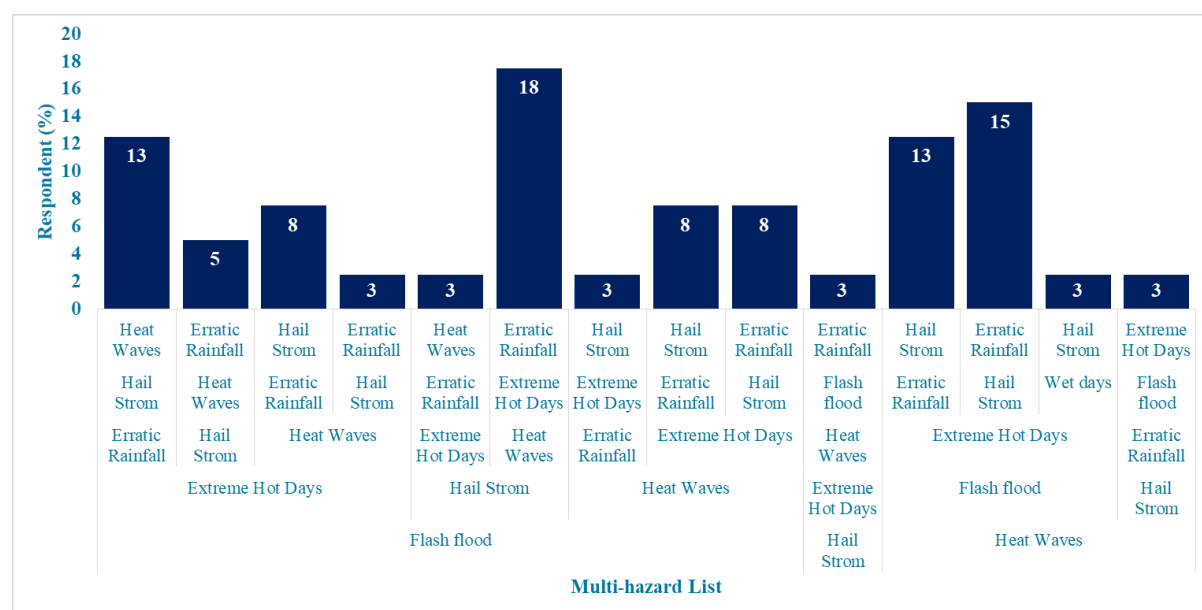
Although, a number of migration research have focused unilaterally on urban unemployment and rural-urban labor migration, interregional rural-rural specificity has been ignored. There is a gap in research that can suggest the changes in rural-rural labor and capital mobility over time in response to social and economic processes in geographically diverse regions. Therefore, a number of researches are important to examine the consequences of interregional immigrant mobility in the local community.

## Chapter 3. Climatic Risk

This Chapter includes the key findings of the risks of different climatic hazards based on blended scientific information collected from different literatures, published by peer reviewed journals, with the primary collective information from local communities for the Sunamganj District. Since spatial dimension of the climatic risk is large, the climatic risks were downscaled to Tahirpur Upazila.

### 3.1 Risk of Hazards

Hazard assessment has been performed based on secondary available datasets from online sources (BMD online portal) and perception analysis through conducting FGDs and KIIs. In total 14 types of combined effect of climate hazards have been identified and prioritized in the context of agriculture production system and farmer livelihood. These are: floods, droughts, extreme hot days, heat waves, erratic rainfall, hail storm, etc. (**Figure 3.1**). These hazards were prioritized by local communities. Among all identified and prioritized hazards, flash flood, riverine flood, heat stress/ high temperature, drought have been emphasized as the severe most physical vulnerabilities. As Extreme temperatures (extreme hot and extreme cold) as well as temperature fluctuations have a direct impact on crop physiology, growth, mortality, reproductive and flowering stages.



**Figure 3.1: Major climate induced hazards for agriculture in the case mouzas**

Source: Field Survey, 2022

The present status of flash flood, river flood and drought have been described in the following subsections in context of climate change impact on crop agriculture.

### **3.1.1 Flash Floods**

Flash floods are caused by heavy or severe rainfall in a short period of time across a relatively small region. In a flash flood, the water level rises and falls rapidly with little or no notice. Flash floods are most common in areas where the upstream basin terrain is quite steep and the concentration time in the basin is relatively short. Flash floods are most prevalent in the north-east, south-east, and Chittagong areas of Bangladesh. However, severe and long-lasting flash floods are prevalent in Bangladesh's north-east area.

The study area is located in a low-income part, Sunamganj district, of the country. The majority of the rivers in this area originate in surrounding hilly parts of India. These rivers are exceedingly flashy, with abrupt and large variations in flow. When abrupt heavy rainfall happens in India's hilly region, water quickly rushes towards the haor areas via a number of rivers and khals, resulting in flash floods.

Flash floods are the most frequent from mid-April through the end of April. This trend has recently shifted, with locals reporting that flash floods have arrived sooner than usual in recent years. In 2004, most of the haors were completely flooded by the 20th of April (MoEF 2012). As a result, water easily overflows and breaches at various spots on the submerged embankment, and flood water enters the haor. In most cases, flood water enters the haor early in the monsoon, leaving farmers with little time to harvest their standing boro crop.

### **3.1.2 River Floods**

The majority of Bangladesh is a low-lying delta created at the meeting point of three major rivers: the Ganges, the Brahmaputra, and the Meghna (GBM). The country's geography is generally low and flat. The elevation of the country's two-thirds is less than 5 meters above sea level, exposing it to river flood. The location and timing of flooding vary depending on rainfall variability within the country and in the GBM watershed.

Flooding is a common phenomenon in the study area. Synchronization of peak flows in major rivers, often caused by monsoon inflow variability in GBM catchments, can result in very high and catastrophic floods, as the entire floodplain drainage system fails to drain all influents, resulting in an unusual situation of suffering from Strength.

According to MoEF (2012) report, riverine flood occurs every year with clockwork regularity. Each year about 80% area of the Tahirpur Upazila on average is inundated due to river spills and drainage congestions during normal flood. There are five (05) classes of flood phases/land types based on a three-day maximum flood depth, theoretically with an exceedance return probability of 1 in 2 years. The land type classification based on flood depth as F0 is 0-30 cm; F1 is 30-90 cm; F2 is 90-180 cm; F3 is 180-300 cm and F4 is more than 300 cm. Maximum agricultural land belongs to the F3 and F4 land type in the study area.

### **3.1.3 Drought**

Drought is a recurrent feature in Bangladesh. The droughts occurring in Bangladesh are not meteorological droughts but merely agricultural droughts which could be also termed as severe moisture stress. Generally, two critical dry periods are notable in Bangladesh (Karim et al., 2015).

Rabi and pre-Kharif drought (January/May), due to: (i) the cumulative effect of dry days; (ii) higher temperatures during pre-Kharif (> 40°C in March/May); and (iii) low soil moisture availability. The drought affects all Rabi crops, such as HYV Boro, Aus, wheat, pulses and potatoes especially where irrigation possibilities are limited. Drought affects sugarcane production. It also affects fruit trees, such as jackfruit, litchi, and banana, which often die during this period.

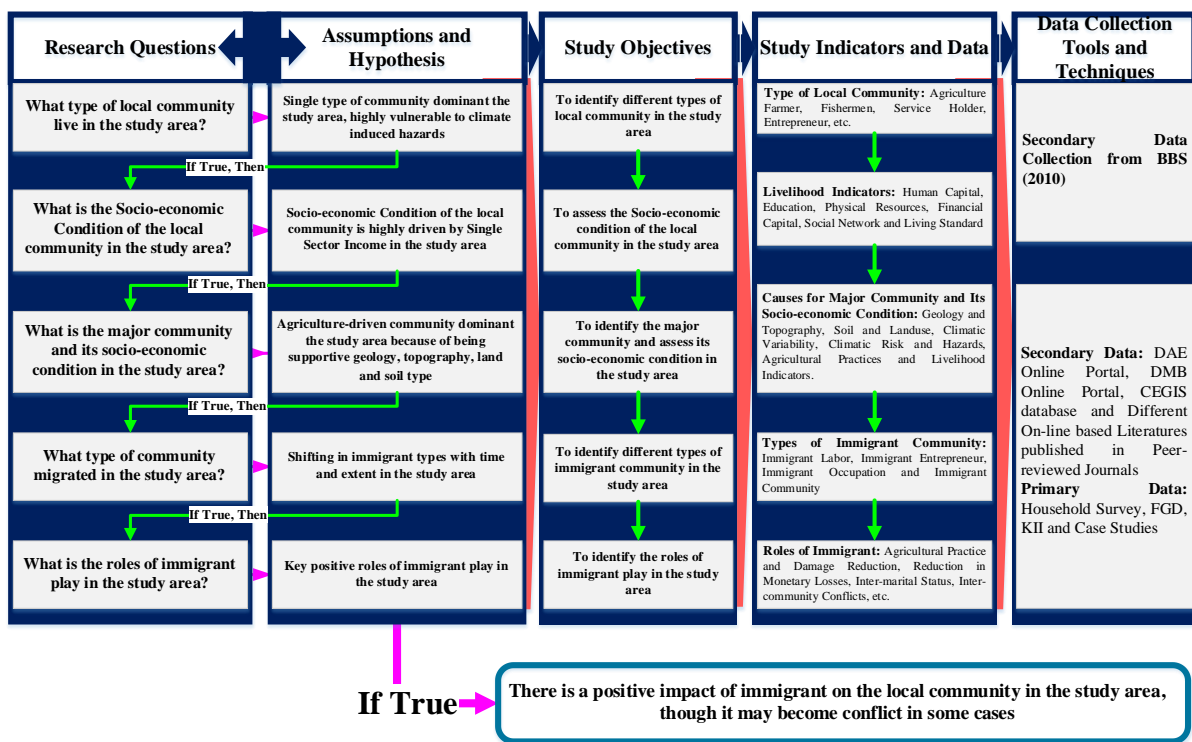
Kharif drought from June/July to October, created by sub-humid and dry conditions in the highland and medium highland areas of the study area. Shortage of rainfall affects the critical reproductive stages of transplanted Aman rice crops in December, reducing yield, particularly in those areas with low soil moisture holding capacity (MoWR, 2012).

The impact of drought spreads over the study area. A very severe drought can cause more than 40% damage to broadcast Aus. During the Kharif season, drought causes significant damage to transplanted Aman crop in About 2.32 million ha area annually. Apart from loss to agriculture, droughts have significant effects on land degradation, livestock population, employment and health (WB, 2000).

## Chapter 4. Methodology of the Study

### 4.1 Methodological Tools and Techniques

The present study considered an integrated approach to identify role of immigrants on the socio-economic condition of the local community covering Jamalgar and Niamatpur Mouzas of the Tahirpur Upazila of Sunamganj District. Two participatory action research tools were applied to collect information the agricultural farmers (local community) and immigrant groups in the study area. These include literature review and secondary data analysis, Focus Group Discussion (FGD), Key Informant Interview (KII) and case study. A schematic diagram of the study methodology is given in the **Figure 4.1**.



**Figure 4.1: Hypothesis and Methodology of the study**

#### *Literature Review and Secondary Data Analysis*

A comprehensive literature review was made to understand the basic theories, concepts and present liquidity of information on livelihood, socio-economic activities, migration landscape, and different physio-graphic, climatic and economic causes behind the immigrant community and their impact on the local community. Literatures were collected from different nationally and internationally published reports, scientific journals, and online sources. Secondary

quantitative data were collected from different published and renowned database, scientific journals and online sources.

### ***Participatory Action Research***

Different level of formal and informal participatory consultation meeting was conducted for the proposed action research.

#### **Focus Group Discussion (FGD)**

Focus Group Discussion (FGD) brings people together with similar income-generating experiences to discuss a specific topic of interest to them. In this study, it was important to understand the voices of farmers and migrant workers in a participatory manner. In this case, the method looks for data and information on socioeconomic indicators, including human capital, intellectual capital, financial capital, physical capital, and social capital. Four FGDs (01 for agricultural farmers and 01 for migrant workers per mouza) are implemented according to the following steps:

##### *Setting Venue*

- Developed previously a moderation-guide for leading the discussion in a focused way;
- Ensured a time stamp for each section with adequate coverage of the topics within two hours maximum;
- Selected the leading group from the target population- (i.e., agriculture famer and immigrant labor, immigrant practitioners and immigrant community);
- Ensured 8-12 participants with some harmony in occupational level;
- Pronounced people to comfortably express their opinions were ensured;
- Selected venue based on having adequate ventilation and lighting with comfortable seating;
- Facilitated the recording arrangement (at least audio if not video recording) to capture non-verbal expressions from participants during the discussion.

##### *Setting Ground Rules*

- One person spoke at a time;
- I acted as a moderator and actively looked for everyone to participate;
- No participant could dominate the conversation;
- The participants answered according to the purpose of the meeting, the general topic and ideally the specific questions.

#### **Key Informant Interview**

Several Key Informant Interview (KII) were held at the selected unions to understand the role of immigrant on the socio-economy of the local community. Key informants were selected from all the agriculture farmers, immigrant labor, immigrant practitioner, immigrant entrepreneur and the other immigrant community those who have more collective knowledge

about the inter-relationship among different communities. From each union, a key informant from each subject group was selected and interviewed during the study.

### **Case Studies**

Four case studies from each group (including immigrant labor, immigrant practitioner, immigrant entrepreneur and immigrant community) were conducted during this study. The impact of the immigrants was understood from these case studies. The case studies have supplemented the life stories and socio-economic condition of studied agriculture farmers (with and without immigrant situation). An open-ended questionnaire was used to take these information.

### ***Direct Household Survey***

In addition to participatory approach, some quantifiable data on the socio-economic indicators of the agricultural farmers as the local community were collected through applying direct survey approach. Sampling design was formulated according to the objectives and scope of the study, representative of the study area and accessibility and availability of data in order to conduct the survey.

## **4.2 Types and Sources of Data**

In order to address the objectives of the study, both primary and secondary data are used. The author collected the primary data through conducting a number of household surveys on agriculture farmers, FGD, KII and case studies on agriculture farmers, immigrant labors, immigrant practitioner and immigration community focusing on factors affecting interregional migration pattern. Secondary data were collected from different sources, such as: online portals of government institutions, reports and bulletins. Published and unpublished documents were extensively reviewed to justify relevant secondary information. The **Table-4.1** shows the various data, data type, collection method and analysis of the data.



