

**INFLUENCE OF COVID-19 ON SOCIO-ECONOMIC
CONDITIONS OF THE FARMERS IN SOME SELECTED AREAS
OF BANGLADESH**

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**INFLUENCE OF COVID-19 ON SOCIO-ECONOMIC CONDITIONS OF THE
FARMERS IN SOME SELECTED AREAS OF BANGLADESH**

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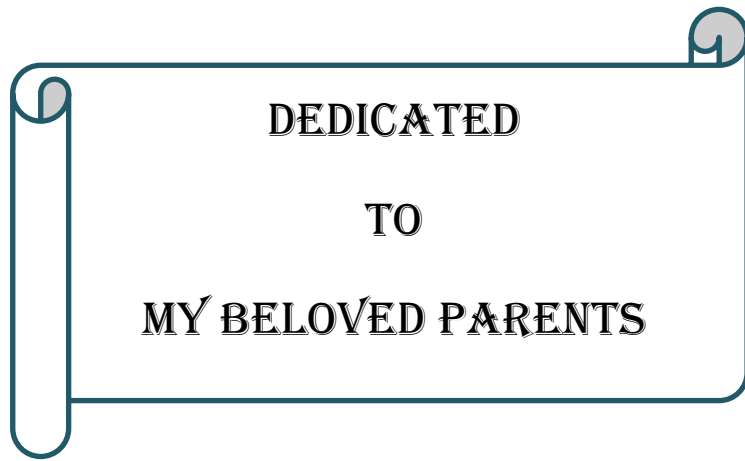
This is to certify that the thesis entitled “**INFLUENCE OF COVID-19 ON SOCIO-ECONOMIC CONDITIONS OF THE FARMERS IN SOME SELECTED AREAS OF BANGLADESH**” submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE IN AGRICULTURAL EXTENSION AND INFORMATION SYSTEM**, embodies the result of a piece of bona fide research work carried out by **MD. NAZMUL HUSSAIN**, Registration No. **19-10331** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

I further certify that such help or sources of information, as has been available of during the course of this investigation has duly been acknowledged.

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DEDICATED
TO
MY BELOVED PARENTS

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LIST OF ABBREVIATIONS AND ACCRONOMYS

%	=	Percentage
BBS	=	Bangladesh Bureau of Statistics
e.g.	=	exempli gratia (L), for example
<i>et al.</i>	=	And others
etc.	=	Etcetera
FAO	=	Food and Agricultural Organization
i.e.	=	id est (L), that is
J.	=	Journal
No.	=	Number
SD	=	Standard Deviation
SPSS	=	Statistical Package for Social Sciences
Tk.	=	Taka
YAS	=	Yearbook of Agricultural Statistics

INFLUENCE OF COVID-19 ON SOCIO-ECONOMIC CONDITIONS OF THE FARMERS IN SOME SELECTED AREAS OF BANGLADESH

MD. NAZMUL HUSSAIN

ABSTRACT

The ongoing COVID-19 pandemic has resulted in a new era in the efficacy of the agricultural sectors. Farmers of Bangladesh are directly affected by COVID-19. Considering the above situation, the present study was designed to investigate the influence of COVID-19 on socio-economic conditions of the farmers in some selected areas of Bangladesh. Data were collected from the 107 respondents selected from the intervention area (5 villages). Majority (71.80%) of the farmers faced medium influence of COVID-19. Among the variables, age and problem faced by the farmers in crop cultivation during COVID-19 had positive significant contribution and sanitation practiced by the farmers had negative contribution to the influence of COVID-19 on their socio-economic conditions. Among these, problem faced by the farmers in crop cultivation had the highest contribution (42.2%). All the factors cooperatively contribute 51.3% of the variance of influence of COVID-19 ($R^2 = 0.513$). Majority (64.60%) of the farmers had medium problem in crop cultivation during COVID-19. According to problem faced index (PFI), rate of increasing cost of production ranked first and loan is not available when need ranked last. It is concluded that the influence of COVID-19 on farmer's socio-economic conditions were moderate and needed further advancement. Bases on the results, it was recommended that the government and non-government organizations should take initiatives for reducing the influence of COVID-19 on farmer's socio-economic conditions.

Keywords: Influence, COVID-19, Farmer, socio-economic condition, Bangladesh.

CHAPTER 1

INTRODUCTION

1.1 General background

The recent outbreak of the severe acute respiratory coronavirus 2 (SARS-CoV-2), also called coronavirus 2019 (COVID-19), evolved into one of the most severe pandemic situation over the past one hundred year (Dhama et al., 2020a.b; Sohrabi et al., 2020). COVID-19 was first reported by the World Health Organization (WHO) on the 31st December 2019 from Wuhan, Hubei Province, China and then around the world. WHO announced it as a global pandemic on 11th March 2020. Pandemic is an epidemic that has spread to several countries or continents and generally affects many people. Meanwhile, an epidemic is a term to describe the sudden increase in the number of cases of a disease in a population in a specific area. The term pandemic is not used to indicate the severity of a disease, but only the extent of its spread. In the current case, COVID-19 becomes the first pandemic caused by a coronavirus. The surge of COVID-19 in Wuhan, China led to the closure of public places, halting of public transportation, isolation and management of infected persons, all in a bid to curb the spread of COVID-19 (Zhong et al., 2020). The symptoms of COVID-19 include fever, fatigue, dry cough, malaise and breathing difficulty. So far, the disease is characterized by high morbidity and mortality rates (Roy et al., 2020) alongside other ailments. A pandemic shock can have a greater significance on economies due to lost human lives than the other shock such as drought or flood or a trade embargo. Undoubtedly, all these shocks affect agricultural systems; however, pandemic shocks affect all the sectors of an economy. The pandemic disrupts demand and supply of food impact on the global supply chain; while droughts tend to be localized affecting only the associated sector or stakeholders (Mishra et al., 2021).

The ongoing pandemic is a global emergency that have potential impact on the global population. As a part of the world, Bangladesh is also facing crisis in different sector including agricultural sector. The influence of COVID-19 on agriculture varies from country to country among farmers. The pandemic has created an unprecedented economic and social crisis in Bangladesh (Kumar and Pinky, 2020). The ongoing pandemic has made severe impact on agriculture, society and economy and express the vulnerabilities of agriculture to the external disturbances.

About 70 percent people overall depend on agriculture for their livelihood in Bangladesh (The Daily Star, 2021). As a land scarce country, most of the farmers are marginal and small scale farmers which is 84.27% (BBS, 2016). Following the classification of DAE, sample households were categorized into 5 groups based on land holding status: landless (<0.02 hectare), marginal (0.02-0.2 hectare), small (0.21-1.01 hectare), medium (1.02-3.03 hectare) and large (>3.03 hectare). The average farm size of Bangladesh is 0.59 hectare, whereas average farm sizes of marginal, small medium and large farms are 0.11 ha, 0.47 ha, 1.55 ha, 4.71 ha respectively (BBS, 2016).

In order to reduce the spread of disease in Bangladesh, several measures were taken by the government such as social distancing that limited large gatherings, lockdown of public and private places and restrictions of movements that disrupted the agricultural activities of rural farm families, making it difficult for them to access information on agronomic practices, denied them access to inputs and markets, leading to hike in prices of inputs, wastages of harvested produce due to transportation challenges and reduced income to meet their family demand, hence, putting their food security and the food security of the country at risk.

So, in this context, a research has been conducted under the title “Influence of COVID-19 on socio-economic conditions of the farmers in some selected areas of Bangladesh”.

1.2 Statement of the problem

Natural disaster is very common in our country but COVID-19 is completely different. The pandemic impacted farmer’s socio-economic condition as they had difficulties in accessing inputs, farm labors and supplies needed for maximum productivity of their farms, in selling their products due to lockdown policies which is enforced by the government. Moreover, farmer’s income was affected because of the result of the decay of perishable products.

From the context of the above circumstances, some questions were raised for the completion of the research, which are as follows:

1. What were the socio-economic conditions of the farmers?

2. What were the influence of COVID-19 on socio-economic conditions of the farmers?
3. What were the contributions of the selected characteristics of the farmers to the influence of COVID-19 on their socio-economic conditions?

1.3 Objectives of the study

Research is an organized investigation in order to make a solution of that problem. To make solution, clear and specific objectives are very important. In order to answer the above questions, the following specific objectives were set in order to proper direction of the study:

1. To describe the socio-economic conditions of farmers.
2. To assess the influence of COVID-19 on the socio-economic conditions of the farmers.
3. To explore the level of contribution of the farmers selected characteristics to the influence of COVID-19 on their socio-economic conditions.