**Table 4.1: Various tasks in process, data type, methods and analysis of the study**

Sl. no	Analytical Dimensions	Data Type	Analytical Issues	Method/ Tools	Analysis	Data Source
1	Climatic variability and hazards and climate induced risks especially on agricultural sectors in the study area (e.g., drought, flood and flash flood).	Qualitative and quantitative. Secondary information, primary data	<p><b><u>Climatic attributes:</u></b> Temperature, Rainfall and Evaporation translated from Evapotranspiration.</p> <p><b><u>Physical descriptions:</u></b> Geology and Topography.</p> <p><b><u>Land physiography:</u></b> Soil and Landuse.</p> <p><b><u>Agriculture system:</u></b> Agriculture land use, Major crops, Cropping pattern.</p>	<p><b><u>Secondary Information:</u></b> Interview, Checklist, various reports, publications, periodicals collection</p> <p><b><u>Primary Information:</u></b> Questionnaire, FGD, KII and Case study.</p>	Content and data analysis	DAE Online Portal, DMB Online Portal, and other online sources
2	Risk factors based on agricultural practices and technology used in agricultural sectors in the climate vulnerable areas (e.g., fertilized, pesticide, irrigation, etc.) of Bangladesh					
3	Livelihood system, change in livelihood status	Qualitative and quantitative secondary information and quantitative primary information	<p><b><u>Livelihood Asset:</u></b> Human Capital, Knowledge, Physical Resources, Financial Capital, Social Networking, Agriculture, Entrepreneurship, Micro-finance and Livelihoods activities,</p>	<p><b><u>Secondary Information:</u></b> Various reports, publications, periodicals collection</p> <p><b><u>Primary Information:</u></b> Questionnaire, FGD, KII and Case study.</p>	Data analysis	<p><b><u>Data:</u></b> Agriculture Farmers, Immigrant Labor, Immigrant Practitioner, Immigrant Entrepreneur and An Immigrant Community.</p> <p><b><u>Literature:</u></b> Relevant NGOs and Articles published in peer reviewed Journals</p>

### **4.3 Methodological Steps in the Study**

The study was by the several methodological steps as follows:

#### **4.3.1 Study Area Selection and Sampling**

The study area included two mouzas (Niamatpur and Jamalgar) of Tahirpur Upazila in Sunamganj District, which are among the flash flood-prone areas in Bangladesh. Since all the mouzas in Tahirpur Upazila in a particular region have homogeneity in terms of disaster risk, agricultural production system and local agricultural practices, two mouzas were randomly selected on the basis of dependence on the same haor, the Matian Haor.

#### **4.3.2 Description of the Study Area**

##### *Nature of the Study Area*

The present study selected two mouzas of two different unions under the Tahirpur Upazila of the Sunamganj District. These mouzas are: Jamalgar mouza in the Tahirpur Union and Niamatpur mouza in the Dakshin Baradal Union. Some physio-graphic and climatic natures are briefly described in the following sections.

##### **Geology and Topography**

The study area belongs to the Sylhet Trough, which is a sub-basin of the Bengal Basin and consists of 13-20 km thick alluvial and deltaic sediments underlain by much older gneiss and granitic rocks. The basin is bounded by the Shillong Plateau in the north, by the Indian Burmese ranges in the east and by the Indian Shield in the west. The southern and eastern parts of the Sylhet Trough are characterised by a series of north trending folds which have formed as a result of deformation from the Indo-Burman ranges. The anticlines constitute the Tripura Hills along the southern border of the region.

The study area has experienced some of the greatest subsidence. It has subsided 30-40 feet (10-12 m) in the last several hundred years. A subsidence rate of 21 mm/y in the Surma Basin was reported by the Master Plan Organisation (1985) and FEC (1989). This value appears to have been arrived at by using Morgan and McIntire's estimate of 10 m subsidence in 500 years. Therefore, if it is considered that the Sylhet Basin is subsiding at a rate of 2-4 mm every year and that the soil compaction rate is 1-2 mm/yr, then the actual subsidence rate of the Sylhet Basin might be 3-6 mm/yr.

## **Soil and Landuse**

The natural resources in an area determine the potential physical uses of that land. Certain environmental characteristics indicate the suitability of the land for supporting various types of development. Topography, drainage patterns, floodplains, soil characteristics, and groundwater properties are the major features that determine if an area is physically suitable for a specific type of development. The haor area encompasses nine Agro-Ecological Regions (AEZs) namely: (1) the Sylhet Basin, (2) the Eastern Surma-Kushiyara Floodplain, (3) the Old Meghna Estuarine Floodplain, (4) the Old Brahmaputra Floodplain, (5) the Middle Meghna River Floodplain, (6) the Young Brahmaputra and Jamuna Floodplain, (7) the Northern and Western Piedmont Plains, (8) the Northern and Eastern Hill and (9) the Akhaura Terrace. Among these, only three AEZs comprise the main haor basin. They are the Sylhet Basin, the Eastern Surma Kushiyara Floodplain and the Old Meghna Estuarine Floodplain. Land type classification is based on the depth of inundation during monsoon season due to normal flooding on agriculture land. There are five land type classes (MPO): F0 High land (above flood level), F1 Medium highland (flood depth of 0-90 cm), F2 Medium lowland (flood depth of 90-180 cm, F2), F3 Lowland (flood depth of 90-270 cm) and F4 Very lowland (flood depth of >270 cm). About 21% of cultivable area is incorrectly drained, where floodwater recedes within 15 days and 61% of cultivable areas are poorly drained and remain under floodwater from 15 days to eight months. About 10% of cultivable areas are very poorly drained, where floodwater stays more than eight months keeping the area wet during most of the dry season. The rest of the area (8%) where rainwater recedes quickly from soil surface is well-drained.

The soils within the same haor system can vary in texture, drainage class, fertility, and other parameters. The soils of the study area are grey silty clay loams and clay loam on the higher parts that dry out seasonally and grey clays in the wet basin. Peat occupies some wet basin centers. The soils are medium to highly fertile because of having a moderate content of organic matter and soil reaction is mainly acidic.

About 74% of the top soil texture of the study area is clay to clay loam, 21% loam and the rest are silty loam, sandy loam and sand. At the end of the monsoon season, floodwater recession depends on soil and topography. As a result, Rabi crop cultivation starts in different times in the haor region. Recession of surface water starts from the first week of October and ends in the middle of November in about 25% of cultivable area. Nineteen percent of cultivable area becomes free of floodwater from the middle of November to the middle of December and 38% from the middle of December to the beginning of January. Organic matter helps the soil to

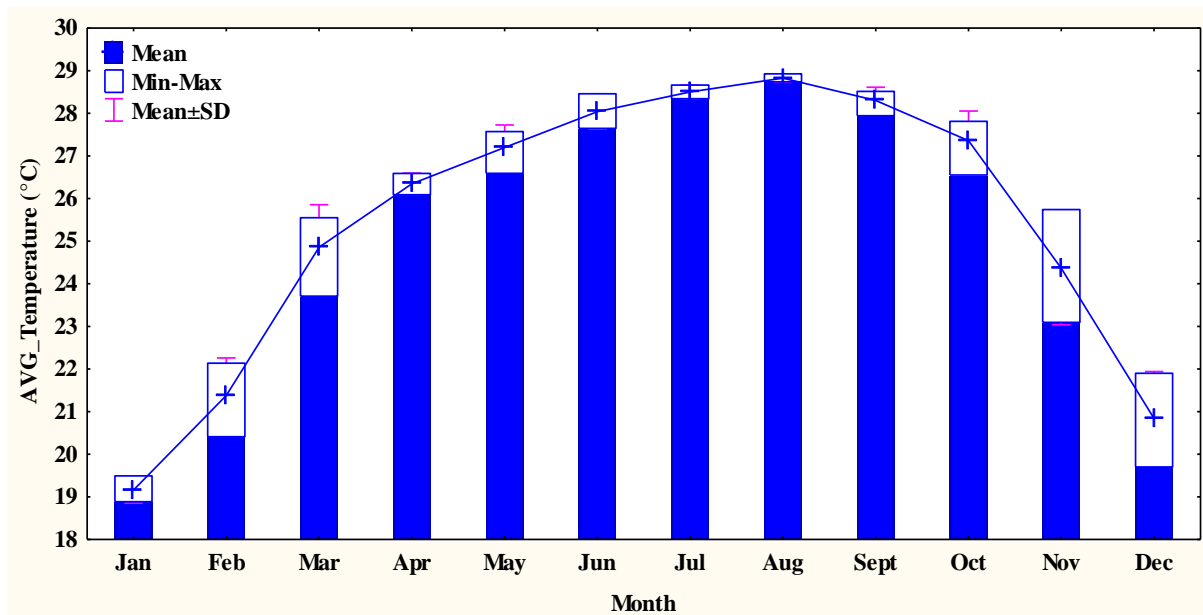
soften making land preparation easy. It helps to increase the moisture holding capacity and retains the nutrient status of soil. About 44% of the area is covered with high to medium high organic matter where organic content is more than 3.4%. The rest of the area has low to very low organic matter content.

### Climatic Variability

This section covers the historical climatic trends for the study area in order to assess the risk of agricultural production in response to flash flood, drought and climatic extreme events. Trend analysis has been analyzed there using BMD data. It is observed that most of the stations of Bangladesh Meteorological Department (BMD) show an increasing trend in average temperature. All the stations of north east region show increasing trend in annual average temperature.

### Average Temperature

The analysis on the monthly variability of 30 years average historical data (1990-2020) illustrates that average temperature has been highly varied in the pre-monsoon season (during the study period, February-March) (**Figure 4.3**). However, the highest average temperature was found in the month of August with lowest variability (Average  $\pm$  Standard Deviation (SD)).

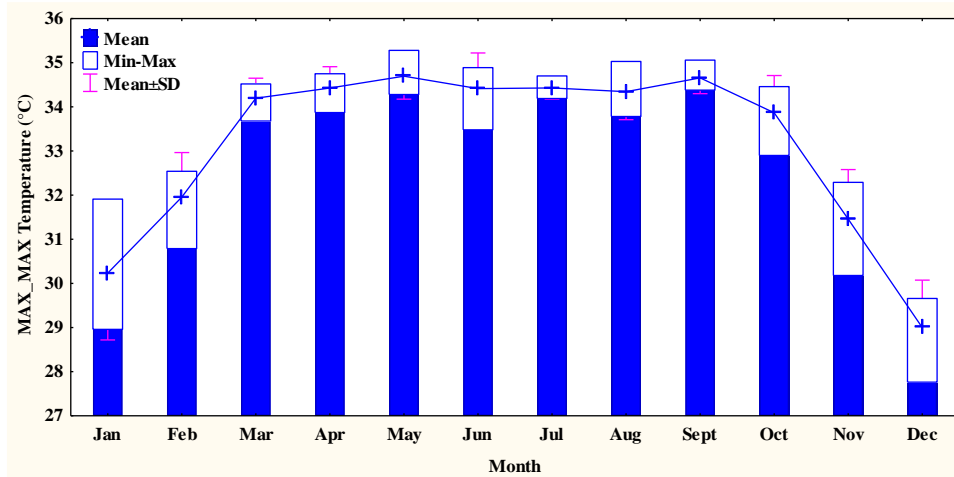


**Figure 4.3: Average monthly temperature in the Sunamganj District**

Source: BMD (1990-2020)

### Maximum Temperature

It has been found that the maximum of the maximum temperature frequently occurred during March-May (**Figure 4.4**). This maximum temperature mostly become high risk of crop damage.

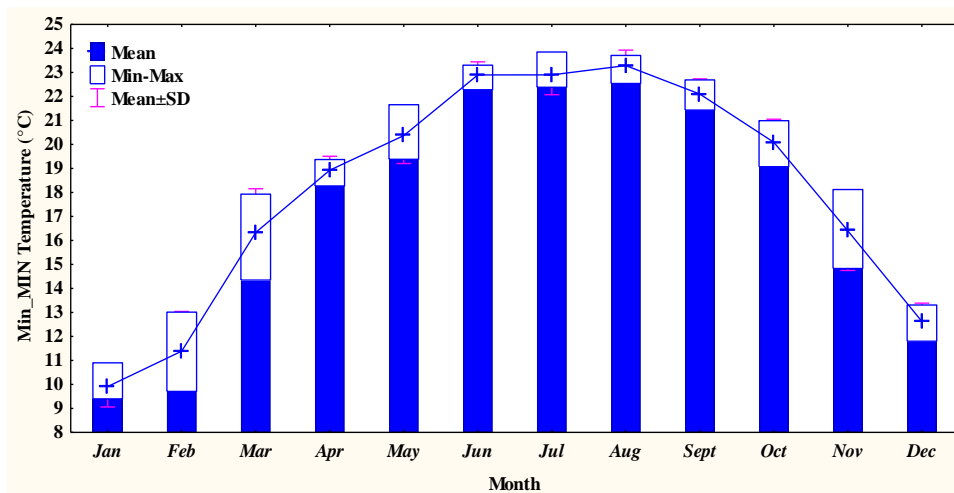


**Figure 4.4: Maximum monthly temperature in the Sunamganj District**

Source: BMD (1990-2020)

### Minimum Temperature

It has been found that the minimum of the minimum temperature frequently occurred during January-February (**Figure 4.5**). This minimum temperature also become high risk of crop damage caused due to cold.

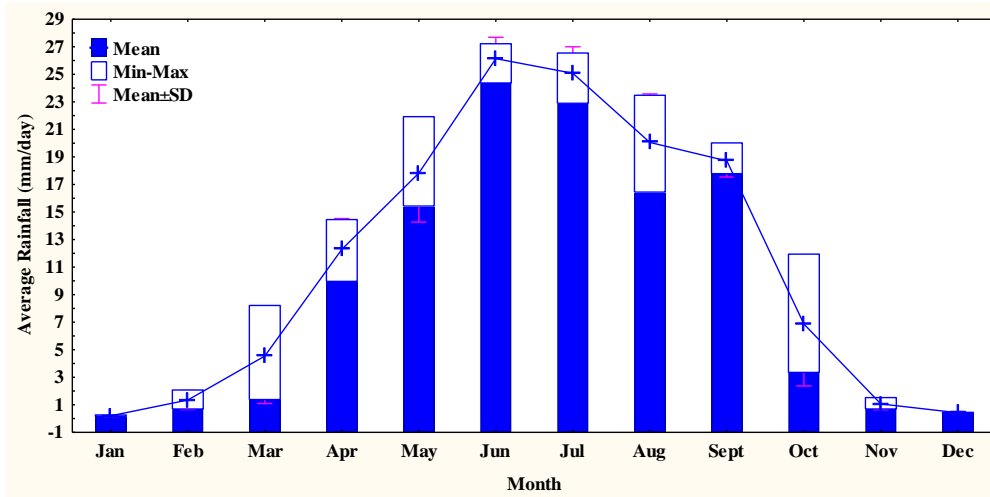


**Figure 4.5: Minimum monthly temperature in the Sunamganj District**

Source: BMD (1990-2020)

### Rainfall

The study also presents that, the rainfall of pre-monsoon (March-May, study duration) has the increasing trend. However, decreasing trend is observed only during monsoon season by 189.5 mm. It has been found that the maximum rainfall during April-May (**Figure 4.6**) frequently result in occurring flash flood in the study area. According to the agriculture farms, moreover, no rainfall during these months also result in crop damage caused due to agricultural draught.