1.4 Justification of the study

Bangladesh is not new to disaster because of its geographic location and land characteristics. It is located between the Bay of Bengal and the Himalayas. That's why natural disaster is very common in our country. But the COVID-19 pandemic is totally different. COVID-19 pandemic adversely affected farmer's socio-economic conditions. The measures to combat the spread of COVID-19 hindered the farmer's from having easy access to both their land and markets to sell their products or buy seeds and other essential inputs, or struggle due to higher food prices or limited purchasing power.

This study will provide an idea of the influence of COVID-19 on the socio-economic conditions of the farmers. Thus, the findings of the study will be favorable to academicians, policymakers, extension workers, consultants, beneficiaries, relevant government and non-government officials to make appropriate strategies to overcome the adverse situation of COVID-19.

1.5 Assumptions of the study:

According to Goode and Hatt (1952), an assumption is the supposition that an apparent fact or principle is true in the light of the available evidence. The researcher had taken the following assumptions while undertaking the study:

- I. The respondents were capable of providing proper answers to the questions contained in the interview schedule.
- II. The researcher adjusted to social and environmental conditions of the study area. That's why respondents correctly provide their information.
- III. The respondents in the sample represent the whole population of the study area.
- IV. The collected data were free from any bias.
- V. The responses answered by the respondents were reliable.
- VI. The questions, items and scale of measurement of the variables were authentic to present the actual condition of the farmers.
- VII. The findings would give clear concept of the influence of COVID-19 on socio-economic conditions of the farmers.

1.6 Limitations of the study:

In order to make the research meaningful and manageable, it was necessary to impose some limitations as stated below:

- I. The study was confined only in five villages in Harinakundu upazila.
- II. Data were collected from small group of farmers because of time and resources limitation.
- III. Characteristics of the farmers are many, but only nine characteristics were selected as independent variables due to limitation of time, money and other resources.
- IV. Many of the farmers are illiterate. So, it is difficult to collect exact information from the farmers.
- V. This study depends upon the primary data which is valuated based on the farmer's response.

1.7 Definition of important terms

Age: It is defined as the period from the birth to the time of interview.

Education: Education is defined as the highest grade completed by a person in the system of regular, special and adult education. Grade is defined as the stage of interaction usually covered in the course of school year.

Family size: It refers to the number of members in the individual group member's family.

Annual income: Annual income refers to the annual earnings of all the family members of a respondent from agricultural, livestock, fisheries and others accessible sources during a year.

Knowledge on COVID-19: Knowledge on COVID-19 refers to the knowledge of different aspects of COVID-19.

Influence: The capacity to have an effect on the character, development, behavior of someone or something, or the effect itself.

Problem: Problem refers to a difficult about which something to be done. Problem faced by the farmers in this study was defined as the extent of difficulties faced by the farmers in cultivation during COVID-19.

CHAPTER 2

REVIEW OF LITERATURE

Review of literature is essential in the sense that it provides scope for reviewing the stock of knowledge and information relevant to the proposed research. The aim of this chapter is to review the available published works pertinent to the present study. There have been some available published information about the influence of COVID-19 on farmer's socio-economic conditions which gives a guideline in designing future research planning and validating new findings. Nevertheless, the work carried out in different parts of the world in allied fields are presented below:

2.1 General review of literature of the influence of COVID-19

The COVID-19 has caused gigantic negative effects on populace wellbeing, society, education, and the economy in Bangladesh. During the early period, due to a lack of accurate facts about the case affected and death tension up-and-down among the nations. Dairy farmers, vegetables producers, pharmaceuticals, poultry farmers are in deep crisis due to lower prices (Begum et al., 2020).

In a survey, BRAC (Bangladesh Rural Advancement Committee) reported that extreme poverty has rambled 60% than before and 14% of the people have no food at home (BRAC, 2020).

To protect public health, governments around the world initiated several measures (ranging from media announcements to partial or even complete lockdown) to mitigate the disease. These measures led to profound changes in consumers buying behavior and food consumption patterns, disturbances in transportation networks and the closure of some food suppliers (Nakat and Bou-Mitri, 2020). Scholars argue that COVID-19 generated a crisis that has economic (Nicola et al., 2020), social (Blofield et al., 2020), and political dimensions (van der Ploeg, 2020). Supply chain issues such as backhauling (Sharma et al., 2020), workplace absenteeism in food processing and manufacturing companies (Walters et al., 2020), and the increase of unemployment rates along with the economic uncertainty resulting from business restrictions (Leduc and Liu, 2020), are negatively impacting the trade of all agricultural food products. From the early stage of COVID-19 outbreak, panic consumption and food stockpiling – not only by consumers (Hobbs, 2020) but also by some governments (Almeida and

de Souza, 2020) – exerted considerably high pressure on food production and distribution systems (Hobbs, 2020). New York Times reported that, until April 2020, Dutch flower growers destroyed about 40,00,00,000 flowers that remain unsold (Siegal, 2020). The closing of borders was a strategy used in many countries to control contagion risk, which, however, led to shortage of both farm inputs (e.g., seeds, pesticides, and fertilizers) and farm labor since, in some regions of the Northern hemisphere, harvest depends on the migrant workforce (OECD, 2020). Although the production of staple crops, being highly mechanized in the developed world, was not seriously affected, the more labor-intensive crops (fruits and vegetables) require large amount of human labor, thus being more vulnerable to the effect of COVID-19 (Laborde et al., 2020). This virus has rigorously affected the agricultural sector by creating labor shortages which ultimately make farmers unable to harvest in time. The consequences of this imbalanced agricultural production system are inadequate food supply, increasing hunger, and malnutrition (Siche, 2020).

The agricultural sector lead the GDP of the Southeast Asian region to drop about 1.4% which is equivalent to USD 3.74 billion (Gregorioa and Ancog, 2020). Besides, restrictions on movement hampered the smooth flow of agricultural inputs and outputs, causing supply chain disruption (Barrett, 2020). The pandemic greatly impacted the demand and supply of foods that might lead to food security at risk (Gu and Wang, 2020).

The increasing number of lockdown days, monetary policy decisions and international travel restrictions severely affected the level of global economic activities and the closing, opening, lowest and highest stock price of major stock market indices in the world (Ozili and Arun, 2020). Also, they observed that the imposed restriction on the internal movement of people and higher fiscal spending had a positive impact on the level of economic activities.

When on March 24, 2020 the govt. of India ordered a complete lockdown of the country as a response to the COVID-19 pandemic, it had serious unwanted implications for farmers and the supply chains for agricultural based on farming, industrialization of its agricultural systems being only modest. The lack of migrant labor in some regions and a surplus of workers in others greatly affected the April harvest, leading to a decline in agricultural wages in some communities and an

increase in others, as well as to critical losses of produce. Moreover, the partial closure of rural markets and procurement options, combined with the insufficient supply of products, led to shortages of food supplies and dramatically increased prices, which particularly affected urban dwellers and the poor (Kumar et al., 2020).

Fishing operations at sea had encountered difficulties due to national lock-down measures in many countries. Due to a severe labor shortage in India, shrimp processing plants have not operated at full capacity. Shrimp exports in India and Thailand have been hit hardest by decreased, delayed, or canceled orders from major markets such as China, the EU, Japan, and the United States. Because of the decline in demand, manufacturing plants were forced to lower down, resulting in an oversupply of raw materials. Transport disruptions in Indonesia made it difficult for manufacturing plants in cities to procure raw materials. The prices of two staples, milkfish and rice, have risen in the Philippines (FAO, 2020).