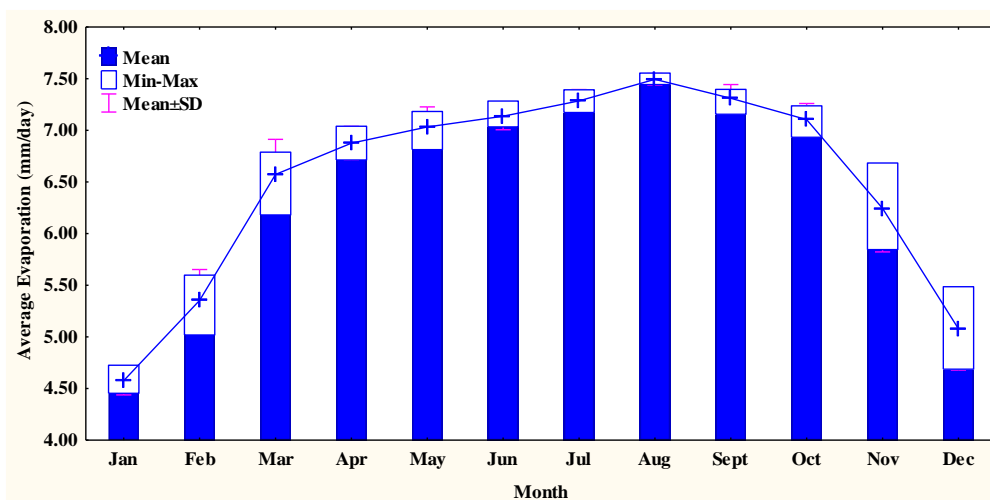


**Figure 4.6: Average rainfall in the Sunamganj District**

Source: BMD (1990-2020)

### Evaporation

The highest evaporation was found in the month of August with the lowest variability (Average $\pm$ SD) and the lowest evaporation was in January (Figure 4.7). However, the higher rate of evaporative loss during March-May cause devastating crop damage than found in the month of August because of less rainfall. Since boro rice crop needs irrigated water, this high evaporation with less rainfall cause highly crop damage in the study area.



**Figure 4.7: Average evaporation in the Sunamganj District**

Source: BMD (1990-2020)

### 4.3.3 Questionnaire/Checklist Preparation and Finalization

In this step, the household survey questionnaires and FGD, KII, and case study checklists were developed based on the literature review and secondary data analysis. Then, a short field visit was organized to test these questionnaires and checklists with both native and immigrant

communities. Finally, these survey instruments were redesigned and modified according to the results of this visit to make them more targeted, effective, efficient and practical.

#### **4.3.4 Data Collection**

In this step, a comprehensive study was conducted to collect primary data through household survey on agriculture farmers, FGD, KII and case studies on agriculture farmers, immigrant workers, immigrant practitioners, and immigrant communities focusing on factors that influence interregional migration patterns.

#### **4.3.5 Data Analysis and Reporting**

In this step, primary data collected from farmers, and immigration labor, entrepreneurs, practitioners, and other immigrant communities in the study area through household surveys were analyzed using MS. Excel and STATISTICA statistical software packages to plot variability and correlation analysis. Based on these analyses, the study identified the roles that an immigrant community can play in the local agricultural community.

##### ***Identification of Major Local Community in response to Physiographic Nature and Climatic Hazard Risk***

The study analyzed the different literatures from various online sources to identify the main physiographic characteristics of the study area. In addition, climatic variability and climate induced hazards were analyzed to determine the likelihood that a community would be dominated in response to climatic hazard risk.

##### ***Assessing Socio-economic Condition in the Study Area***

The author in this step also analyzed the secondary data from the Household and Population Census (2011) to assess the socio-economic condition of the community in the study area. Different descriptive statistics were used to analyze the socio-economic condition.

##### ***Assessing Socio-economic Condition of the Major Community***

The study also applied descriptive statistics using Excel spreadsheet and STATISTICA software package to analyze household survey data to assess the socio-economic condition of the major community in the study area.

### *Identifying Immigrant Community and Assessing Interregional Migration*

The study conducted a qualitative perceptual analysis of primary data collected through FGDs, KIIs, and case studies to identify different immigrant communities and the causes and consequences of their interregional migration in the study area.

#### *Identifying Roles of Immigrant Community on the Major Local Community in the Study Area*

Author analyzed different perceptions of both the major local community and the immigrant community to determine the role of the immigrant community. Finally, the author applied regression analysis to evaluate the relationship between the local community's agricultural involvement and human capital, financial capital, physical capital, and standard of living in light of regional economic theory (Oberg, 1994; Alonso, 1976; Quigley, 1972; Harris and Todaro, 1970; Thomas, 1941; Wilkinson, 1967). The study therefore analyzed the impact of interregional migration of the immigrant community on the local community of the study area by considering two contemporary ideas behind interregional migration.

## 4.4 Hypothesis

This study assumes some alternative hypotheses against the null hypothesis as shown in the table (Table-4.2):

**Table 4.2: Hypothesis of the study**

Null Hypothesis	Alternative Hypothesis	Type of Test
No difference among different communities to adapt with the climate induced hazards	Single type of community dominates the study area of highly vulnerable to climate induced hazards	No test required
There is no influence of sectoral income on the socio-economic condition of the local community	Socio-economic Condition of the local community is highly driven by Single Sector Income in the study area	T-test
No difference among different communities to adapt with the different geology, topology, land type and soil type	Agriculture-driven community dominant the study area because of being supportive geology, topography, land and soil type	No test required
There is no difference in immigration pattern with time and extent in the study area	Shifting in immigrant types with time and extent in the study area	No test required
There is no influence of immigrants in the study area	Immigrant play key roles in the study area	T-test



## Chapter 5. Case Studies

### 5.1 Case-1: Tale of an Immigrant Entrepreneur

In this study, a personal interview was conducted with an immigrant entrepreneur, named Shubuj Chandra Borman, at his tea shop located in the Tahirpur Upazila Parishad.

**Shubuj Chandra Borman:** was the youngest of five children—two sisters and three brothers. His father, Nitya Ranjan Barman, was a financially stable man. After his father died, his two big brothers took responsibility for the family. He got married immediate after completing his primary education. He and his wife then went to Dhaka for wishing a stable life, but they had to return their place after ten years. Then his two brothers migrated to Gajipur District, leaving their family responsibility to the care of him.

He used his entire capital to buy about 0.3 acres of cultivable land under Matian Haor in Tahirpur Upazila. Because of being very-low land and vulnerable to flash floods, he can cultivate this land only during the Boro season (December-April) period. Therefore, he has to produce high-yielding rice variety BRRI-29 in some portions of the land and early variety BRRI-28 in the rest of the land. However, this cropping pattern also becomes vulnerable to other climatic events. For example, he has lost a considerable amount of rice crop this year due to severe drought, some due to hail storms, and others by the flash flood. As a result, he lost his primary income to bear the family expenses. Shubuj Chandra Borman showed little hope for the future. “I become hopeless about the future of my family.” To cope with this financial crisis, he has taken a loan from BRAC and become an entrepreneur. He firstly started a tea stall in addition to agriculture. Slowly he raised his business network with the local community and increased the capital to enlarge his business from tea stall to grocery store within the last two years.

#### *Observation*

It has been observed that the study area of having considerable financial potentials attract Shubuj Chandra Borman-like young generation to seek hope for becoming an entrepreneur immigrated from another region. They can get married to the local community and settle down here. It has also been observed that the immigrant entrepreneur has more chance to be involved in societal activities than an immigrant laborer. Although, they are facing financial losses caused due to a number of natural hazards, they cope with this challenge by getting loan from different microcredit programs of NGOs.

## **5.2 Case-2: Tale of an Immigrant Homeopathy Practitioner**

Another interview was conducted with an immigrant homeopathy practitioner, named Muhammad Ali, at his practice chamber located in the Tahirpur Bazar.

**Muhammad Ali:** is a homeopathy doctor, son of Md. Zahoor Ali. There are 10 people in his family of 6 boys and 4 girls. His family resides in the Gazipur District's Sripur Upazila. In 1994, he migrated to Tahirpur Upazila due to a financial crisis on the recommendation of his sister-in-law and began his homeopathic profession. I have been informed that many residents in the community seek therapy at his clinic. From this enterprise, he supports his younger son to get his graduate degree, other sons to start their businesses, and three daughters marrying.

*Observation:*

The above interview expressed that the study area also entices some people to immigrate here for practicing as a homeopathy doctor. The local communities are so aggregable to welcome them that they can easily involve with them in different societal activities.

## **5.3 Case-3: Tale of an Immigrant Community**

Moreover, a group of representatives of an entire immigrant community was also interviewed at a tea shop, located in the Islampur Bazar. A community left the Bhoirab Upazila of the Kishorganj District and moved into the study area. First of all, they used to temporarily migrate here as the agricultural labor. But they moved here to cultivate by themselves after deciding that this location was more fruitful than their home land. The neighborhood did not take this well. From that, the immigrant community has sprung some critical societal disputes. However, in recent years, they have come to a mutual understanding.

*Observation:*

The above discussion indicated that migration becomes conflict when entire communities are completely moved from their home land. That is not well accepted firstly by the local community and may give rise to some critical societal conflicts among them. But the conflicts end with the course of time by comprehending one another.

## **5.4 Case-4: Tale of Immigrant Labor**

In addition to conducting household survey, FGDs and KIIs, I privately discussed with an immigrant labor, named Chitta Ranjan Saha, at the agricultural field located in the Dakkhin Bardal mouza. Observations are given below.

**Chitta Ranjan Saha:** He is a 55-years old labor immigrant living in the other mouza (Tekatukia) of the Tahirpur Upazila. His family consists of six people. For 25 years, he has been working as a stone collector in the Jadukata River and traveling here as an immigrant worker every year. He travelled here with a group of 25 individuals, and worked for almost 20 days. He can earn about 400 BDT per day by harvesting the standing crops of about 2 acres here. He remarked that there aren't enough reliable sources of income and job opportunities in his mouza. He is, in turn, employed in different fields as a wage worker. He may make around 15,000/-BDT by collecting sand and stones from the Jadukata River from January to April, 8,000/-BDT from harvesting boro rice crops in May, and about 7,000/-BDT from various activities in the other months. It suggests that he may make sufficient money from January to May. The local administration has halted collecting stones from the Jadukata River, he said, to provide sufficient human capital for the harvesting of the standing boro rice crop in the month of May.

#### *Observation*

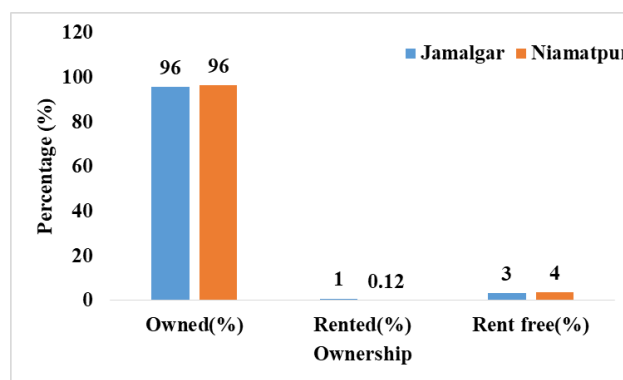
It has been found that the trend of immigration of labor from the distant regions has been decreasing for about 15 years. This scenario poses the labors of nearby mouzas, unions and even Upazilas to come here as the agricultural labor. These labors have to suspend their regular stone collection from the Jadukata River. More surprisingly, the local Government helps them to stop this collection for harvesting boro-rice during April-May. This condition results in increasing flows of capital from the high-wage-households to the low-wage-households within the study area.

## Chapter 6. Analysis of the Findings

### 6.1 Socio-economic Condition of the Tahirpur Upazila

#### 6.1.1 Household Ownership Pattern

The ability to hire workers for domestic and agricultural tasks depends on possessing a home of one's own. Thus, the ratios of owned, rented, and rent-free dwellings in Jamalgar and Niamatpur were compared in the current study (**Figure 6.1**). In the Jamalgar and Niamatpur mouzas, which are located in the unions of Tahirpur and Dakshin Baradal, respectively, about 96% of the residents live in their homes. This is the largest proportion of persons in any household ownership arrangement. Similar to this, there is no discernible difference between these mouzas' percentages of rented and rent-free households. This finding suggests that the ability of the residents in both mouzas to hire labor is more or less comparable.



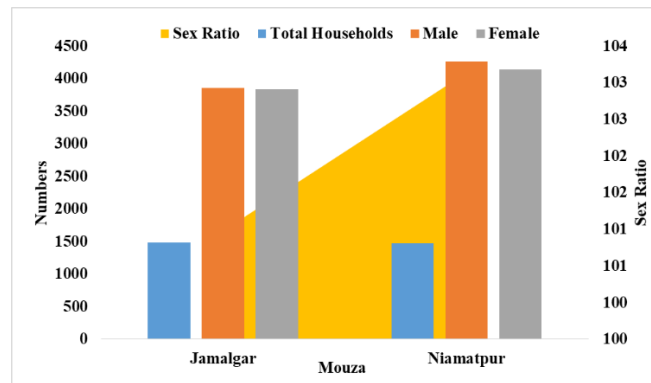
**Figure 6.1: Ownership of the households in two case mouzas**

*Source: Household and Population Census, 2011*

#### 6.1.2 Basic Demography

##### *Population*

The present study compared the sex ratio, total households, and male and female population between Jamalgar and Niamatpur mouzas (**Figure 6.2**). Although there is almost the same number of families overall, Niamatpur has a higher male-to-female ratio than Jamalgar mouza. This finding suggests that Niamatpur is more equipped than Jamalgar mouza to address the labor shortfall in terms of human resources.

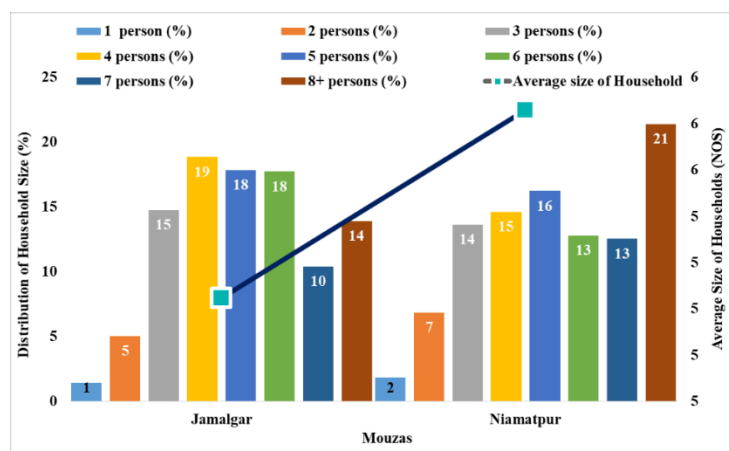


**Figure 6.2: Population in two case mouzas**

Source: Household and Population Census, 2011

### Household Size

The present study examined the variance in the household size distribution (shown in Figure 6.3). It was discovered that the largest number of households in the Niamatpur mouza (about 21%) contain 8 people, compared to the maximum number of households in the Jamalgar mouza (about 19%). Additionally, it has been shown that Niamatpur has larger average households than Jamalgar mouza.

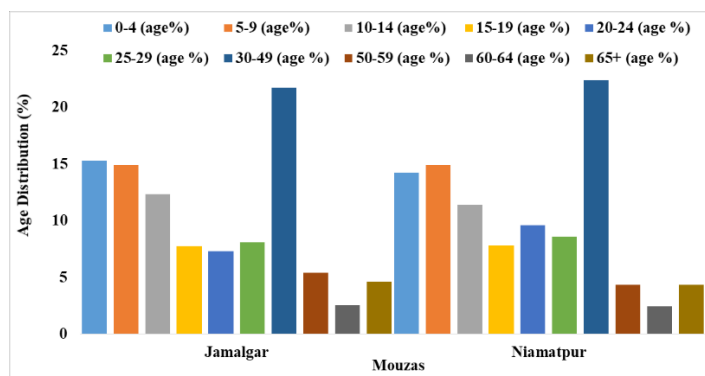


**Figure 6.3: Demographic structure of the households in two case mouzas**

Source: Household and Population Census, 2011

### Age Distribution

Table 6.4 depicts the population distribution in terms of age composition. All populations are classified into three distinct groups: those under the age of 15 are considered children, those between the ages of 16 and 55 are called youth, and those over the age of 56 are regarded the elderly. Analyses of the table show that the youth population, particularly those aged 30-49, make up the majority of the population in both of the investigated mouzas.

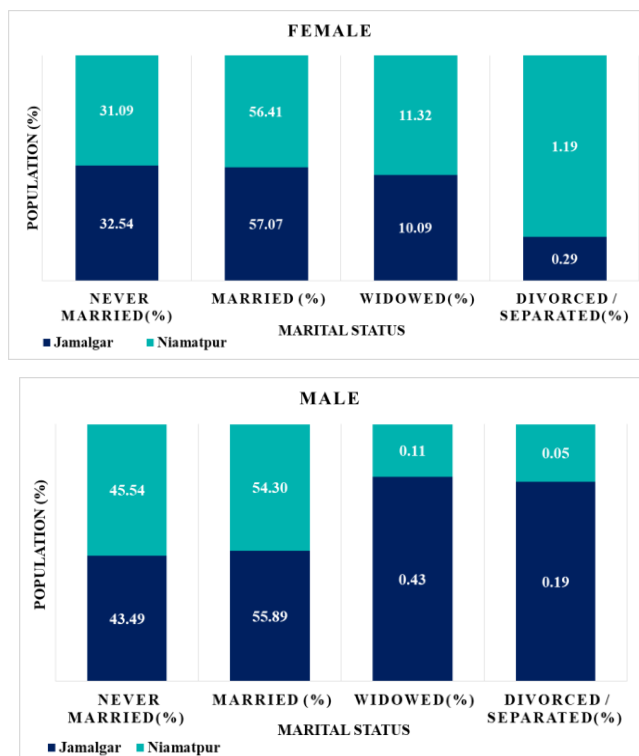


**Figure 6.4: Age distribution per households in two case mouzas**

Source: Household and Population Census, 2011

### Marital Status

Both mouzas have a balanced percentage of married men and women, according to the data (Figure 6.5). Females in both mouzas, however, are more likely to be widowed than males. However, only a small percentage of the male and female populations are divorced or separated. It implies that people of the investigated mouzas have a lower demand for marriages with those who have migrated from outside of these mouzas.

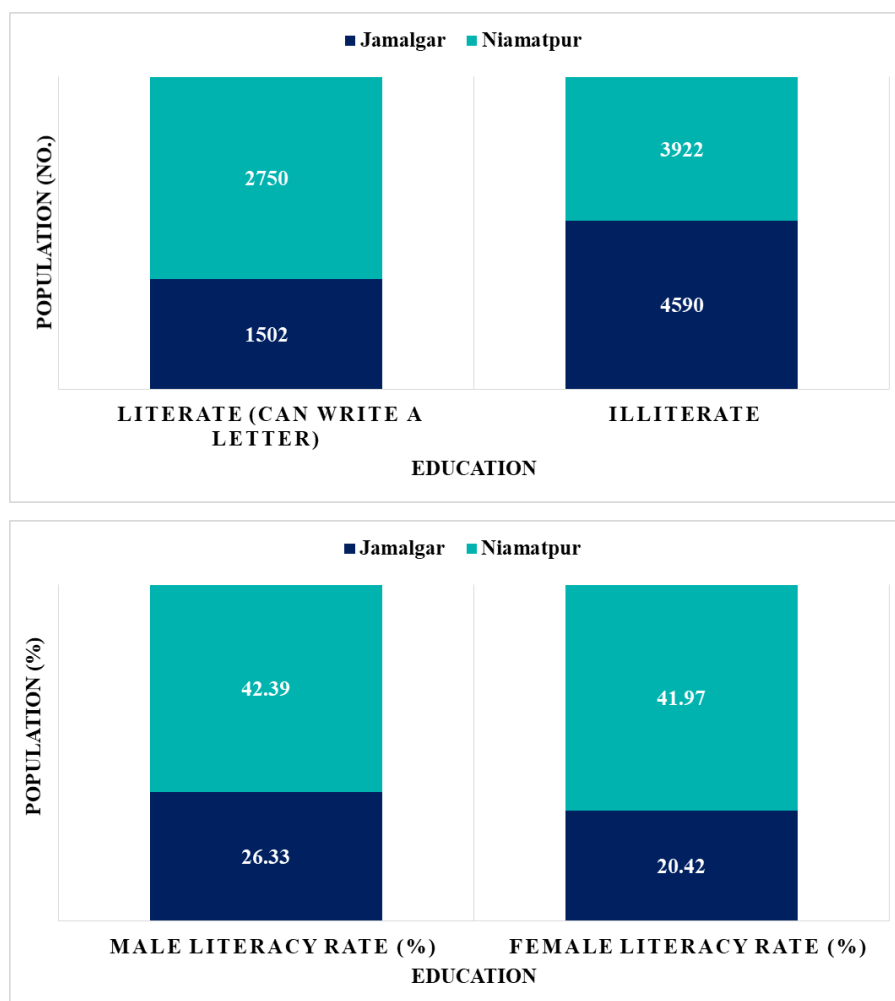


**Figure 6.5: Marital status of male and female in two case mouzas**

Source: Household and Population Census, 2011

### 6.1.3 Education

The distribution of the population's education and literacy levels between the two mouzas is shown in the table below (**Table 6.6**). More residents in Jamalgar mouza (about 4,590) are classified as illiterate because they are unable to write a letter. On the other hand, the Niamatpur mouza has been shown to have more male and female literates than the Jamalgar mouza.



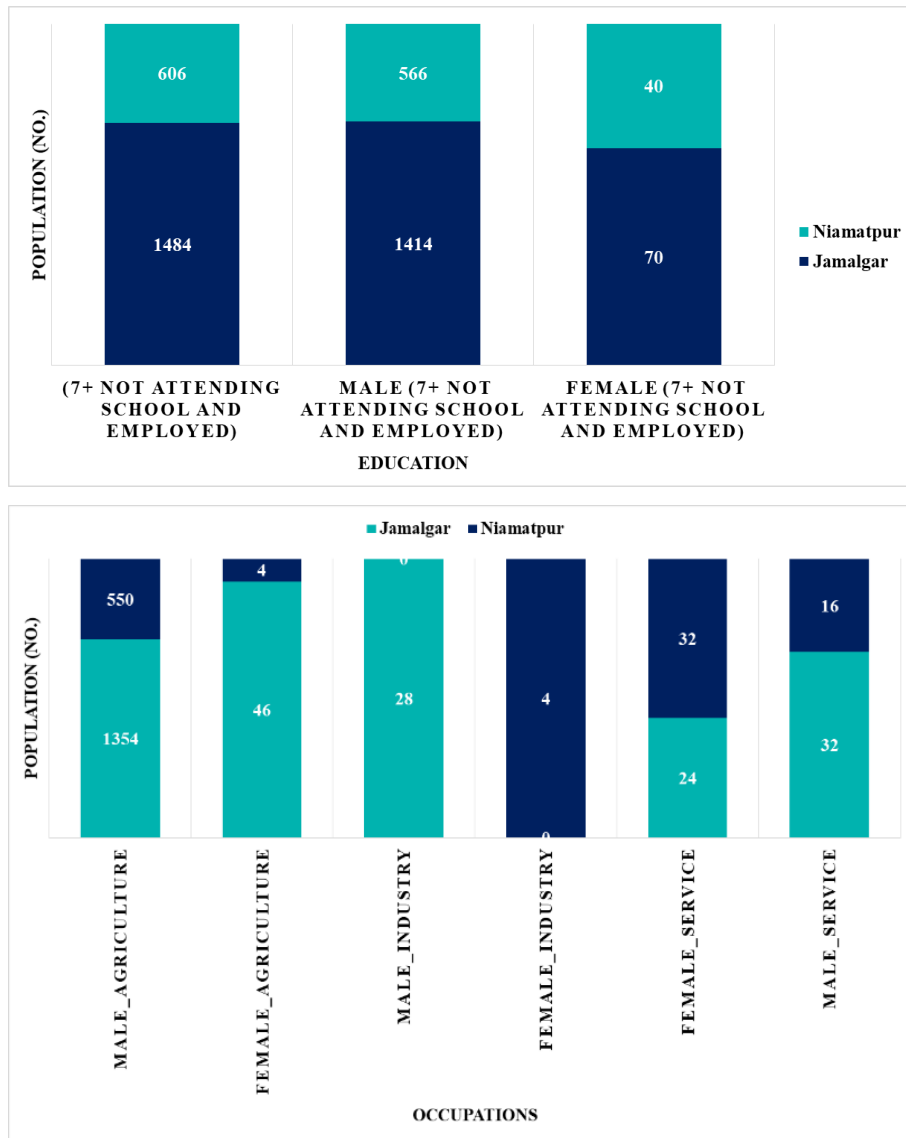
**Figure 6.6: Education status in two case mouzas**

Source: Household and Population Census, 2011

### 6.1.4 Employment Status

It has been observed that the Jamalgar mouza employs more men and women than the Niamatpur mouza (**Figure 6.7**). It has also been revealed that the primary means of subsistence in the research region is agriculture. In both mouzas, the majority of men are directly employed in agricultural work and activities. In the Jamalgar mouza, around 5% and 35% of the male and female population, respectively, are engaged in various occupations, but in the Niamatpur mouza, approximately 3% and 80% of the male and female population, respectively, are

engaged in service. As a result of seasonal differences in the study regions, the residents of Niamatpur mouza (approximately 83% of the population, primarily females) choose a variety of occupations for their living.



**Figure 6.7: Employment status in two case mouzas**

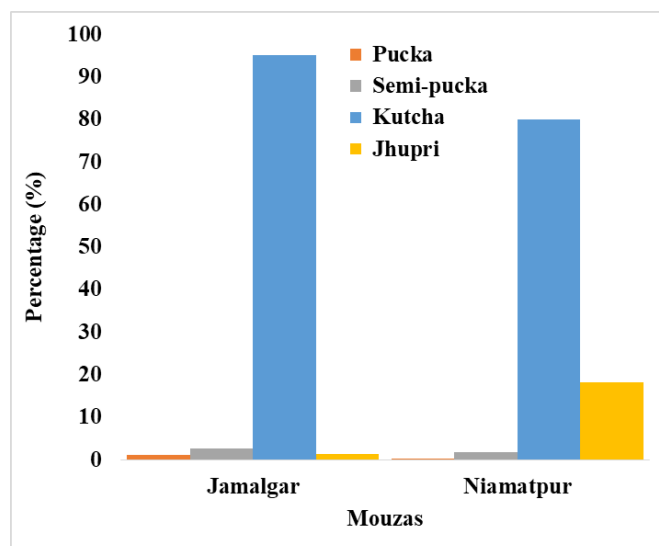
Source: Household and Population Census, 2011

## 6.1.5 Livelihood Standards

### *Housing Condition*

Housing structures in the study area are not satisfactory. For example, total 90% of housing structures are kutcha and 4% are Jhupri in the study area. Only 4% of total housing structures are found as pukka which have concrete structures (**Figure 6.8**).



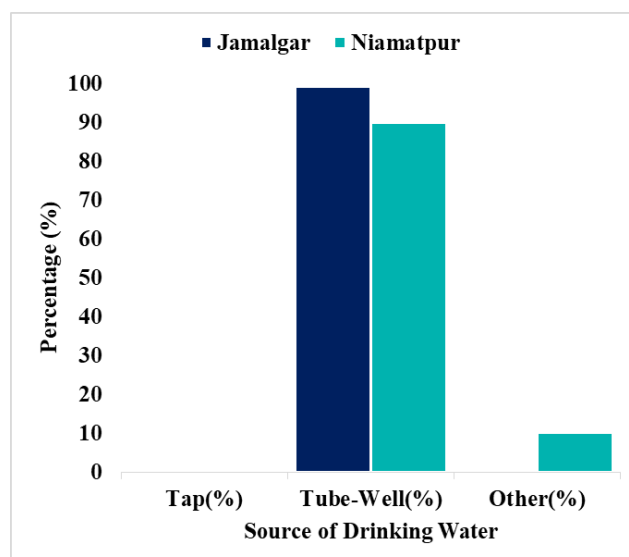


**Figure 6.8: Housing condition in two case mouzas**

Source: Household and Population Census, 2011

### *Drinking Water*

In the research region, it was discovered that in the Jamalgar mouza, over 90% of families used tube well water for drinking purposes, whereas only over 90% did so in the Niamatpur mouza (**Figure 6.9**). Due to the expensive cost of installing deep tube wells in these mouzas, residents often share tube wells with their neighbors or use other methods to gather drinking water, such as taps, ponds, etc.

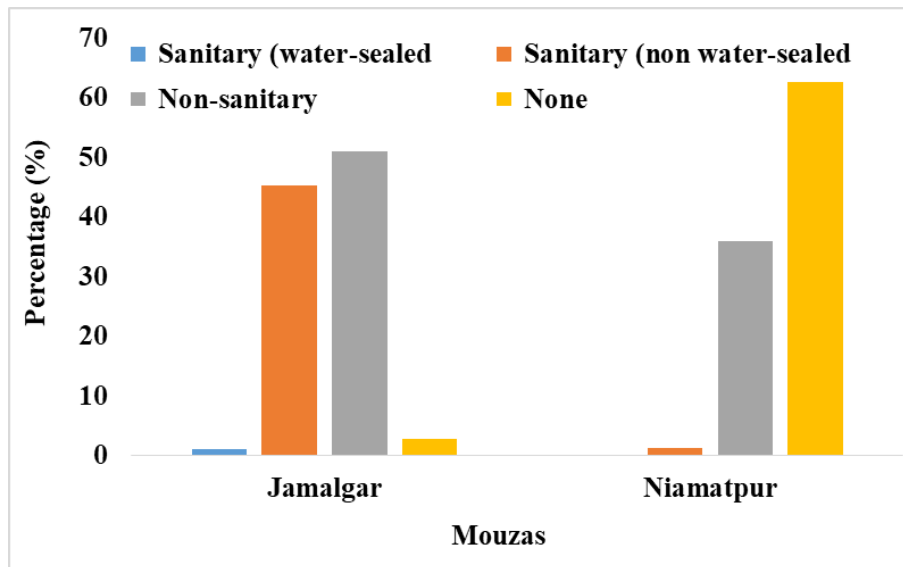


**Figure 6.9: Water supply for drinking in two case mouzas**

Source: Household and Population Census, 2011

### Sanitary Facilities

The sanitation facility is not satisfactory in the study area. Very few percentages of households get facilities of water-sealed sanitary latrines in both mouzas (**Figure 6.10**). Moreover, the maximum household in these mouzas has no sanitary facilities.