In India, restrictions in the movement of people and transport affected the harvest of Rabi season crops (ICRISAT, 2020). Farmers are unable to transport premium agricultural products like strawberry and broccoli to markets. Hence, they are forced to feed cattle during lockdown (Satara, 2020). Roy (Roy AG, 2020) reported that pineapple fruits perished because no transportation is permitted during COVID-19 lockdown. High risk of COVID-19 and the lockdown condition clutched demand and the produced milk remained in farmers homes without selling (Newsflare, 2020). As a result of lockdown, those who have borrowed from formal sectors find it difficult to repay the crop loans and jewel loans for the agricultural purpose (Popat et al., 2020). The worst affected are the thousands of agricultural laborers (Anath, 2020). During this pandemic, due to restrictions and quarantine measures, an increase in online purchases was noticed in the food and beverage sector (FAO, 2020) which is not accessible to people in rural areas. Before the lockdown, skimmed milk powder (SMP) was sold at Rs. 300-310 per kg and cow butter at Rs. 320 per kg. these prices have pummeled to Rs. 170 and Rs. 230 per kg levels (Damodaran, 2020). The procurement price of milk dropped in many states (Rawal et al., 2020). Disruption of food supply chain which led to wastage of produce (Dev et al., 2020). 30% decline in demand for chicken in India during March 2020 (Rekha, 2020). Poultry farmers faced huge losses in this pandemic, because of rumors about the consumption of poultry meat led to a slump in demand for poultry meat (Rawal et al., 2020). Farmers with

poor storage facilities and delays in transportation lead to deterioration of unpasteurized milk quality which gets rejected in the supply chain (Weersink et al., 2020). A statistically significant difference in the market arrivals of jute before and during the COVID-19 pandemic was seen (Logesh et al., 2020). The wholesale prices of sugar also have decreased 4 percent during the lockdown (Bhosale, 2020). The majority of the surveyed farmers incurred a reduction in production, sales, and price (Harris et al., 2020). Farmer's livelihood became risky, as they were not paid for their production which led to the dumping of milk (Evans, 2020). The government procurement system denied the milk from farmers and private factories accepted milk at low prices which forced farmers to dump huge liters of milk (The Hindu, 2020).

Uncertainty imposed by the crisis, restrictions on inter-state movements and absence of transportation disrupted the food supply chains and spiked food prices (Kalsi et al., 2020) and affected farm operations. Analysis using the official time series price data of major food commodities indicated that the wholesale and retail prices of pulse, wheat flour and milk was 1-5% higher a month post-lockdown; prices of edible oils and staple cereals (rice and wheat) were 4-9% lower because of removing import restrictions and govt. interventions like free distribution of food grains. Vegetable prices rose with tomato prices increasing by 77-78% in a week and 114-117% a month post lockdown (Cariappa et al., 2020). Markets saw increased arrivals in May owing to distress sale and market reforms insulated farmers from lower prices (Varshney et al., 2020). Smaller cities and rural areas saw higher price rises than the urban areas. Survey results indicated that three-fourths of the consumers reported a price rise in food commodities during the lockdown (Cariappa et al., 2020). The lockdown coupled with sudden negative income shock posed serious concerns about food and nutrition security in India. In a survey of 2259 migrant youth, 32% reduced their daily food intake (Imbert, 2020). Consumers changed their behavior patterns by reducing consumption of non-essentials, reduced market visits, stocking and consumption behavior changed equally across intensity of incidence viz., green, orange, and red (Cariappa et al., 2020).

Being an agricultural country, the travel restriction and lockdown have affected every stage of the food supply chain, including food production and distribution in Nepal. Farmers are compelled to dump milk and vegetables after a significant decrease in supply and closure of processing companies and proper markets. This has led to

sudden price hike, black marketing and shortage of products in the local markets (Poudel et al., 2020). The COVID-19 has affected day to day life and is slowing down the global economy (Haleem et al., 2020). Fornaro and Wolf (2020), using a simple model, show that the coronavirus triggered a negative supply shock. The health crisis transformed into an economic crisis which was amplified through financial channels (Ramelli and Wanger, 2020).

The outbreak and spread of COVID-19 disease in Nigeria led to rapid shutdowns in cities and states across the country which severely affected the tourism industry. The COVID-19 affected the financial markets all over the world (Zhang et al., 2020). COVID-19 spillovers to Nigeria and the existing structural weaknesses in Nigeria contributed to making the crisis more severe in the country (Ozili, 2020). A study was done to determine the levels of Knowledge, Attitude and Practices (KAP) towards COVID-19 among residents of north-central Nigeria. A cross-sectional online survey with a semi-structured questionnaire using a Snowball sampling technique was conducted during the national lockdown. Collected data were analyzed using descriptive statistics, analysis of variance (ANOVA), Pearson's correlation and regression tests. From a total of 589 responses received, 80.6% respondents between ages 18-39 years, 59.6% males, 90.4% had a college degree or above and 56.2% reside in urban areas. Respondents had good knowledge (99.5%) of COVID-19, gained mainly through the internet/social media (55.7%) and Television (27.5%). The majority of the respondents (79.5%) had positive attitudes toward the adherence of government IPC measures with 92.7%, 96.4% and 82.3% practicing social distancing/self-isolation, improve personal hygiene and using face mask respectively. However, 52.1% of the respondents perceived that the government is not doing enough to curtail COVID-19 in Nigeria. Pearson's correlation showed significant relationship between knowledge of COVID-19 and attitude towards preventive measures ($r = 0.177$, $p = 0.004$, $r = 0.137$, $p = 0.001$) (Ruben et al., 2020).

A nationwide online cross-selection survey was carried out in Uganda. Out of 1763 participants, 97.6% were aware of the current pandemic. 83.9% of participants had a good knowledge score (21.8/27), 72.4% had a good attitude and 85.3% were practicing measures to prevent the spread of the Coronavirus disease. The ordered logistic regression showed that being a Health worker was significantly associated with a high knowledge (aOR:6 (3.32-10.93); a good attitude (aOR:2.5(1.68-3.8) and

good practice (aOR:2.9 (1.95- 4.2). On contrary, being a driver, business entrepreneur and a security personnel were found to have less rate in awareness, knowledge, attitude and practice (Ssebuufu et al., 2020).

The pandemic COVID-19 has slowed down human activities globally and throwing countries into a slump and possible economic depression. Bangladesh, a growing economic country, is also experiencing severe economic shockwaves. Besides the economic shock, it is also facing an imbalance in the food supply in all of its channels. In Bangladesh, the trend of COVID-19 cases is increasing and due to the lockdown situation, the food supply is hampering badly. Since most farmers are not adopted to mechanized agriculture and facing labor shortage, their production has fallen at risk in terms of harvesting. Due to buyer shortage and unavailability of supply channels, products are being forced to sell at a low price and it will take years to overcome this shock as the prognosis of COVID-19 is still unknown to all (Zabir et al., 2021).

The effect of COVID-19 pandemic can be seen in the agriculture sector in terms of supply chain disruptions and agricultural production. The lockdown restricts on the movement of farming goods and communities, especially labors who must generally move from one place to another to work and earn income. In Bangladesh, to harvest Boro rice in the haor area before the flash flood, a large number of labors need to go to that area from different parts of the country. But the labors were unable to move due to social distancing and decreased transportation. To solve this problem agricultural mechanization was practiced but it was new to some farmers and felt difficulties in operating it due to lack of proper training. It was estimated that 3.11 percent or 17.03 million tons of agricultural production is reduced during the first four months of 2020 in Southeast Asia only because decline in agricultural farm labor. Perishable goods, such as fresh fruits and vegetables are the most affected area of agriculture. The lack of adequate storage facilities, combined with transport disruptions and a fall in demand, has led to the wastage of perishable goods. On the other hand, the consumer paid special attention to vitamin C rich fruits as it can boost up the immunity system. The floriculture sector all over the world is under great threat due to COVID-19. Thousands of tons of flowers remain unsold and ultimately perished; sometimes farmers used matured flowers as cattle feed. This is mostly because people prioritize their basic demands like foods not aesthetic demands like

flowers in such a crisis period. The pandemic affects the whole world in a more or less similar manner. Most of the countries import agricultural inputs from the other parts of the world. Lockdown has made the shipment of these products expensive due to the closing of the international border and restriction on commercial flight. Export oriented shrimp farming and transportation of prawn seeds from hatcheries to the coastal region were greatly affected. Hatcheries and nurseries also face rising production costs, as many inputs such as pituitary glands, hormones, probiotics, and prebiotics are imported, in Bangladesh, 70-80% of the ingredients used in fish feed are imported. Obtaining imported inputs has become more difficult, and prices have risen. According to some analysts, input shortages would trigger a 40% reduction in feed supply (Ahasan et al., 2021).

COVID-19 and its accompanying effects have severely affected an estimated 0.3 million dairy farms and 65-70 thousand commercial poultry farms in Bangladesh. Many of them closed or halted productions due to the burden of continuous losses. About 12-15 million liters of milk have remained unsold, as a symbolic protest farmer has thrown away milk on the street, which has caused a daily loss of 570 million Bangladeshi Taka (6.7 million USD) within just two weeks after lockdown in the dairy sector only (Rahman and Das, 2021).

A survey was done of around 5000 respondents across 12 states of India to study the impact of COVID-19 pandemic containment measures (lockdown) on employment, livelihoods, food security and access to relief measures. Findings is a massive increase in unemployment, an equally dramatic fall in earnings among informal workers, large increases in food insecurity, depletion of savings and patchy coverage of relief measures. Two-thirds of the respondents lost work. The few informal workers who were still employed during the lockdown experienced more than a fifty percent drop in their earnings. Even among regular wage workers, half received either no salary or reduced salary during the lockdown. Almost eighty percent of surveyed households experienced a reduction in their food intake and a similar percentage of urban households did not have enough money to pay next month's rent (Kesar et al., 2021).