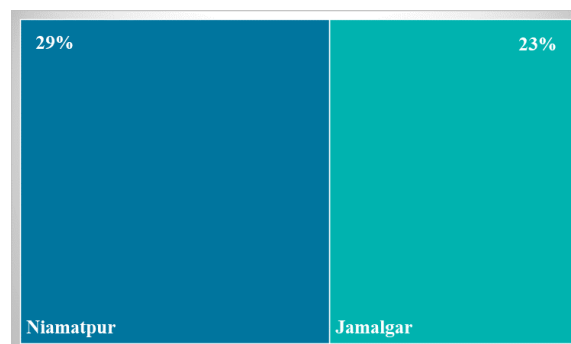


**Figure 6.10: Sanitary condition in two case mouzas**

Source: Household and Population Census, 2011

### Electricity Facilities

The availability of electricity is a key indicator of a community's living standards. Approximately 23% of all houses in Jamalgar mouza and 29% of all households in Niamatpur mouza lack access to electricity, which is a poor proportion of the standard of life (Figure 6.11). Although the proportion of houses with access to electricity varies per mouza, each one still falls beneath the national coverage (53%). (Source: Household and Population Census, 2011).



**Figure 6.11: Electricity facilities in two case mouzas**

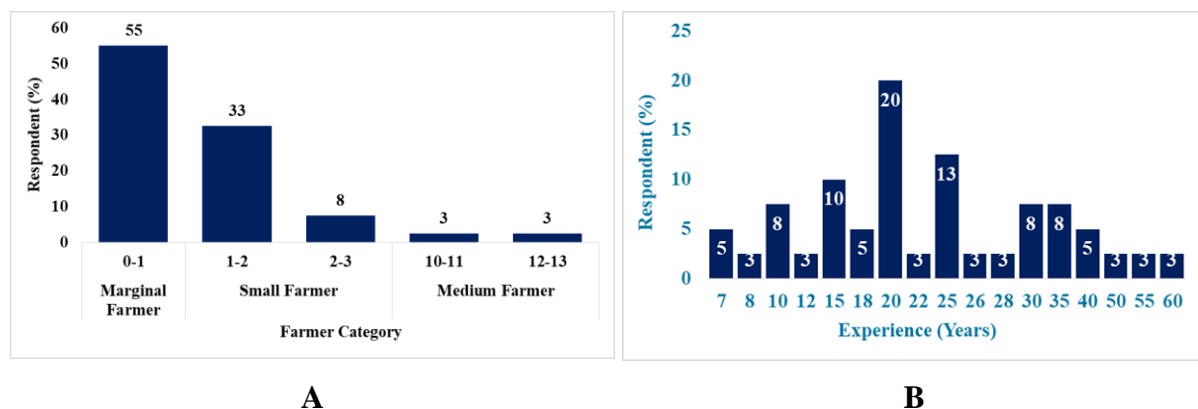
Source: Household and Population Census, 2011

## 6.2 Socio-economic Condition of the Agriculture Farmer

The present study assessed the socio-economic condition of the agricultural farmers, which have been directly dependent on immigrant labor for harvesting rice for more than 10 years. The socio-economic condition of these farmers is briefly discussed in the following sections.

### 6.2.1 Farmer Category

A maximum of five (05) categories have been identified in the research locations. The first three (03) groups can be categorized as small farmers, marginal farmers (those with 0.51 to 1.0 acres of agricultural land), and the extremely poor (labor) (having 1.01 acres to 2.5 acres of agricultural land). The latter two (02) categories can be categorized as medium (farmers with agricultural land between 2.51 and 5 acres) and big (farmers with agricultural land larger than 2.5 acres). More farmers (approximately 55%) have been found to fall into the marginal category (Figure 6.12-A). Most of the sample farmers have a minimum of 20 years of experience (Figure 6.12-B).



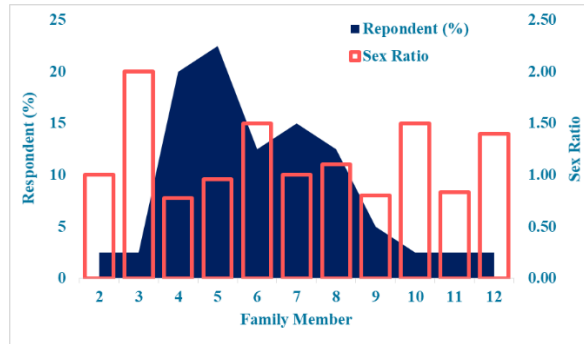
**Figure 6.12: Major Farmer category and their experiences in the study area**

Source: Field Survey, 2022

### 6.2.2 Demographic Structure

#### *Household Size and Sex Ratio*

The present research reveals that the least home size is 2,3, and 10–12 people, while the greatest household size (more than 20%) consists of 4-5 people (Figure 6.13).

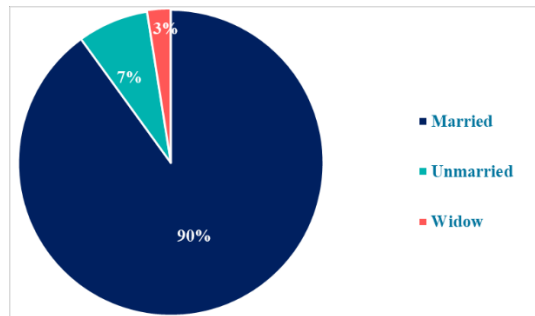


**Figure 6.13: Family member with sex ratio in the sample farmer households**

Source: Field Survey, 2022

### Marital Status

It has been found that maximum sample farmers are married while some are widowed (**Figure 6.14**).

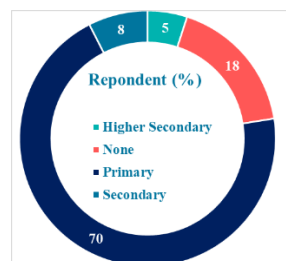


**Figure 6.14: Marital status in the sample farmer households**

Source: Field Survey, 2022

### 6.2.3 Education

The following **Figure 6.15** shows that about 70% of the farmers have primary education, followed by secondary and higher secondary education. About 18% of sample farmers are illiterate.



**Figure 6.15: Education status in the sample farmer households**

Source: Field Survey, 2022

### 6.2.4 Household Condition

Housing structures in the study area are non-satisfactory. The floor of about 90% of houses is made of mud (Kacha), and the walls and roof of tin (Figure 6.16).

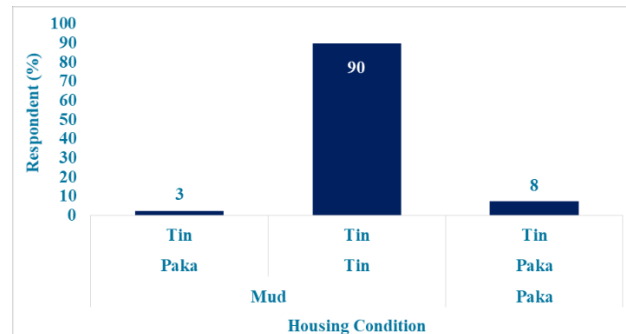


Figure 6.16: Housing condition of the sample farmers

Source: Field Survey, 2022

### 6.2.5 Electricity

In the study area, 98% of homes have access to electricity on average, which is a significant indication of the standard of life (Figure 6.17). Only 3% of homes do not have access to power.

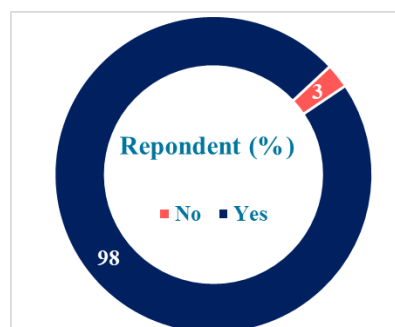
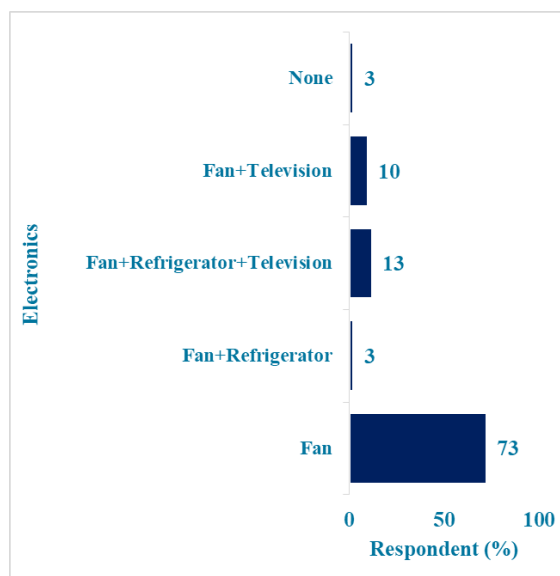


Figure 6.17: Electricity supply to the sample farmers

Source: Field Survey, 2022

### 6.2.6 Electronics

The majority of the sample farmers were found to have electric fans, and among them, around 16% had refrigerators and approximately 23% had televisions (Figure 6.18). Few sample farmers lack any electronics. It suggests that the majority of agricultural farmers are members of the middle class.

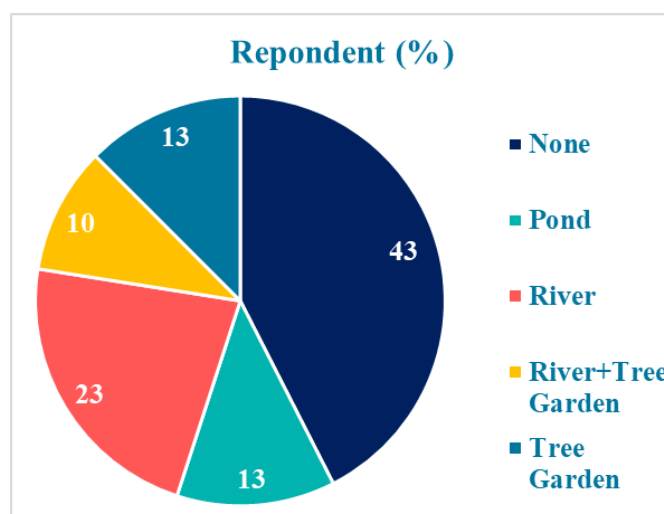


**Figure 6.18: Electronics used by the sample farmers**

Source: Field Survey, 2022

### 6.2.7 Natural Resource

It has also been found that more than 50% of the sample farmers are husbanded by natural resources, including ponds (about 13%), and river and tree gardens (about 46%) (**Figure 6.19**).



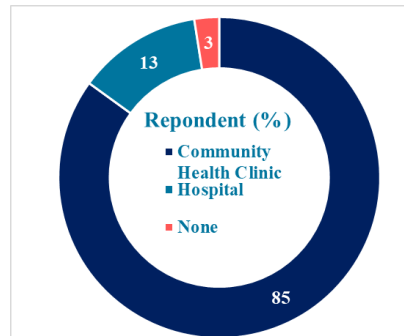
**Figure 6.19: Natural Resources for the sample farmers**

Source: Field Survey, 2022

### 6.2.8 Medical Support

The present research revealed that due to the presence of community health clinics in their communities, the majority of the sample farms only had minimal medical help (**Figure 6.20**). A small percentage of them (about 13%) can receive medical assistance at the Tahirpur Upazila

hospital. However, this medical help usually becomes unavailable due to poor communication during the rainy season.

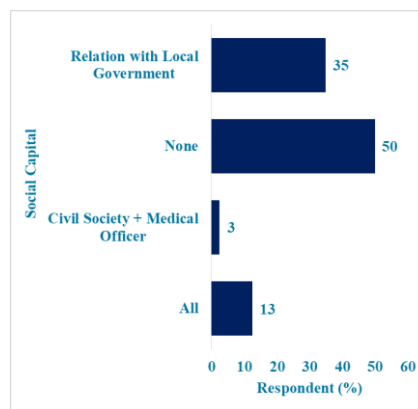


**Figure 6.20: Medical Support for the sample farmers**

Source: Field Survey, 2022

### 6.2.9 Social Support

The sample farmers in the study area lack appropriate social support (**Figure 6.21**). Approximately 35% of the sample's farmers are in contact with the local government, and 13% are with the local government, civil society, and medical professionals. The other farmers have no network with the government or civil society.



**Figure 6.21: Social Support for the sample farmers**

Source: Field Survey, 2022

### 6.2.10 Agricultural Practice of the Sample Farmers

As a result of its susceptibility to flash floods, the study region is predominately low land type. Three cropping seasons occur in the area each year. These are the Kharif-I (16 March–15 July), Kharif-II (16 July–15 October), and Rabi seasons (16 October-15 March). The erratic nature of the alternate dry and rainy spells defines the Kharif-I. The main crops grown in areas are summer vegetables that are vulnerable to flash floods. Due to inequities in rainfall distribution,

flooding depth, low solar radiation, and high temperatures and humidity, the Kharif-II season is not conducive to good yields. Farmers in flash flood-prone areas mostly grow transplanted Aman as a crop. However, due to the research area's relatively low land, this crop cannot be grown there. The Rabi season, on the other hand, benefits from high solar radiation, little humidity, and a warm climate. In the study area, boro, mustard, nut, and other robi-vegetables are the major plants throughout this season (**Table 6.1**). As a result of the low land, the sample farmers are only able to grow one type of crop on it.

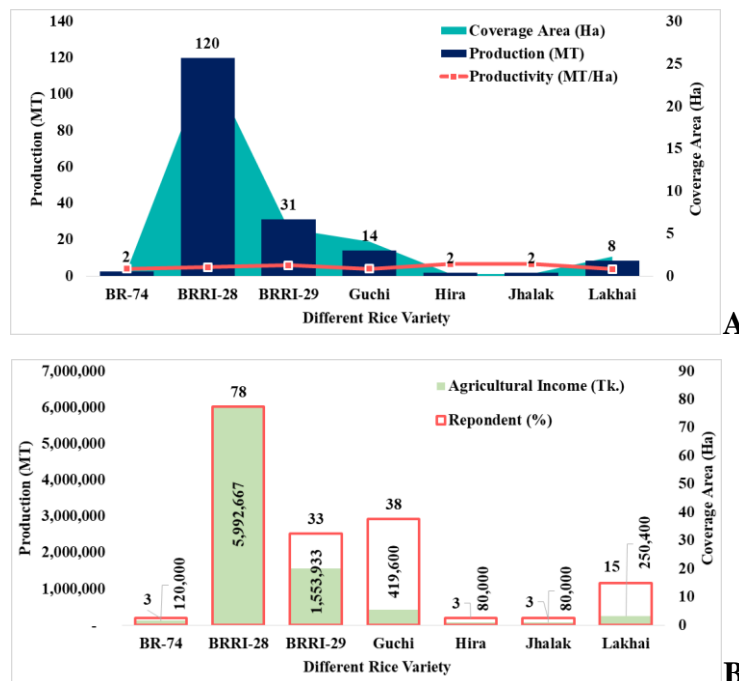
**Table 6.1: Major Cropping pattern in the study area**

Kharif-I	Kharif-II	Rabi	Cropping patterns (%)
Fallow	Fallow	Boro	90
Fallow	Fallow	Vegetables	3
Fallow	Fallow	Mustered	5
Fallow	Fallow	G. Nut	2

Source: Field survey, 2022

### Rice Verity and Production

The household surveys and RRA with various farmer categories revealed several crop varieties in the study area. The most productive cultivable area is covered by BRRI-28, followed by BRRI-29 and different local varieties, including Guchi, Lakhai, Jhalak, and hybrid varieties (**Figure 6.22-A & -B**).