2.2 Research gap of the study:

There are many researches on the influence of COVID-19 but very few researches was so far conducted to ascertain the influence of COVID-19 on farmers socio-economic conditions. This was a research gap. Yet, there was no research in Bangladesh where contributions of the farmer's socio-economic characteristics on the influence of COVID-19 was explored. This was a significant research gap of the study. Moreover, only a few researchers followed the systematic method of influence analysis to ascertain the influence of COVID-19. This was also a research gap of the study.

2.3 Conceptual framework

Selection and measurement of variables constitute an important task for any scientific research. The hypothesis of a research while constructed properly, it contained at least 2 important variables, independent variable and dependent variable. Dependent variable may be affected by interacting forces of many independent variables. It is impossible to deal with all variables in a study. So, there is need to limit the variable. This study concerned with the influence of COVID-19 on socio-economic conditions of the farmers as dependent variable and 9 characteristics of the farmers i.e. age, family type, family size, no. of earning members, educational qualification, service ability of the farmers, knowledge on COVID-19, monthly income during COVID-19 and problem faced by the farmers in crop cultivation during COVID-19 as independent variables. Considering the above mentioned discussion, a conceptual framework has been developed for this study, which is diagrammatically presented in the figure 2.1

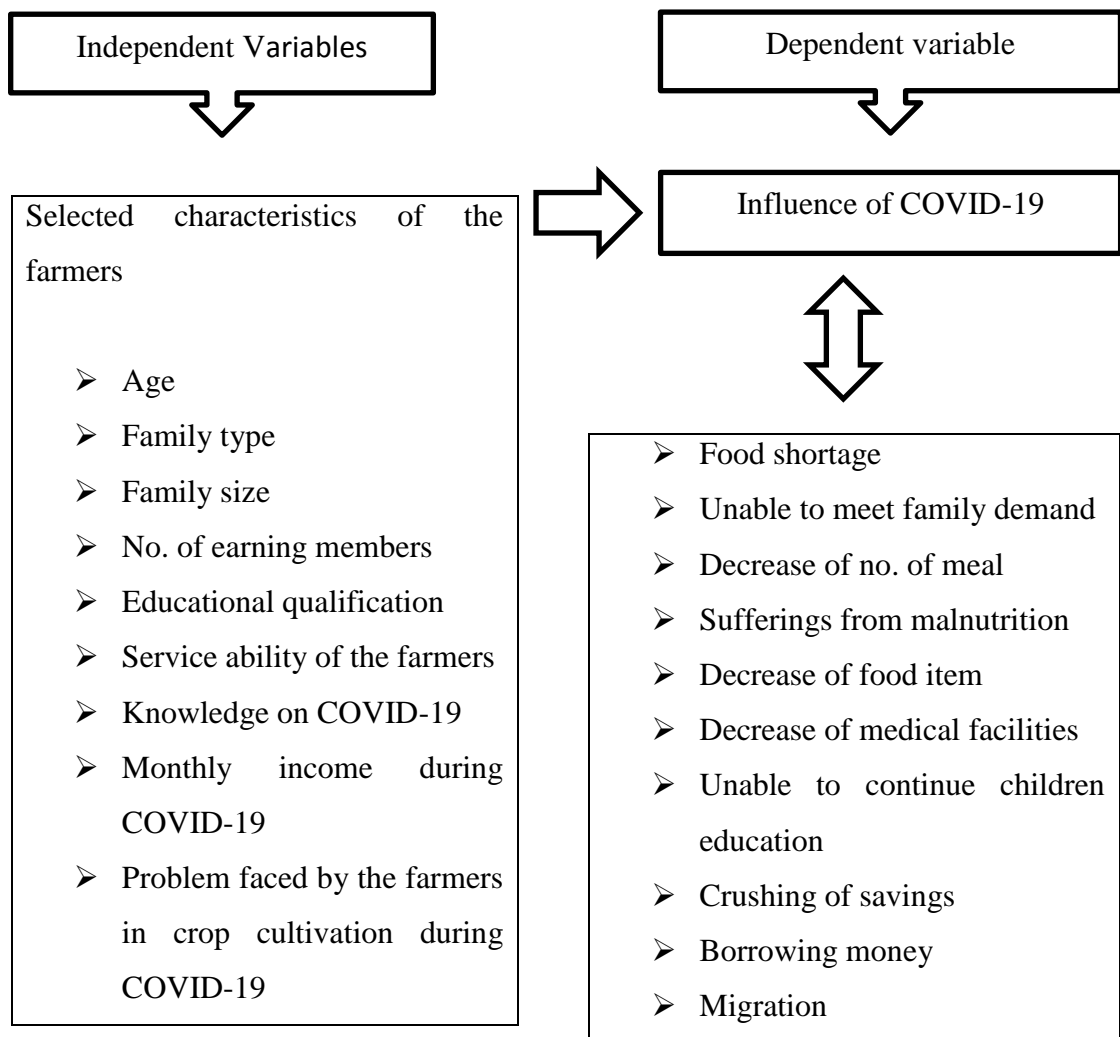


Figure 2.1 The conceptual framework of the study

CHAPTER 3

METHODOLOGY

In any scientific research, methodology plays an important role. Appropriate methodology is must to perform a research work. It should be such a way that would make the researcher to collect valid and reliable information. The methods and procedures that are followed in this study have been described in this chapter.

3.1 research design

3.1.1 Locale of the area

The study was conducted in the Harinakundu, Jorapukuria, Mandartola, Chatkabaria and Dignogor villages in Harinakundu upazila under Jhenaidah district. This area was selected due to some reasons such as time limitation, financial shortage, easy accessibility etc. The study area has been presented in figure 3.1



Figure 3.1: A map of Jhenaidah district showing the study area by using red borders

3.1.2 Population and sampling techniques

All the farmers in Harinakundu, Jorapukuria, Mandartola, Chatkabaria and Dignogor villages are the population of the study. An updated list of all the farmers in the

selected villages were collected from Upazila Agricultural office, Union Parishad Secretary, and local farmers. Sample size of the study was determined by applying the following formula (Arkin, 1963):

$$n = \frac{Nz^2p(1-p)}{\{Nd^2 + z^2p(1-p)\}} \dots\dots\dots (1)$$

Where: n= Sample size

N= Total number of farmers (approximately 1291)

z= Confidence level (at 95% level z= 1.96)

p= Estimated population proportion (8.34%)

d= Error limit of 5% (0.05)

From the equation we get 107 farmers that would be representative for the population. 107 farmers were randomly and proportionately selected from the population (table 3.1). Face to face interview schedule was used by a pre-prepared structured interview schedule to gather the needed information for the study.

Table 3.1: No. of farmers from each village

Sl. No.	Village	Population	Sample Size	Reserve list
1	Harinakundu	342	28	3
2	Jorapukuria	356	30	4
3	Mandartola	271	22	3
4	Chatkabaria	211	18	2
5	Dignogor	111	9	1
Total		1291	107	13

3.1.3 Data collection instruments

Keeping in mind the objectives a structured interview was prepared to collect reliable and valuable information from the farmers. Simple and direct questions and different scales were used in order to collect the information. Direct questions were included to collect information like age, education, family size etc. Scales were used to measure influence of COVID-19, problems faced by the farmer etc.

3.1.4 Data collection

The researcher himself collected the data from the farmers through personal interview. At the time of data collection, aims and objectives of the study were explained to the farmers. It helps the researcher to be friendly with the farmers to collect the necessary information. The information provided by the farmers were recorded very carefully.

3.1.5 Variables of the study

Variables are the elements which are measured in any research. Research work usually consists of two main variables named independent variables and dependent variables. Independent variables are that factors which are manipulated in an attempt to ascertain its relationship to the phenomenon observed by the researcher. Dependent variable is the factor that changes, disappear or varies when the researcher introduces, removes or varies the independent variable (Townsend, 1953). In a research, Selection and measurement of variable constitute a significant task. Following this conception, the researcher reviewed literature to widen the understanding about the natures and scopes of the variables relevant to the research work and finally nine independent variables were selected that include age, family type, family size, number of earning members, educational qualification, service ability of the farmer, knowledge on COVID-19, annual income during COVID-19 and problem faced by the farmers in crop cultivation during COVID-19. In this research, dependent variable is the influence of COVID-19 on socio-economic conditions of the farmers.

3.2 Measurement of variables

The methods for measuring the variables are given below:

3.2.1 Measurement of independent variables

The following procedures are followed for the measurement of the independent variables.

3.2.1.1 Age

Age of the farmers was measured in terms of the birth to the time period of carrying out of the interview schedule on the basis of his statement. A score of one (1) was

assigned for each year of one's age and it took place in the number 1 position of the interview schedule that is given in the Appendix part.

3.2.1.2 Family type

Family type was measured by either the farmer had a nuclear family or a joint family. For nuclear family it was given 1 point and for joint family it was given 2 points. This variables position was 2 in the interview schedule that was given in Appendix part.

3.2.1.3 Family size

Family size of a respondent was measured on the basis of the actual no. of members in his/her family who live together under the same roof. It was measured by the actual no. of family members that was expressed by the farmers. For example, when a farmer has 5 members in his family, it was given 5 points. This variable was placed in item no. 3 in the interview schedule which was given in the Appendix part.

3.2.1.4 Number of earning members

Number of earning members was measured by the total members of the respondent's family who earned money. For example, 2 point for 2 earning member. This variable was placed in the item no. 4 in the interview schedule that was placed in the Appendix part.

3.2.1.5 Educational qualification

Educational qualification was measured by assigning scores against a respondent's successful year of schooling. The score was given for passing each level in an educational institution (Rashid, 2014).

For example, if a respondent passes the final exam of the fifth class, his score is 5. If the respondent is illiterate, his score is 0, if he can sign only, his score is 0.5. This variable item appears in number 5 position in the interview schedule which is presented in the Appendix part.

3.2.1.6 Service ability of the farmers

3.2.1.6.1 Condition of house

Condition of house was measured by giving the farmer 1 point for katcha, 2 points for semi pacca and 3 points for pacca.

3.2.1.6.2 Use of electricity

Use of electricity was measured by giving the farmer 1 point if his answer was yes, and 2 points if his answer was no.

3.2.1.6.3 Sanitation practice

It was measured by scoring 1 for katcha, 2 points for sanitary and 3 points for open field.

3.2.1.6.4 Number of meal per day

It was measured by total number of meal intake by a farmer and the scoring was done by giving 1 point for 2 meals, 2 points for 3 meals and 3 points for 4 meals.

3.2.1.7 Knowledge on COVID-19

Farmer's knowledge on COVID-19 was measured by asking 7 questions related to different parts of COVID-19. It was measured by giving 2 points for each question. Therefore, total points for all questions became 14. The point was given according to the answer by the respondents. For correct answer a person is given 2 points, but if his/her answer was wrong, they did not get any point. And his score is 0. A partial score was given for a partially correct answer. So, the respondents score ranges from 0 to 14, where 0 indicate no knowledge and 14 indicate very high knowledge. This variable was placed in the item number 7 in the interview schedule that is shown in the Appendix part.

3.2.1.8 Annual income during COVID-19

Annual income refers to the annual gross income of the farmer and his family members from different sources. It was expressed in Taka. For the measurement of this variable, total earning Taka of was converted into score. 1 score was assigned for

every 1000 Taka. This variable appears in item no. 8 in the interview schedule as presented in Appendix.

3.2.2 Measurement of dependent variable

The dependent variable was treated as the influence of COVID-19 on socio-economic conditions of the farmer. The dependent variable was measured by asking 10 questions having 5 alternative responses. The following scores were given for each answer:

Extent of influence	Score
Severe influence	4
High influence	3
Medium influence	2
Low influence	1
Not at all	0

The influence of COVID-19 on socio-economic conditions of a farmer were measured by adding the scores of 10 items. So, influence score could range from 0 to 40. Here, 0 indicates the influence is not at all and 40 indicates severe influence of COVID-19 on socio-economic conditions of a farmer. This variable is included in item no. 9 in the interview schedule which is given in the Appendix part.

3.3 Problem faced by the farmers in crop cultivation during COVID-19

Problem faced by the farmers in crop cultivation were measured by the extent of problem faced by the farmers. By asking 7 questions extent of problem was measured. The following scores were given for each problem:

Extent of problem	Score
Severe problem	4
High problem	3
Medium problem	2
Low problem	1
Not at all	0

Based on farmer's response, the score range could be 0 to 28, where 0 indicates no problem and 28 indicates severe problem. This variable is included in item no. 10 in the interview schedule which is given in the Appendix part.

3.3.1 Rank order of problems in crop cultivation

To ascertain the best problem conflict strategies Problem Faced Index was calculated for each of the selected items of crop cultivation.

Problem Faced Index was calculated by using the formula:

$$\text{Problem Faced Index} = f_{sp} * 4 + f_{hp} * 3 + f_{mp} * 2 + f_{lp} * 1 + f_{np} * 0$$

Where, f_{sp} = No. of respondents faced severe problem

f_{hp} = No. of respondents faced high problem

f_{mp} = No. of respondents faced medium problem

f_{lp} = No. of respondents faced low problem

f_{np} = No. of respondents faced no problem

Each problem strategies range could be from 0 to 428, where 0 indicates no problem and 428 indicates highest extent of problem.

3.4 Hypothesis of the study

According to Kerlinger (1973) a hypothesis is a conjectural statement of the relation between two or more variables. Hypothesis are always in declarative sentence form and they are related, either generally or specifically from variables to variables. Hypothesis may be broadly divided into 2 categories:

1. Research hypothesis
2. Null hypothesis

3.4.1 Research hypothesis

Each of the nine (9) selected characteristics (age, family type, family size, number of earning members, educational qualification, service ability of the farmers, knowledge on COVID-19, monthly income during COVID-19 and problem in crop cultivation

during COVID-19) of the farmers has significant contribution to the influence of COVID-19 on socio-economic conditions of the farmers.

3.4.2 Null hypothesis

The null hypothesis reflects that there is no observed effects of a research or it states that there is no contribution between the concerned variables. Therefore, in order to conduct the test, the following null hypothesis was undertaken for the present study:

“There is no contribution of the selected characteristics (age, family type, family size, number of earning members, educational qualification, service ability of the farmers, knowledge on COVID-19, monthly income during COVID-19 and problem in crop cultivation during COVID-19) of the farmers to influence of COVID-19 on socio-economic conditions of the farmers.

3.5 Data processing and analysis

The data obtained from interview schedule was coded and tabulated in a data sheet. All personal traits were categorized and arranged in simple tables for descriptions. Statistical tools such as frequency distribution, percent, range, mean and standard deviation were used to interpret data. Data analysis was done using the concerned software Microsoft Excel and Statistical Package for Social Science (SPSS) Version 26.0.

3.6 Statistical analysis

Regression analysis was used to determine the contribution of the selected characteristics of the farmers to the influence of COVID-19 on their socio-economic conditions. In this study 0.05 percent level of significance were used as the basis for rejecting a null hypothesis. The null hypothesis was rejected if the computed value of (B) was equal or greater than the designated significance (p). Then it was concluded that there was a significant contribution between the two concern variables. When the computed value of (B) was small at designated significance (p), then the null hypothesis can't be rejected.

The model that is used for analysis can be explained as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + e$$

Where,

Y = Influence of COVID-19 on socio-economic conditions of the farmers

a = Constant value of the equation

X₁ = Farmer's age

X₂ = Family type

X₃ = Family size

X₄ = Number of earning members

X₅ = Educational qualification

X₆ = Service ability of the farmers

X₇ = Knowledge on COVID-19

X₈ = Monthly income during COVID-19

X₉ = Problem in crop cultivation during COVID-19

e = Random error, which is normally and independently distributed with 0 mean and constant variance

b₁, b₂, b₃, b₄, b₅, b₆, b₇, b₈ and b₉ are regression co-efficient of the corresponding independent variables.

CHAPTER 4

RESULTS AND DISCUSSIONS

Present experiment was conducted on the Influence of COVID-19 on socio-economic conditions of the farmers. The results of this experiment were presented and discussed in this chapter. For the convenience of easy understanding, the results were presented under subheading and data were presented in table or graph.

4.1 Socio-economic characteristics of the farmers

Behavior of one person is determined by one's personal characteristics. There are various characteristics of the farmers that might have consequence for the socio-economic conditions of the farmers. But in this study, nine (9) characteristics of the farmers were selected as independent variables, which included their age, family type, family size, number of earning members, educational qualification, service ability of the farmer, knowledge on COVID-19, annual income during COVID-19 and problem in crop cultivation during COVID-19 that might be greatly influenced to the Influence of COVID-19 on their socio-economic conditions are presented-

4.1.1 Age

Age of the farmers ranged from 18 years to 70 years, the mean was 43.67 with a standard deviation of 11.46. Age of the farmers are classified into 3 categories namely young aged, middle aged and old aged following MoYS (2012).