**Figure 6.22: Production by different rice varieties**

Source: Field Survey, 2022



### *Production Damage by Flash Flood*

Furthermore, Aman and Boro (HYV) suffer the highest production losses in flash flood zones. The current study revealed that the harvesting time of local variety (130-145) is too long to prevent flash flood risk (**Table 6.2**). Because of this, the Bangladesh Rice Research Institute (BRRI) created BRRI-28, a short-duration rice variety during the boro season. However, this rice type is highly susceptible to damage because of inadequate irrigation, temperature swings, and other climatic events. To prepare for flash floods and other extreme occurrences, the agricultural farmer cultivates a variety of rice types on each plot of land. For instance, they grow BRRI-28 for flash flood adaptation and BRRI-29 and other hybrid types for high output since they are highly productive. Because local varieties are more resilient than high-yielding and hybrid varieties, farmers also planted different local varieties on sections of their land to ensure production while adjusting to other harsh occurrences. Additionally, producers can save the seed rice from the local varieties for the following year's planting.

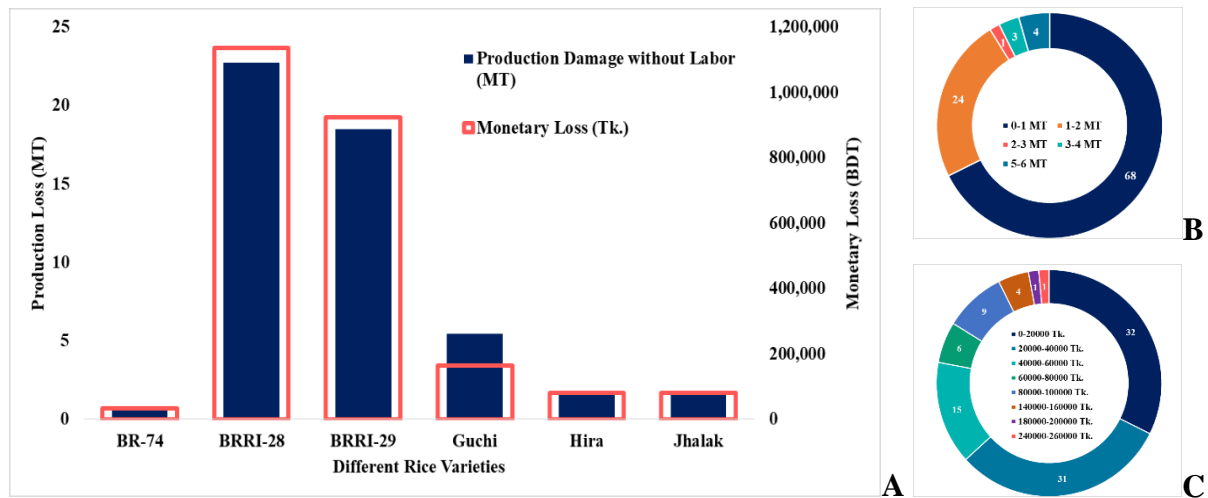
**Table 6.2: Variety, duration and yield of crops in the study area**

Crop	Variety	Duration (days)
Aus (HYV)	BR2, BR26	135, 110
Aus (local)	Hashikolmi, Khashiabinni	135, 145
Aman (local)	Biroi, Gainja, Paijam	145, 135
Aman (HYV)	BR11, BRRI dhan30, BRRI dhan32, BRRI dhan34, BRRI dhan39, BRRI dhan41 and Pajam	140-145
Boro (local)	Jagli, Lafa, Tapi, Gochi, Borohabji	145
Boro (HYV)	BR14, BRRI dhan28, BRRI dhan29	140
Boro (hybrid)	Hira, Sonarbangla, Aloron, Jagoron, Raicher, Moyna	110
Jute	Kenaf, Mesta	150
Potato	Hira, Diamond, Kardinal, Lalpakri	85-90
Wheat	Protiva, Shatabdi, Sharouv, Gaurov	120-145
Sesame	Til-6	100-110
Mustard	Tori-7, BARI Mustard-9, BARI Mustard-14	60-70
Pulse	BAR Grasspea-1, Local improved	130-140
Ginger	Local (improved)	240-2500
Turmeric	Dimla, Shinduri	One year

*Source: Field survey, 2022*

According to the results of the current study, farmers greatly depend on agricultural labor to safeguard their goods against production and financial loss. According to the present study, BRRI-28 will experience the most production loss and financial loss for farmers without laborers, followed by BRRI-29, Guchi, Hira, Jhalak, and BR-74 (**Figure 6.23-A**). The

maximum farmers would lose around one metric ton (MT) of rice output per hectare and the related revenue in the absence of labor (Figure 6.23-B & -C).



**Figure 6.23: Production loss by different rice varieties**

Source: Field Survey, 2022

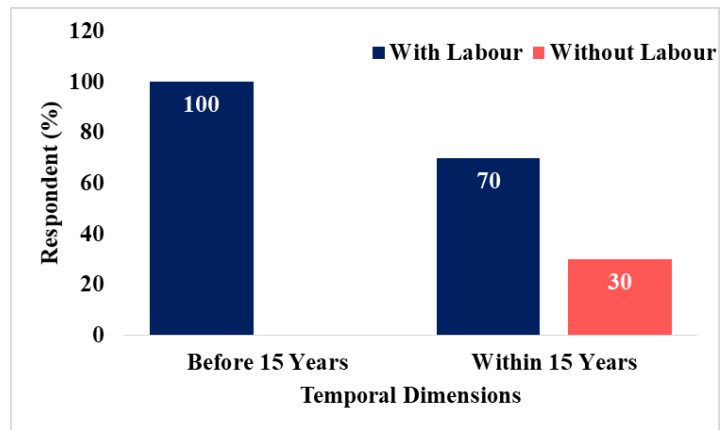
## 6.2.11 Agriculture Input

### *Fertilizer and Pesticide Use and Cost*

Seed, labor, fertilizer, and insecticides are a some of the inputs that come into play. The maximum quantity (2,500 kg) per hectare per acre of labor and seed is needed for boro rice crops. For Boro HYV and Boro, the highest amount (1,000 ml/ha) of liquid insecticides is required (Hybrid).

### *Agricultural Labor*

According to the farmers who responded, the boro rice crop requires the maximum number of laborers (180Nos) per hectare. However, during the last 15-20 years, the phenomenon of recruiting workers has altered. Additionally, agricultural growers had been hiring workers for more than 15 years from several areas, including northwest Bangladesh. Nevertheless, for 15 years, they have been engaging workers from the adjacent Upazilas, even from the nearby mouzas. All farmers relied on such immigrant labor to varying degrees 15 years ago, whereas only roughly 70% of the sample farmers do so now (Figure 6.24).



**Figure 6.24: Use of immigration labor in the agriculture practice**

*Source: Field Survey, 2022*

## Chapter 7. Discussion

### 7.1 Agriculture Dependent Local Community

Supportive landscape, hydro-climatic conditions, and different natural hazards and anthropogenic interventions (like interregional migration) can promote a society of diverse populations. These aspects result in developing one production system and the dependent lifestyle and demographic composition to establish in parallel to physical infrastructures, knowledge, financial mechanisms, and social networking through coping with different natural hazards (S. Oberg, 1995).

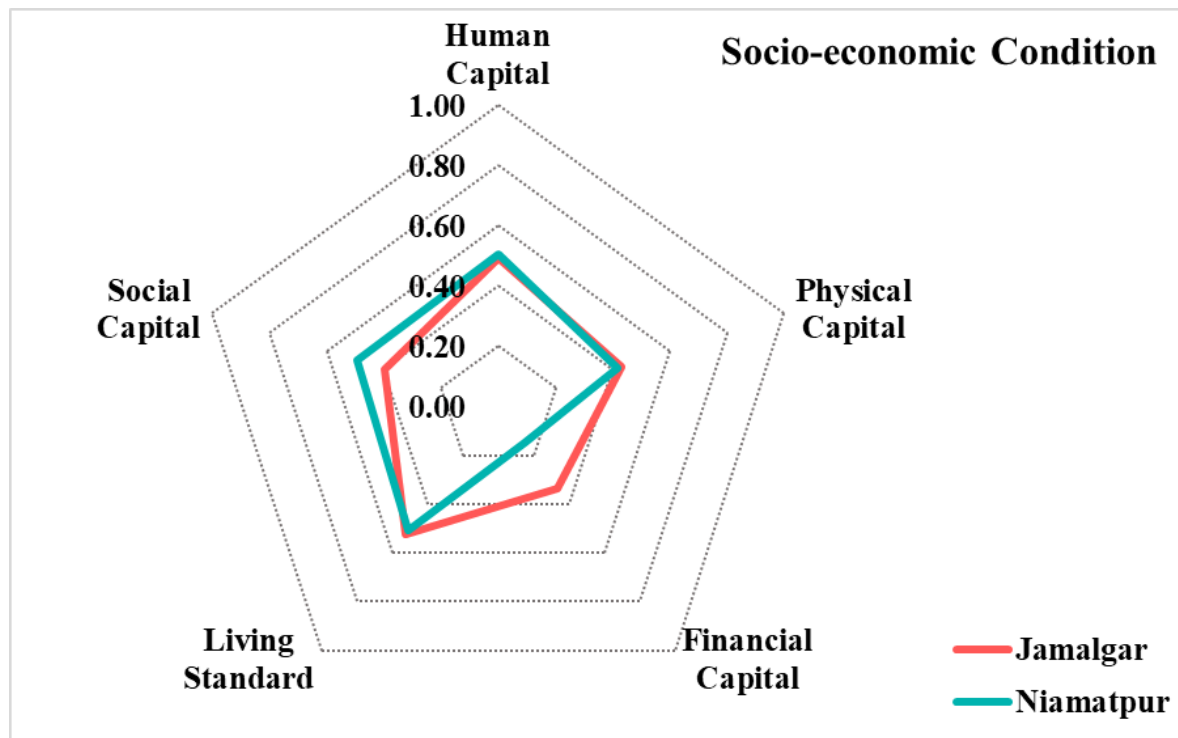
The present study has found that the study area belongs to the Sylhet Trough, which is a sub-basin of the Bengal Basin and consists of alluvial and deltaic sediments (MoWR, 2012). The deformation from the Indo-Burman ranges results in characterizing a series of north-trending folds. The study area has experienced the highest subsidence at a rate of 21 mm/y. These physiographic natures of the study area result in creating almost round-shaped tectonically depressed and marshy lands, locally called Haors, that are vulnerable to river floods during the monsoon, and flash floods during the pre-monsoon season each year. The study area is in the deep haor areas among the three haor categories (Foothill and Near Hill Haors, Floodplain Area Haors, and Deeply Flooded Haors) because the maximum proportion is under the lowland and very lowland among the five land type classes: F0 (High land), F1 (Medium highland), F2 (Medium lowland), F3 (Lowland) and F4 (Very lowland). The conditions in the study area play a supporting role in improving agricultural production (Laekemariam F. et al., 2016; Abate A., 2014; Haor Master Plan, 2012). It is, thus, suggested that the particular physiographic nature and hydro-climatic conditions are highly supportive for an agro-based production system, which is bifurcated by a Robi-crop production system for six seasons (November-April) and fisheries production system for another six seasons (May-October) every year.

Therefore, the present study inferred that an agriculture-dependent community dominates the study area in which all of the socio-economic activities transformed into their capital based on the agro-based production system.

## 7.2 Socio-economic Condition

The British Department for International Development (DFID) has developed a ‘Sustainable Livelihood Framework’ (SLF), one of the most widely used livelihoods frameworks in development practice, by adapting a version of Chambers Conway’s definition of livelihoods.

The approach is based on the belief that people need a lot of capital to achieve positive livelihood outcomes. Therefore, the SLF has identified five types of capital to build livelihoods, including human capital, social capital, natural capital, physical capital and financial capital (DFID, 2000). However, the present study could not identify natural capital due to lack of data in the Population and Household Census (2011). In addition, this study added living standards as an indicator of sustainable livelihoods. This study shows that socio-economic conditions in the two mouzas are moderate across all livelihood indicators. According to the laws of migration in the regional economics (S. Oberg, 1995; Alonso, 1976; Quigley, 1972; Wilkinson, 1967; Thomas, 1941), the current survey considers the study area to be a moderate wage condition that can play as the pull factor (Jussibaliyeva, A. K. et al., 2021) for interregional labor migration from others regions in Bangladesh (**Figure 7.1**).



**Figure 7.1: Socio-economic condition of two assessment mouzas**

Source: Field Visit, 2022

## **7.3 Agricultural Impact on Socio-economic Condition**

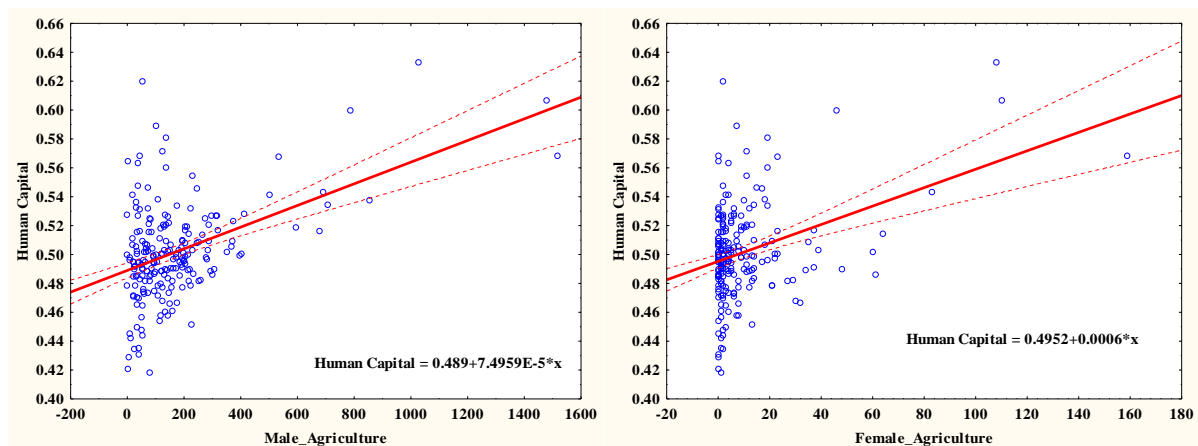
### **7.3.1 Human Capital in response to Agriculture**

Agriculture, including agricultural wage labor and self-employed farming, provided most of the jobs in rural areas occupying more than 54.5 percent of the rural workforce and employing a significantly higher share of women (Kabir, Md. Jahangir et al., 2020; DAE, 2020; World Bank, 2016). Human is one of the valuable capitals, although it is not self-evident. In our society, according to the human capital theory, the length of their education and experience in their working life until the age of 45-65 can promote an individual to increase the magnitude of human capital (S. Oberg, 1995). Some argue that changes in proportions of older and experienced persons over time would partly change and indirectly influence the speed of economic restructuring and thus interregional migration (Klein 1992; Malmberg 1992). They argue that older people are less attractive in the labor market because their knowledge is not up to date with modern technology, and they produce much less on average in the physical hard work. However, other studies suggested that both attitudes of paying more for the experienced and knowledgeable older laborers and unwillingness to employ new laborers and train them for high productivity will lower the migration rates for the aged-experienced laborers. The present study found that an age group of 30-49 years belonging to the youth group dominates the agricultural workforce in the study area. This group has experience and enthusiasm for up-to-date knowledge of modern technologies to produce more than average in the physical hard work.