Table 4.1 Distribution of the farmers according to their age

Category	Basis of categorization (age)	Observed range (score)	Number of farmers	Percent
Young aged	< 35	18-70	27	25.20
Middle aged	35-50		51	47.70
Old aged	> 50		29	27.10
Total			107	100

Data presented in the Table show that, among the farmers, 25.20% was young aged, 47.70% was middle aged and 27.10% was old aged. Findings indicated that majority (72.90%) of the respondents were young to middle aged. It may be the cause of young and middle aged farmers were more energetic and could more work than old farmers. A survey was conducted in Nigeria where 80.6% of the respondents were between 18-39 due to their physical strength (Ruben et al. 2020).

4.1.2 Family type

Family type of the farmers ranged between 1 and 2, where mean was 1.28 and standard deviation was 0.45. Farmers are classified into two categories based on their family type. These are nuclear family and joint family.

Table 4.2 Distribution of the farmers according to their family type

Category	Basis of categorization (score)	Observed range (score)	Number of farmers	Percent
Nuclear	1	1-2	77	72
Joint	2		30	28
Total			107	100

Data presented in the Table show that, among the farmers, 72% had nuclear family and 28% had joint family. Findings indicated that majority (72%) of the farmers had nuclear family. In a survey Hasan found 85% of the farmers had nuclear family (Hasan, 2020).

4.1.3 Family size

Family size of the farmers ranged from 2 to 10, where mean was 4.36 and standard deviation was 1.40. Farmers are classified into 3 categories based on their family size. Small family, medium family and large family.

Table 4.3 Distribution of the farmers according to their family size

Category	Basis of categorization (score)	Observed range (score)	Number of farmers	Percent
Small family	Up to 3	2-10	27	25.20
Medium family	4-6		75	70.10
Large family	Above 6		5	4.70
Total			107	100

Data presented in the Table show that, among the farmers, 25.20% farmer had small family, 70.10% had medium family and 4.70% had large family. Findings indicated that most of the farmers (70.10%) had medium family size. The average family size was 4.36 which is greater than national average of 4.06 (BBS, 2016). The tendency of nuclear family is increasing in the study area and subsequently the size of the family becomes smaller over the time.

4.1.4 Number of earning members

Numbers of earning members of the farmers varies from 1 to 3, where mean was 1.33 and standard deviation was 0.56. Farmers are classified into 3 categories based on their number of earning members.

Table 4.4 Distribution of the farmers according to their number of earning members

Category	Basis of categorization (score)	Observed range (score)	Number of farmers	Percent
Small	1	1-3	77	72.00
Medium	2		25	23.40
Large	3		5	4.60
Total			107	100

Data presented in the Table show that, among the farmers, small earning members was 72%, medium earning members was 23.40% and large earning members was

4.60%. Findings indicated that majority (72%) of the farmers had small earning members. It may be cause of nuclear family.

4.1.5 Educational qualification

Education qualification of the farmers are varied from 0 to 11, where mean was 4.78 and standard deviation was 4.14. Farmers are classified into 5 categories based on their educational qualification. Illiterate, can sign only, primary, secondary and above secondary.

Table 4.5 Distribution of the farmers according to their educational qualification

Category	Basis of categorization (score)	Observed range (score)	Number of farmers	Percent
Illiterate	0	0-11	28	26.20
Can sign only	0.5		11	10.30
Primary	1-5		37	34.60
Secondary	6-10		20	18.70
Above secondary	11		11	10.30
Total			107	100

Data presented in the Table show that, among the farmers, 26.20% of the farmers were illiterate, 10.30% of the farmers could sign only, 34.60% had primary education, 18.70% had secondary education, 10.30% had above secondary education. Findings indicated that majority (34.60%) of the farmers had primary education, and total literacy rate among the farmers were 63.50%, which is lower than the national literacy rate 73.90% (MSVSB 2018,BBS). Ekram found total literacy rate among the farmers was 82.9% (Ekram, 2016).

4.1.6 Service ability of the farmers

4.1.6.1 Condition of house

Condition of house of the farmers were varied from 1 to 3, where mean was 2.06 and standard deviation was 0.61. Farmer's condition of house are classified into 3 categories. These are kacha, semi pacca and pacca.

Table 4.6 Distribution of the farmers according to their condition of house

Category	Basis of categorization (score)	Observed range (score)	Number of farmers	Percent
Kacha	1	1-3	17	15.90
Semi pacca	2		67	62.60
Pacca	3		23	21.50
Total			107	100

Data presented in the Table show that, among the farmers, 15.90% of the farmers had kacha house, 62.60% of the farmers had semi pacca house and 21.50% of the farmers had pacca house. Findings indicated that majority (78.50%) of the farmers had semi pacca to pacca house. Here, kacha is only 15.90% where average in Bangladesh is 65.88% (BBS, 2019).

4.1.6.2 Use of electricity

Use of electricity of the farmers was 1, where mean was 1.00 and standard deviation was 0. Farmers are classified into 2 categories based on the use of electricity. These are use of electricity (yes) and use of electricity (no).

Table 4.7 Distribution of the farmers according to their use of electricity

Category	Basis of categorization (score)	Observed range (score)	Number of farmers	Percent
Yes	1	1	107	100
No	2		0	0
Total			107	100

Data presented in the Table show that, among the farmers, 100% of the farmer used electricity. Because the study area was 100% electricity covered area where the average use of electricity in Bangladesh is 81.91% (BBS, 2019). In a survey Hasan found 82.5% of the farmers used electricity (Hasan, 2019).

4.1.6.3 Sanitation practice

Sanitation practice of the farmers varied between 1 and 2, where mean was 1.75 and standard deviation was 0.44. Farmers are classified into 3 categories based on their sanitation practice. These are katcha, sanitary and open field.

Table 4.8 Distribution of the farmers according to their sanitation practice

Category	Basis of categorization (score)	Observed range (score)	Number of farmers	Percent
Katcha	1	1-2	27	25.20
Sanitary	2		80	74.80
Open field	3		0	0
Total			107	100

Data presented in the Table show that, among the farmers, 25.20% of the farmers used katcha latrine, 74.80% of the farmers used sanitary latrine and no farmers used open field. Findings indicated that majority (74.80%) of the farmers used sanitary latrine which is greater than the average of 71.91% in Bangladesh (BBS, 2019). This may be the cause of health consciousness of the farmers.

4.1.6.4 Number of meal per day

Number of meal per day of the farmers varied between 1 and 2, where mean was 1.99 and standard deviation was 0.97. Farmers are classified into 3 categories based on their no. of meal per day. 4 meal, 3 meal and 2 meal.

Table 4.9 Distribution of the farmers according to their no. of meal per day

Category	Basis of categorization (score)	Observed range (score)	Number of farmers	Percent
4 meal	3	1-2	1	0.90
3 meal	2		106	99.10
2 meal	1		0	0
Total			107	100

Data presented in the Table show that, among the farmers, 0.90% of the farmers take 4 meal per day, 99.10% take 3 meal per day and no farmers take 2 meal per day. It may be the cause of availability of food.

4.1.7 Knowledge on COVID-19

Knowledge on COVID-19 of the farmers are varied from 1 to 13, where mean was 6.15 and standard deviation was 2.96. Farmers are classified into three categories based on their knowledge. Which are low knowledge, medium knowledge and high knowledge.

Table 4.10 Distribution of the farmers according to their knowledge on COVID-19

Category	Basis of categorization (score)	Observed range (score)	Number of farmers	Percent
Low knowledge	< 4 < (Mean-SD)	1-13	24	22.40
Medium knowledge	4-9 (Mean \pm SD)		67	62.70
High knowledge	> 9 > (Mean+SD)		16	14.90
Total			107	100

Data presented in the Table show that, among the farmers, 22.40% of the farmers had low knowledge, 67.70% of the farmers had medium knowledge and 14.90% of the

farmers had high knowledge. Findings indicated that majority (77.60%) of the farmers had medium to high knowledge on COVID-19. Farmers gained knowledge through television, newspaper, youtube and different social media that supply news on COVID-19 regularly. Ssbuufu et al. found 83.9% of the respondents had a good knowledge about COVID-19 and score was 21.8/27 (Ssbuufu et al., 2020).

4.1.8 Annual income during COVID-19

Annual income of the farmers during COVID-19 are varied from 36 to 780 thousand taka, where mean was 121.12 and standard deviation was 84.85. Farmers are classified into 3 categories on the basis of their annual income. These are low income, medium income and high income.