Some literature argues that accumulated experience is the effective investment in a traditional environment that is static in technology and relative prices in low-income countries (like Bangladesh) when the decision-making environment is static (W. Huffman and P. Orazem, 2004; Huffman, W. E., 1988; Becker, G., 1993; Schultz, T.W., 1972). The present study found that maximum farmers mainly depend on collective knowledge, among which about 18% of sample farmers are illiterate, for their production system (agriculture) in the study area. However, different government and non-government organizations (including World Vision, BRAC, ASA, etc.) have taken some training initiatives to raise resilience against climate-induced hazards.

Furthermore, the magnitude of human capital depends on how men and women allocate their time in their occupations (W. Huffman and P. Orazem, 2004). This study has found that occupational diversity in women is higher than in the case of men. Men are mainly involved in

the agriculture production system, whereas women are equivalently engaged in agriculture and other sectoral services in the study area. The regression analysis showed that human capital is significantly dependent on the involvement of men (t-value = 7.45, p-value = 0.000) and women (t-value = 5.67, p-value = 0.000) in the agriculture production system (**Figure 7.2**). And this capital has been increased by about 0.007% and 0.006% with an increasing one person of men and women involvement. A. Bashir et al. (2018) have found a similar relationship in an agro-based economy in Indonesia, suggesting that increasing agriculture involvement will push the human capital significantly. These findings are also in line with the result of the study by Bleakley (2013); and Djomo & Sikod (2012) (referred by Bashir et al., 2018).

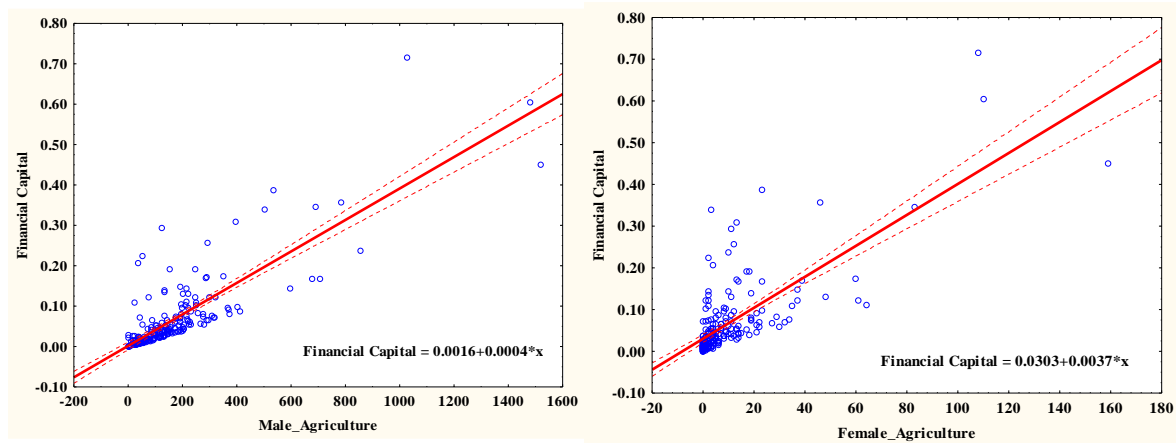


**Figure 7.2: Relationship between human capital and agriculture involvement**

Source: Household and Population Census, 2011

### 7.3.2 Financial Capital in response to Agriculture

HIES derived key welfare measures between 2000 and 2010 showed that the share of households with rural farm-sourced income (income from all crops and horticulture, livestock, fisheries, and agricultural wages) increased marginally through the decade. World Bank (2016) reported that agriculture production made a noticeable contribution to income growth for poor and vulnerable households, contributing the largest share of income gains for the poor. However, agricultural income is small for the non-poor households, and non-agricultural income actually declined (World Bank, 2016). It is, therefore, assumed that financial capital is highly responsive to agricultural involvement in the marginalized rural economy. Similarly, the present study found that the higher the male and female involvement in agriculture, the higher the magnitude of financial capital (**Figure 7.3**). This positive relationship depicts that male (t-value = 21.62, p-value = 0.000) and female (t-value = 15.92, p-value = 0.000) involvement in agriculture is significantly correlated with financial capital.



**Figure 7.3: Relationship between financial capital and agriculture involvement**

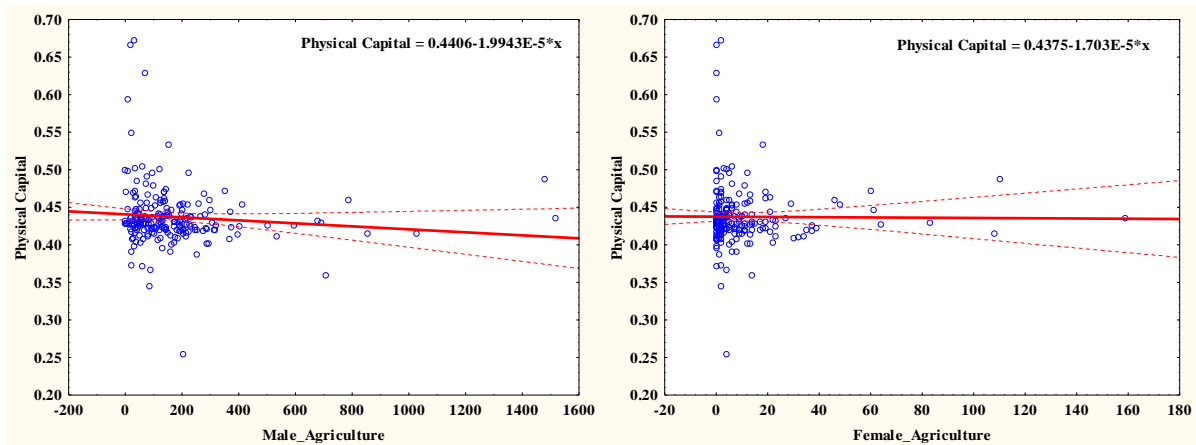
Source: Household and Population Census, 2011

### 7.3.3 Physical Capital in response to Agriculture

Increasing male involvement (t-value = -1.40, p-value = 0.16) in agriculture has slightly negative relations with the magnitude of physical capital in the study area. However, female participation (t-value = 0.0003, p-value = -0.008) cannot affect the physical capital in the study area (Figure 7.4). It is the reverse relationship of the male and female involvement in agriculture with the financial capital. It can be expected that financial capital of involving in agriculture flows in different ways besides the physical capital. It will be happened if the farmer faces multiple challenges with his/her financial resources. Several past studies reported that the study area is highly vulnerable to multiple-climate-induced hazards, input management (like agricultural labor) for the agriculture production system, and also post-harvesting loss management actions (Pavel, T. et al., 2022; Rahman, S. T., & Monjur-Ul-Haider, M., 2020; Abedin, J., & Khatun, H., 2019; MoWR, 2012). For this reason, the financial capital earned by agriculture cannot transform into the physical capital of these agricultural farmers. These farmers need more financial options to increase their resilience in their physical capital from various sources, like micro-credit loans from different NGOs and other services (like involvement in industries).

On the other hand, rapid population change with new demands on physical infrastructure, in the short and medium run, is characteristic of interregional migration to a certain extent (Öberg, S., 1995.). Some agriculture farmers argued that the decreasing differences in the physical infrastructure between the agricultural farmers and immigration laborers have decreased the interregional migration rate of these laborers for about fifteen (15) years.



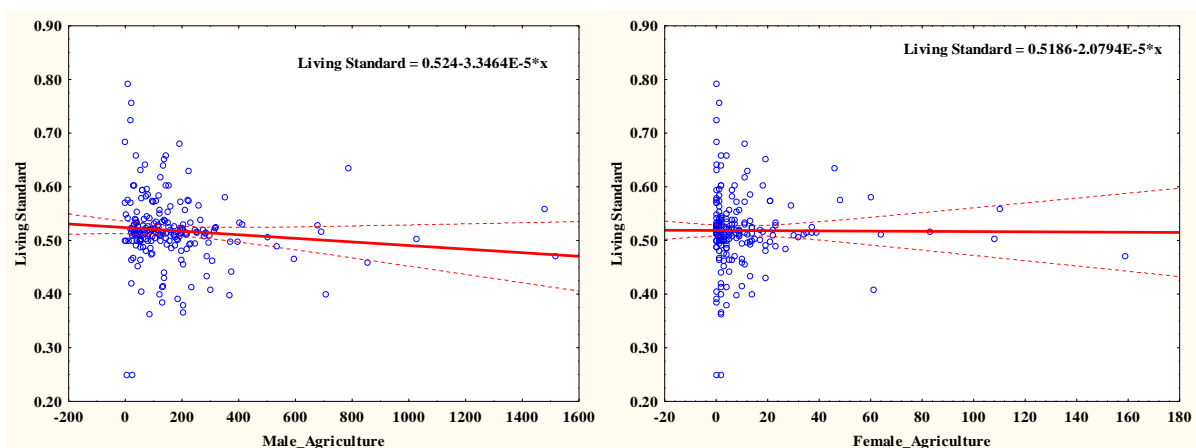


**Figure 7.4: Relationship between physical capital and agricultural development**

Source: Household and Population Census, 2011

### 7.3.4 Living Standard in response to Agriculture

The current study also discovered that, even though female participation in agriculture does not affect the living standards of those in the study region who depend on it for a living, growing agricultural engagement may result in a decrease in the size of living standards (Figure 7.5). It is also claimed that this association follows the link with physical capital rather than the relationship between male and female engagement in agriculture with financial capital. As a result, the money made from agriculture cannot significantly raise the standard of life because of using in other ways than providing drinking water, sanitary facilities, and other electrical devices. These farmers require more financial choices, such as microcredit loans from multiple providers and other services, to raise their financial flexibility and living standards.



**Figure 7.5: Relationship between living standard and agricultural development**

Source: Household and Population Census, 2011

## **7.4 Impact of Immigrants on the Socio-economic Condition of the Local Community**

### **7.4.1 Immigrant Labor and Agriculture Farmer Community**

Haor area is mainly suitable for Boro rice cultivation because of its physiographic nature. Although the Boro area under haor was higher (36% of the total Boro area) in Sunamganj, rice cultivation is frequently affected by flash floods due to heavy rainfalls and onrush of water from the upstream Meghalaya hills in India (Kabir, Md. Jahangir et al., 2020). Since Boro rice is the primary food for the haor areas, the flash flood causes a threat to the food security of the haor people. Kabir, Md. Jahangir et al. (2020) supposed that this condition promotes the agricultural farmers in the areas to employ a number of migrant laborers to expedite rice harvesting to escape unexpected crop loss due to flash floods. They observed that wage workers migrated to Sunamganj from both haor and non-haor areas Faridpur, Tangail, Netrokona, Sirajganj, Pabna, Mymensingh, Sylhet, and Habiganj (Kabir, Md. Jahangir, et al., 2020; DAE, 2020). But the present study found two scenarios in interregional labor migration patterns in view of the annual dimension. For example, about 15 years ago, the local agricultural farmers in the study area could hire labor from Dhaka, Faridpur, Kishorganj, Madaripur, Mymensingh, Munsiganj, Netrokona, and Tangail, but the source districts of immigrant labor have been decreasing for fifteen (15) years. They are now hiring these labors from nearby mouzas, unions, Upazilas, and even districts (like Netrokona). To cope with this situation, some immigrant laborers come by suspending stone collection from the Jadukata River. The local Government usually helps them to stop this collection for harvesting boro-rice during April-May. In recent years, mechanization is promoting the agricultural farmers to harvest without losing a significant amount of boro-rice against flash flood. The present study estimated that maximum farmers would lose about one metric ton (MT) of rice production per hectare and associated income (about 44,912 BDT) in case of without labor. This condition could result in decreasing capital flows to human capital, physical capital, and even the living standard attributes of an agricultural farmer. The local farmer community expressed that an equilibrium condition of the wage difference between them and the immigrant labor decreasing the interregional migration of these wage labor. This condition supports the basic law of migration in regional economics that equilibrium in wage difference can decrease the interregional migration in the long run. In this theory, capital flows toward the low-wage region, and labor flows toward the high-wage region. But capital in the study area flows from the high-wage-households to the low-wage-households during the present condition. In addition, mechanization in boro-rice harvesting

needs more financial capital than some laborers demand (Islam and AKMS, 2018). The present study, thus, suggested that this results in more liquid financial capital that cannot be transformed considerably into physical capital and living standard attributes of the agricultural farmers in the study area. Because the financial capital significantly flows toward boro-rice cultivation and harvesting management, climate change adaptation, and disaster risk reduction options. It is also mentioned that women of the local agriculture farmer community never get married to immigrant labor. Moreover, the overall approach of that local community is satisfactory for the immigrant labor community.

#### **7.4.2 Other Immigrant Communities and Local Community**

The above discussion indicated that financial capital highly flows within the study area. Moreover, this area has high natural significance because of the natural beauty of haors (mainly the Tanguar Haor, declared as the Ramsar Site, which attracts many national and international tourists. Many tourism activities have been implemented in the study area. Therefore, this area can be considered one of the high-wage regions that can attract other communities for interregional migration. Shubuj Chandra Borman is one of the immigrant entrepreneurs who immigrated to this region from the Gazipur District, and became an entrepreneur here. In addition, Muhammad Ali migrated to this region to practice as a homeopathy doctor. The immigrant entrepreneurs, like Shubuj Chandra Borman and Muhammad Ali, were reported to get married to the local community. It has also been reported that the immigrant entrepreneur can readily be involved with the local community in societal activities than an immigrant laborer can. There is no critical societal conflict between the local community and the immigrant labor, immigrant entrepreneur, and even immigrant practitioners.

Nevertheless, interregional migration turns into conflict when entire communities are completely migrated. For example, an entire community immigrated into the study area from the Bhoirab Upazila of the Kishorganj District. They were first involved as the labor for the local farms. But they then decided that this place was more fertile than where they had previously lived, so they relocated here to farm by themselves. That was not well received by the local community in the area. This immigrant population has given rise to some critical societal conflicts. But now, they have managed to comprehend one another.

## Chapter 8. Conclusion, Implications and Future Study

### 8.1 Conclusion

Interregional migration of different level of immigrants plays an important role in the socio-economic aspects of local communities, particularly the agriculture community, in rural areas and is expected to grow in size, complexity, and diversity. As immigrant labor and capital flows can be shifted as economic activity, the restructuring of local infrastructure and economic policies will affect the source region (immigration from the region) and destination region (immigration to the region, Tahirpur Upazila) continue to improve. These changing flows play a role in changing the socio-economic landscape of the Tahirpur Upazila. From illiterate to highly educated and from youth to adults can migrate to maximize the income opportunities that high-income communities create, supported by the destination social network.

The study area can be considered one of the high-income areas that can attract other communities for inter-regional migration. Financial capital flows in large quantities within the study area. In addition, this area is of high natural importance due to the natural beauty of the haor, which attracts a number of domestic and international tourists. However, the major production system, Boro-cultivation, under Haor areas in Sunamganj is highly affected by flash floods. This situation has led farmers to hire numbers of migrant workers to harvest rice earlier and avoid unexpected crop losses from flash floods. However, the present study saw a paradigm shift in the way the farmer employs these wage workers for the 15 years. The tendency for these workers to migrate across regions from the source districts has been declining for 15 years. It can reduce capital flows in the characteristics of human capital, physical capital, and even the living standard of farmers. Limited wage gap between them and migrant workers is, therefore, expected to lead to a reduction in interregional migration of these wage workers. However, as it stands, capital in the study area flows from high-income households to low-income households. In addition, mechanization in boro-rice harvesting requires more financial capital than some labors need. The study, therefore, suggests that the increased capital flows within the region as a result of the downward trend in immigrant workers and the mechanization have led to more liquid financial capital that cannot be largely translated into physical capital, and agricultural living standard attributes in the study area.

This area also attracts some communities to migrate here as entrepreneurs, and some as practitioners (homeopathy, etc.). In addition to them, the area has also attracted entire communities who migrated to live here. However, social conflicts can vary according to the size and occupation of immigrant communities. Migrant entrepreneurs can more easily engage with local communities in community activities than migrant workers. On the other hand, studies have also reported that migration between regions become conflict when entire communities are completely migrated.

## **8.2 Implications and Future Study**

Like immigrant labor, other immigrant communities are directly related to and dependent on various socio-cultural and normative factors that determine their role and status in local agricultural communities. Migration can therefore be seen as a self-help strategy for poverty reduction and alleviation and should be properly recognized and used appropriately for the sustainable development of both source and destination regions.

This paper marks a paradigm shift of the process of hiring the migrant workers for over 15 years. Especially these farmers who have to spend more money and energy to harvest the boro rice within the stipulated period. Therefore, local government authorities should ensure easy and affordable transport of migrant workers, improve their housing and stay, health protection networks, and a good relationship between harvest, price, and labor wages. Planning well in advance of the term is recommended. Authorities should work with NGOs and other organizations working with marginalized groups to extend basic service provision to migrant workers by adopting a “user pays” approach. To be successful, the immigrant community, especially social networks of workers, entrepreneurs, and other practitioners, must be involved in decision-making.

Moreover, the Bangladesh census does not question population migration, despite its significant demographic, social, and economic impact. Without the 'place of last residence' question with duration, the 'place of birth' question asked in the BBS follow-up seems meaningless for records of non-permanent immigrants. Similarly, survey questions about 'household types of institutions' (BBS 1992b: 7) should include boarding houses or 'mess' on a priority basis. Labor force surveys conducted by the BBS must include questions on 'place of birth', 'current place of residence' and 'year of immigration'. Also, the census should include “workplace” questions to identify temporary immigrants. Since people in Bangladesh work

multiple jobs, it may be appropriate to ask follow-up questions about how they use their time at their main job where he spends 6 hours to 8 hours in a row.

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## Glossary

Aman	Rice grown in Kharif-II season
	Deep water rice sown during Kharif-I and harvested in Kharif-II season
B.Aman	under rainfed-Rice broadcasted during March-April and harvested during Mid October to Mid-November.
Aus	Rice grown in Kharif-I season
B.Aus	Broadcasted Aus
	Rice grown in winter season
Boro	Winter rice, fully irrigated, planted in December-January and harvested before the onset of monsoon in April- May.
District	An administrative unit comprising several Upazila/thanas
Flood plain	A nearly flat plain along the course of a stream or river that is naturally subject to seasonal/periodical tidal flooding.
	<i>Land Type by Flood Depth</i>
F0	High land, generally not flooded, intermittent flooding up to 30 cm
F1	Medium-high land, seasonally flooded 30-90 cm
F2	Medium-Low land, seasonally flooded 90- 180 cm
F3	Low land, seasonally flooded <9 months over 180-300 cm
F4	Very Low land, seasonally flooded >9 months over >300 cm
HYV	High Yielding Variety
Khal	Bengali term for a small natural channel (in some cases excavated)mostly for drainage.
Kharif:	Cropping season between March-October, often divided into Kharif- - 1(March-June) and Kharif-II ( July-October)
Khas land	Khas land: Public lands and water bodies not registered in the name of any individual or corporate body, regarded by land administration officials as belonging to the state.
Monsoon	Period of rains starting in June and ending in October
Rabi	Crops grown in the Rabi season such as wheat, pulses, Mustard etc.
Rabi Season:	Cropping season between November and February.
Sustainable development	Development that meets the need and aspiration of the current generation without compromising the ability of future generations to meet their needs.

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Sustainable use      The use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

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T. Aman      Transplanted variety of rice grown in Kharif-II season

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**Sustainable development**      Involves activities that meet the needs of the present without compromising the ability of future generations to meet their own needs.

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## Appendix-1: Photo Album











Appendix-2: Participant Lists

Participant List of Agriculture Farmer

Sl. No.	Name of Participants	Mobile Number	Signature
১.	আলি আকবর খানি-		আকবর
২.	আছফুর রহমান-	01724871598	আছফুর
৩.	আশরাফ	01926641599	আশরাফ
৪.	আবিরুল রহমান-	01707342838	আবিরুল
৫.	আবদুল সালিম-	01717590873	আবদুল
৬.	আবুল	01758256960	আবুল
৭.	আছফুর রহমান-	01734761199	আছফুর
৮.	সামাইন রশিদ	01711996822	সামাইন
৯.	ডাফনে মিয়া	01724807359	ডাফনে
১০.	মো: কেদার আমিন	01724451864	আমিন
১১.	নিরমল দাস	01718725787	নিরমল
১২.	প্রবাল চন্দ্র দাস	01766819699	প্রবাল
১৩.	সাব্বির দাস	01722150737	সাব্বির
১৪.	সুনিল বসু	01913058979	সুনিল
১৫.	সাজিব দাস	01747924591	সাজিব
১৬.	চাঁদ রুদ্দুস দাস	01759722412	চাঁদ রুদ্দুস
১৭.	আজিজুর রহমান	01784254545	আজিজুর
১৮.	মো: সাইফুল হক	01710462247	সাইফুল
১৯.	মো: আলম হাশেম	01703973388	আলম
২০.	মো: সাইফুল হক	01737459572	সাইফুল
২১.	মো: হারুন	01762455896	হারুন
২২.	মো: সাইফুল	01762033624	সাইফুল
২৩.	মো: নাজের আহমদ	01745311836	নাজের
২৪.	মো: আবিরুল রহমান	0172388361	আবিরুল
২৫.	মো: কাজিম	0176412696	আবিরুল
২৬.	মো: সিজদুর রহমান	01739667407	সিজদুর
২৭.	মো: বেদুল মোস্তাফিজ	01729568458	বেদুল
২৮.	আজহারুল ইসলাম	01755237952	আজহারুল
২৯.	আবদুল আলম	01775796345	আবদুল
৩০.	রাসেল উদ্দিন	01723091395	রাসেল

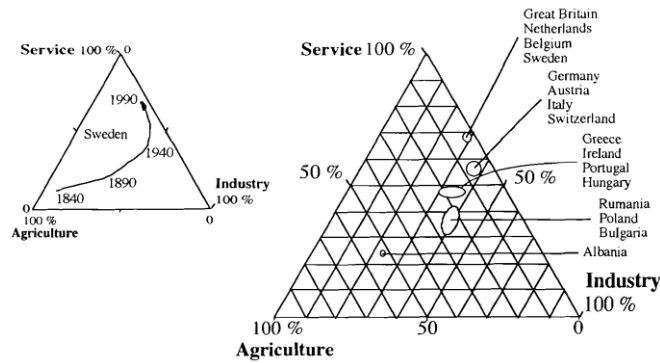
## Participant List of Immigrant Communities

Sl. No.	Name of Participants	Profession	Mobile Number	Signature
১.	মো: আমলিয়া মিয়া	আমি	০১৭০৩৭৬২৭০৭	আমিয়া
২	চিৎ বুদ্ধন বাই	আমি	০১৩১৬৬৩৬৭০৬	চিৎবাই
৩.	মাসুদ মিয়া	আমি	০১৭৯৫৫২৭৪৬৭	মাসুদ
৪.	আলি আহমদ	আমি	০১৭২৭৭৩৩৩৭৭	আলি
৫.	মো: জাহির আমলিয়া	আমি	০১৩০১৫২২০৪৮	জাহির
৬.	মো: আশিফ উদ্দিন	আমি	০১৬৫৫৫৪৮৭৫১	আশিফ
৭.	মো: আলি	আমি	০১৭২৯৩২৬৭১৭	আলি
৮.	মু.ব. আমলিয়া	আমি	০১৭৫০২১৬১৫৫	মু.ব. আমলিয়া
৯.	মোল্লাবুদ্দিন জাহির	আমি	০১৭২১২৯১৫৫৭	মু.ব. আমলিয়া
১০.	সবুত চন্দ্র বরুমা	উদ্যোক্তা		সবুত
১১.	মো: জাহির আমলিয়া	আমি	০১৭০৬৭৭১২৩১	জাহির
১২.	মো: আলি	আমি		আলি

## Participant List of Entire Immigrant Community

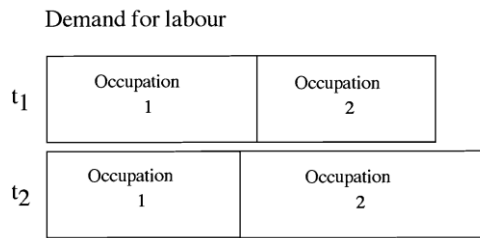
SL No.	Name of Participants	Mobile Number	Signature
୧	ମା: ଆକୂଳ ଗୁପ୍ତ	0171928 9436	ଆକୂଳ ଗୁପ୍ତ
୨	ମା: ସୁମତ୍ତରା ମାମୁଣ	01708882689	ସୁମତ୍ତରା
୩	ମା: ନରବୁଲ ସିଂଲାଇ	01766829969	ନରବୁଲ
୪	ମା: ଆକୂଳ ଆମିନ		ଆମିନ
୫	ମା: ଅବମାତ୍ତ ମିସ୍ତା		ଅବମାତ୍ତ
୬	ମା: ନିହୁ ମିସ୍ତା		ନିହୁ ମିସ୍ତା
୭	ମା: ଆକୂଳ ଆଜିତ		ଆକୂଳ ଆଜିତ
୮			
୯			
୧୦			

### Appendix-3: Pictorial Diagram



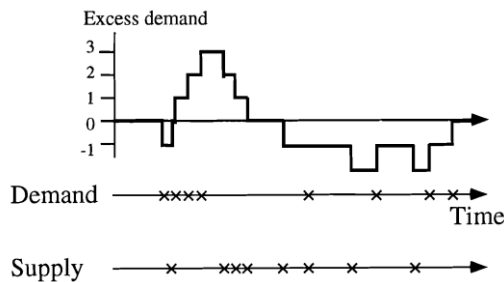
**Figure 2: Occupation in sectors of the economy in some European countries in 1990 (right) and restructuring of employment between these sectors in Sweden, 1840-1990 (left)**

Source: Oberg 1995



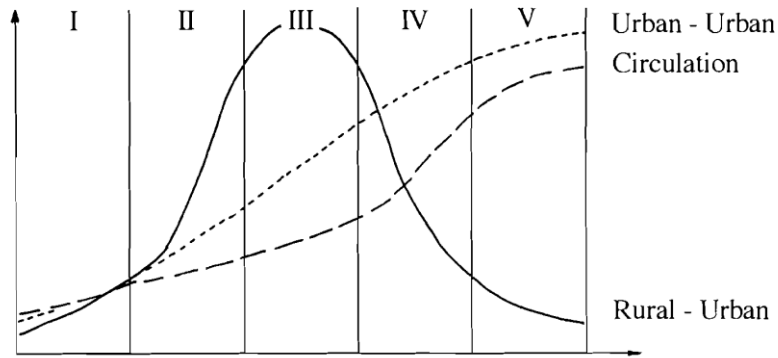
**Figure 3: Structural changes in the production system will influence the total demand for labor in a region and also the demand within occupational sectors**

Source: Oberg 1995



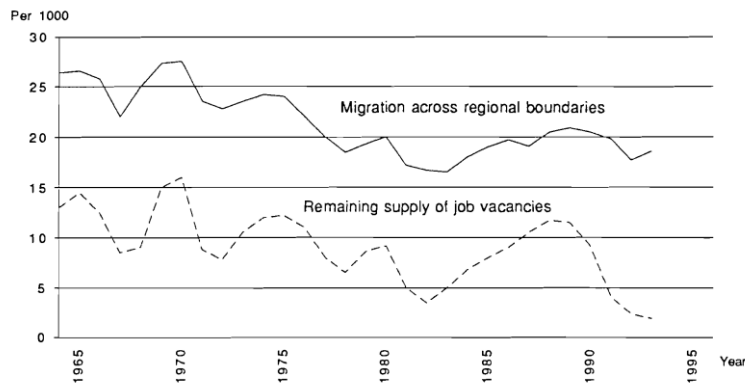
**Figure 4: With the same amount of vacancies and job seekers on local labor markets in long-term balances, short-term imbalances will cause interregional migration.**

Source: Oberg 1995



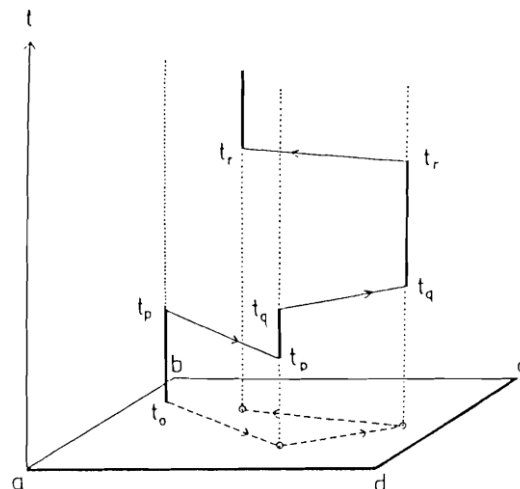
**Figure 5: Zelinsky's hypothesis of the mobility transition and its five phases: a simplified version**

Source: Zelinsky 1971



**Figure 6: Some interregional migration is due to the supply of job vacancies. Data from Sweden 1965- 1994**

Source: Statistics Sweden and the Swedish Labor Market Board.



**Figure 7: A time-geographic approach to migration from 1969.**

Source: Hagerstrand 1969. \*Part of the time-space path of an individual. Dotted vertical lines represent stations. Movements take place between stations at times  $t_p$ ,  $t_q$  and  $t_r$ . Dashed lines project movements on the landscape.