Table 4.11 Distribution of the farmers according to their annual income during COVID-19

Category	Basis of categorization (score)	Observed range (score)	Number of farmers	Percent
Low income	< 37 < (Mean-SD)	36-780	1	0.90
Medium income	37-205 (Mean ± SD)		98	91.60
High income	> 205 > (Mean+SD)		8	7.50
Total			107	100

Data presented in the Table show that, among the farmers, 0.90% of the farmers had low income, 91.60% of the farmers had medium income and 7.50% of the farmers had high income during COVID-19. Findings indicated that majority (91.60%) of the farmers had medium income during COVID-19.

4.2 Influence of COVID-19

Influence of COVID-19 of the farmers are varied from 0 to 27, where mean was 11.17 and standard deviation was 5.30. Farmers are classified into 3 categories based on the

influence of COVID-19. These are low influence, medium influence and high influence.

Table 4.12 Distribution of the farmers according to their influence of COVID-19

Category	Basis of categorization (score)	Observed range (score)	Number of farmers	Percent
Low influence	< 6 < (Mean-SD)	0-27	14	13.30
Medium influence	6-16 (Mean ± SD)		77	71.80
High influence	> 16 > (Mean+SD)		16	14.90
Total			107	100

Data presented in the Table show that, among the farmers, 13.30% of the farmers faced low influence, 71.80% faced medium influence and 14.90% faced high influence. Findings indicated that majority (71.80%) of the farmers faced medium influence.

4.3 Contribution of the selected characteristics of the farmer's socio-economic conditions

Table 4.13 Linear regression showing the contribution of selected characteristics of the farmers to the influence of COVID-19 on their socio-economic conditions

Dependent variable	Independent variables	β	P	R^2	Adj. R^2	F
Influence of COVID-19 on socio-economic conditions	Age	0.217	0.025*	0.513	0.439	6.936
	Family type	-0.200	0.117			
	Family size	0.213	0.054			
	No. of earning members	0.004	0.977			
	Educational qualification	0.091	0.349			
	Condition of house	-0.005	0.959			
	Sanitation practice	-0.196	0.040*			
	No. of meal per day	0.040	0.614			
	Knowledge on COVID-19	0.097	0.380			
	Annual income during COVID-19	-0.134	0.182			
Problem faced by the farmer in crop cultivation during COVID-19	0.422	0.000**				

** Significance at $p < 0.01$;

* Significance at $p < 0.05$

From the hypothesized relationship, three (3) variables namely, age, sanitation practice and problem faced by the farmer in crop cultivation during COVID-19 were found significant contribution to the influence of COVID-19 on farmer's socio-economic conditions. Among them age and problem faced by the farmer in crop cultivation during COVID-19 had positive significant contribution and sanitation practice had negative significant contribution. All the factors cooperatively contribute 51.3% of the variance of effect of COVID-19 ($R^2=0.513$).

4.3.1 Contribution of age to the influence of COVID-19 on socio-economic conditions of the farmers

Contribution of age was calculated by testing the following null hypothesis, “There is no contribution of age to the influence of COVID-19 on socio-economic conditions of the farmers”.

The p-value of the concerned variable was found 0.025 with $\beta = 0.217$.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- I. The contribution of the age was 21.7% at 5% significant level.
- II. It was an important contributor to the influence of COVID-19 on socio-economic conditions of the farmers.
- III. The null hypothesis could be rejected.

Age had a positive influence on the influence of COVID-19 on socio-economic conditions of the farmers. So, it was concluded that the more age lead to more influence of COVID-19 on socio-economic conditions of the farmers.

4.3.2 Contribution of Problem faced by the farmer in crop cultivation during COVID-19 to the influence of COVID-19 on socio-economic conditions of the farmers

Contribution of problem faced by the farmer in crop cultivation during COVID-19 was calculated by testing the following null hypothesis, “There is no contribution of problem faced by the farmer in crop cultivation during COVID-19 to the influence of COVID-19 on socio-economic conditions of the farmers”.

The p-value of the concerned variable was found 0.00 with $\beta = 0.422$.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- I. The contribution of problem faced by the farmer in crop cultivation during COVID-19 was 42.2% at 1% significant level.
- I. It was the height contributor to the influence of COVID-19 on socio-economic conditions of the farmers.

II. The null hypothesis could be rejected.

Problem faced by the farmer in crop cultivation during COVID-19 had a positive influence on the influence of COVID-19 on socio-economic conditions of the farmers. So, it was concluded that the more problem faced by the farmers lead to more influence of COVID-19 on socio-economic conditions of the farmers.

4.3.3 Contribution of Sanitation practice to the influence of COVID-19 on socio-economic conditions of the farmers

Contribution of sanitation practice was calculated by testing the following null hypothesis, “There is no contribution of sanitation practice to the influence of COVID-19 on socio-economic conditions of the farmers”.

The p-value of the concerned variable was found 0.040 with $\beta = -0.196$.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- I. The contribution of the sanitation practice was 19.6% at 5% significant level.
- II. It was an important contributor to the influence of COVID-19 on socio-economic conditions of the farmers.
- III. The null hypothesis could be rejected.

Sanitation practice had a negative influence on the influence of COVID-19 on socio-economic conditions of the farmers. So, it was concluded that better sanitation practice lead to less influence of COVID-19 on socio-economic conditions of the farmers.

4.4 Problems faced by the farmers in crop cultivation during COVID-19

Problem faced by the farmers in crop cultivation during COVID-19 are varied from 1 to 15, where mean was 8.85 and standard deviation was 3.12. Farmers are classified into 3 categories based on the problem. These are low problem, medium problem and high problem.

Table 4.14 Distribution of the farmers according to their problems in crop cultivation

Category	Basis of categorization (score)	Observed range (score)	Number of farmers	Percent
Low problem	< 6 < (Mean-SD)	1-15	16	13.00
Medium problem	6-11 (Mean ± SD)		69	64.60
High problem	> 11 > (Mean+SD)		24	22.40
Total			107	100

The table result showed that among the farmers, 13.00% of the farmers had low problem, 64.60% of the farmers had medium problem and 22.40% of the farmers had high problem. Findings indicated that majority (64.60%) of the farmers had medium problem.

4.4.1 Rank order of problems in crop cultivation

The purpose of this section is to understand the comparative problems faced by the farmers in crop cultivation during COVID-19. To compare the problems, a rank order was made based on Problem Faced Index (PFI). Problem Faced Index (PFI) of the farmers of the 7 problem items in crop cultivation ranged from 18 to 291. In descending order of the PFI, a rank order was made which is shown in the Table no. 4.15.

Table 4.15 Rank order of problems faced by farmers in crop cultivation

Sl. No.	Nature of problems	PFI Score	Rank
1	Rate of increasing cost of production	291	1 st
2	Lack of sufficient money	258	2 nd
3	Fluctuation of price of crops	191	3 rd
4	Insufficient labor	86	4 th
5	Non availability of quality seed	53	5 th
6	Middleman domination	45	6 th
7	Loan is not available when need	18	7 th

According to the Problem Faced Index (PFI), rate of increasing cost of production ranked first, lack of sufficient money ranked second, fluctuation of price of crops ranked third, insufficient labor ranked fourth, non-availability of quality seed ranked fifth, middleman domination ranked sixth and loan is not available when need ranked seventh. The findings indicated that rate of increasing cost of production is the height problem facing farmers in crop cultivation during COVID-19. This may be the cause of disruption of transportation system. Least problem is loan in not available when need. This may be the cause of availability of bank and NGO's loan at any time though interest is high.

CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of empirical findings

5.1.1 Selected characteristics of the farmers

Age

22.30% was young aged, Majority of the farmers was middle aged and it was 63.30% and lowest portion was old aged which was 14.40%.

Family type

Highest portion (72%) of the farmers had nuclear family and 28% of the farmers had joint family.

Family size

Highest portion (70.10%) of the farmers had medium family size and lowest portion (4.70%) of the farmers had large family.

Number of earning members

Highest portion (72%) of the farmers had small earning members, medium earning members portion was 23.4% and large earning members portion was 4.6%.

Educational qualification

Highest portion (63.50%) of the farmers were literate and 36.50% of the farmers were illiterate.

Service ability of the farmer

a. Condition of house

Highest portion (62.60%) of the farmers had semi pacca house, and lowest portion of the farmers had katcha house 15.90% and 21.50% of the farmers had pacca house.

b. Use of electricity

100% of the farmers used electricity.

c. Sanitation practice

Highest portion (74.80%) of the farmers used sanitary latrine and 25.20% of the farmers used katcha latrine. No farmers used open field.

d. Number of meal per day

Highest portion (99.10%) of the farmers take 3 meals per day. No farmers take 2 meals per day and 0.09% of the farmers take 4 meals per day.

Knowledge on COVID-19

Highest portion (67.70%) of the farmers had medium knowledge on COVID-19, lowest portion (14.90%) of the farmers had high knowledge and 22.40% of the farmers had low knowledge.

Annual income during COVID-19

Highest portion (91.60%) of the farmers had medium income during COVID-19, lowest portion (0.90%) of the farmers had low income and 7.50% of the farmers had high income.

5.1.2 Influence of COVID-19 on socio-economic conditions of the farmer

Highest portion (71.80%) of the farmers faced medium influence, lowest portion (13.30%) of the farmers faced low influence and 14.90% of the farmers faced high influence on their socio-economic conditions.

5.1.3 Contribution of the selected characteristics on socio-economic conditions of the farmer:

Age and problem faced by the farmers in crop cultivation during COVID-19 had positive significant contribution to the influence of COVID-19 on their socio-economic conditions. Sanitation practiced by the farmers had negative contribution to the influence of COVID-19 on their socio-economic conditions. Among these, problem faced by the farmers in crop cultivation had the highest contribution (42.2%).

Family type, family size, number of earning members, educational qualification, condition of house, use of electricity, number of meal per day, knowledge on COVID-19, monthly income during COVID-19 had no contribution to the influence of COVID-19 on farmers socio-economic conditions.

5.1.4 Problems faced by the farmers in crop cultivation during COVID-19

Highest portion (64.60%) of the farmers had medium problem, lowest portion (13.00%) of the farmers had low problem and 22.40% of the farmers had high problem in crop cultivation during COVID-19.

5.1.5 Rank order of problems faced by the farmers in crop cultivation during COVID-19

Rank order of 7 problems was measured. According to the Problem Faced Index (PFI), Rate of increasing cost of production ranked first and loan is not available when need ranked last.

5.2 Conclusions

Based on the findings and the logical interpretation of their meaning in the light of other relevant facts enabled the researcher to draw the following conclusions:

- In the present study, it was found that the majority (85.60%) of the farmers were young to middle aged due to their physical strength. Most of the farmers were married (88.80%) and majority (72%) of them had nuclear family. Most (70.10%) of the farmers had medium family size. Regarding the education level, majority (34.60%) of the farmers had primary education. Most (62.60%) of the farmers had semi pacca house with 100% electricity service. Majority (69.20%) of them had own tube-well and use sanitary latrine (74.80%). Majority (62.70%) of the farmers had medium knowledge on COVID-19 and medium annual income during COVID-19 (91.60%).
- Majority (85.60%) of the farmers were young to middle aged and it had a positive significant contribution to the influence of COVID-19 on their socio-economic conditions. Thus it can be concluded that the more age of the farmers, the more influence of COVID-19 on their socio-economic conditions because of their less physical strength.

- Majority (87%) of the farmers faced medium to high problem in crop cultivation during COVID-19 and it had a positive significant contribution to the influence of COVID-19 on their socio-economic conditions. Thus, it can be concluded that the more problem faced by the farmers in crop cultivation, the more influence of COVID-19 on their socio-economic conditions. So, the problem in crop cultivation should be solved to decrease the influence of COVID-19.
- Majority (74.80%) of the farmers had sanitary latrine and it had a negative significant contribution to the influence of COVID-19 on their socio-economic conditions. Thus, it can be concluded that the better sanitation practice of the farmers lead to less influence of COVID-19 on their socio-economic conditions. So, influence of COVID-19 can be decreased by increasing better sanitation practice among the farmers.

5.3 Recommendations

5.3.1 Recommendations for policy implication

On the basis of the result of the study, and also on the basis of present and past experience, the following recommendations are formulated as bellow:

- Expansion of the sale of rice and flour to the upazila stage at the fixed price by the govt. in the open market, so that the ultra-profit traders can't syndicate and raise unnecessary prices.
- Innovations in the post-harvest technologies of medicinal plants aromatic plants which supply raw materials to herbal medicines, pharmaceuticals, cosmetics, and food flavor industries could increase export potential and create employment. This types of research should be increased by the govt.
- Private and govt. investments in agricultural research and development, insurance, finance, mechanization, logistics, automation, digital procurement and distribution (e-marketing) should be increased.
- Govt. should increase storage facilities in local area that would encourage farmers to store the commodities at farm level, providing storage is available, against distress selling.
- Govt. already gave 5,000 crore soft loan at 4% interest to the farmers based on agricultural land size. So, marginal farmers and the farmer who works on

others land did not get benefit from this soft loan. Policies should be made keep in mind all levels of farmers benefit.

- Policies for proper utilization of digital technologies for networking among stakeholders and rapid information sharing, along with the use of other agricultural technologies for hygienic and cost-effective farm management, could help in overcoming the impacts of any future disasters like COVID-19.
- Govt. should introduce subsidy-based transportation systems for agriculture to make the supply chain alive.
- To keep the food supply stable in the future, some policies have to be put forward to reduce the agricultural production cost and support the farmers during and after the pandemic period.

5.3.2 Recommendations for further research

Short term and specific location study can't provide total information for proper understanding related to the actual influence of COVID-19 on socio-economic conditions of the farmers. Further studies should be undertaken to cover more dimensions in the relevant subject matters. The following recommendations are suggested for further study:

- This study was conducted only in 5 villages in Harinakundu upazila under Jhenaidah district. Results of this study can be verified and compared by similar studies in other region of the country.
- This study was conducted with only 107 farmers. Further study should be conducted with more farmers.
- This study examines the influence of COVID-19 on socio-economic conditions of the farmers. Influence of COVID-19 on other sector such as food supply, health, education, garments, tourism etc. should be conducted.
- Present study explored the contribution of 9 characteristics of the farmers to the influence of COVID-19 on their socio-economic conditions as independent variables. So, it is recommended that further study would be conducted with more and another independent and dependent variables.
- Due to the scope of paper and limitation of time, the study avoided comparison with historical data that shows the farmer suffered in previous pandemics or plague.

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APPENDIX-A

English Version of the Interview Schedule

Department of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University

Dhaka-1207

Interview schedule for the study entitled

**TITLE: INFLUENCE OF COVID-19 ON SOCIO-ECONOMIC
CONDITIONS OF THE FARMERS IN SOME SLEETED AREAS OF
BANGLADESH.**

Serial No:

Name of the farmer:

Village:

Union:

Upazilla:

District:

1. Age: Years

2. Family type:

i) Nuclear ii) Joint

3. Family size:

4. Number of earning members:

5. Educational Qualification:

i) Illiterate ii) Can Sign only iii) Class i- v
iv) Class vi- x v) Above x

6. Service ability of the farmer

Sl. No.	Item
1	Condition of house: i) Katcha ii) Semi pacca iii) Pacca
2	Use of electricity: i) Yes ii) No
3	Sanitation practice: i) Katcha ii) Sanitary iii) Open field
4	No. of meal per day: i) 4 meal ii) 3 meal iii) 2 meal

7. Knowledge on COVID-19:

Sl. No.	Questions	Full marks	Obtained marks
1	Do you know what is COVID-19?	2	
2	What is the symptom of COVID-19?	2	
3	How much time does it take to show the symptom?	2	
4	Who can be infected by COVID-19?	2	
5	By which way virus can be spread?	2	
6	Do you know what is quarantine and isolation?	2	
7	What can kill the virus?	2	

8. Monthly income during COVID-19:

9. Effect of COVID-19:

Sl. No.	Statements	Extent of effect				
		Severe (4)	High (3)	Medium (2)	Low (1)	Not at all (0)
1	Food shortage					
2	Unable to meet family demand					
3	Decrease of no. of meal					
4	Sufferings from malnutrition					
5	Decrease of food item					
6	Decrease of medical facilities					
7	Unable to continue children education					
8	Crushing of savings					
9	Borrowing money					
10	Migration					

10. Problem faced by the farmers in crop cultivation during COVID-19:

Sl. No.	Statements	Extent of problem				
		Severe (4)	High (3)	Medium (2)	Low (1)	Not at all (0)
1	Non availability of quality seed					
2	Rate of increasing cost of production					
3	Middleman domination					
4	Fluctuation of price of crops					
5	Lack of sufficient money					
6	Insufficient labor					
7	Loan is not available when need					

Thank you for your kind co-operation.

Date:

Signature of the interviewer