

Original Research Article

Effect of Covid-19 on Socio-Economic Conditions of the Farmers in Some Selected Areas of Bangladesh

Comment [ACO1]: The work is not original; it has 71% similarity index

Comment [ACO2]: You may have to consider adopting this topic if what you did must stand «INFLUENCE OF SOCIO-ECONOMIC CONDITIONS ON THE EFFECT OF COVID-19 IN SOME SELECTED AREAS OF BANGLADESH» if not you may have to rework the article to fit into the topic. This is because effect of COVID-19 is meant to be the independent variable according to the topic while socio-economic conditions will be the dependent variable.

The truth is that the topic you have already is the best

Comment [ACO3]: This did not reflect what was done in the study

Comment [ACO4]: This was not captured under the material and methods

Comment [ACO5]: This was only used to test an hypothesis, and so should be stated as such

Comment [ACO6]: Rewrite to fit into suggested corrections

Comment [ACO7]: May likely change after corrections

Comment [ACO8]: What was conceptualised as socio-economic conditions of farmers as captured in the topic was not clearly defined or stated in the introduction

ABSTRACT

Aims: The enduring COVID-19 pandemic has resulted in a new era in the efficacy of the agricultural sectors. Farmers in Bangladesh are directly affected by COVID-19. Considering the farmers' condition regarding the pandemic, the present study was designed to investigate the effect of COVID-19 on the socio-economic conditions of the farmers in some selected areas of Bangladesh.

Study design: Action research design.

Place and Duration of Study: Data were collected from the 107 respondents selected from the intervention area (5 villages) of Jhenaidah district, Bangladesh. The duration was between June 2021 and July 2022.

Methodology: The data obtained from the interview schedule were 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. The effect was measured by different descriptive statistics and multiple regression.

Results: The majority (71.80%) of the farmers faced a medium effect of COVID-19. Among the variables, age, source of drinking water, and problems faced by the farmers in crop cultivation during COVID-19 had a positive significant contribution, and sanitation practiced by the farmers had a negative contribution to the effect of COVID-19 on their socio-economic conditions. Among these, problems faced by the farmers in crop cultivation had the highest contribution (42.2%). All the factors cooperatively contribute 51.3% of the variance of the effect of COVID-19 ($R^2=0.513$).

Conclusion: It is concluded that the effect of COVID-19 on farmers' socio-economic conditions was moderate and needed further advancement.

Keywords: Effect, COVID-19, Farmer, Agriculture, Socio-Economic, crop cultivation, Bangladesh

1. INTRODUCTION

The recent outbreak of the severe acute respiratory coronavirus 2 (SARS-CoV-2), also called coronavirus 2019 (COVID-19), has evolved into one of the most severe pandemic ~~situation-situations~~ in the past hundred years [1]. 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-A 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 the coronavirus. The surge of COVID-19 in Wuhan, China led to the closure of public places, the halting of public transportation, isolation, and management of infected persons, all in a bid to curb the spread of COVID-19 [2]. 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 [3] alongside other ailments. A pandemic shock can have greater significance on economies due to ~~loss~~ loss of human lives than another shock such as drought, flood, or a trade embargo. Undoubtedly, all these shocks affect agricultural systems; however, pandemic shocks affect all sectors of an economy. ~~The pandemic disrupts the demand and supply of food impact the global supply chain~~, while droughts tend to be localized affecting only the associated sector or stakeholders [4].

Comment [ACO9]: Not clear, rephrase

The ongoing pandemic is a global emergency that ~~has a potential impact on~~ potentially impacts the global population. As a part of the world, Bangladesh is also facing a crisis in the different sectors including the agricultural sector. The effect of COVID-19 on agriculture varies from country to country among farmers. The pandemic has created an unprecedented economic and social crisis in Bangladesh [5]. The ongoing pandemic has brought to light the interconnection and interdependencies between agriculture, society, and the economy and expresses the vulnerabilities of agriculture to external disturbances.

About 70 percent of people overall depend on agriculture for their livelihood in Bangladesh [6]. Most of them are marginal to small scale farmers. 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.

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

Comment [ACO10]: Mention some of those natural disasters that are common in Bangladesh

From the context of the above circumstances, some questions are raised for the completion of the research. The research purpose is to answer the following questions:

1. What are the socio-economic conditions of the farmers?
2. What are the effects of COVID-19 on the socio-economic conditions of the farmers?

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

1.1 Objectives of the study

Specifically, the study sought to:

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

1. ~~To~~ describe the socio-economic conditions of farmers; and

2. ~~To~~ determine the contribution of farmers' socio-economic characteristics on the effect of COVID-19.

Comment [ACO11]: This is different from the topic and the research question. Following the topic, it should be, to determine the effect of COVID-19 on the socio-economic conditions of the farmers

2. MATERIAL AND METHODS

2.1 Locale of the area

The study was conducted in the Harinakunda, Jorapukuria, Mandartola, Chatkabarua, and Dignogor villages in Harinakundupazila under Jhenaidah district. This area was selected due to some reasons such as time limitations, financial shortage, easy accessibility, etc. ~~The study area has been presented in Figure 4~~



Figure 1: A map of Jhenaidah district showing the study area by using red borders

Comment [ACO12]: The figure is not clear. What are areas like Maheshpur, Kaliganj, Kotchandpur, Jhenaidah dadar and Shailkupa doing on the map? Please, present a clearer map that captures clearly the area that was studied

2.2 Population and sampling techniques

All the farmers in Harinakunda, Jorapukuria, Mandartola, Chatkabarua, and Dignogor villages ~~constituted are~~ the population ~~offor~~ the study. An updated list of all the farmers in the selected villages was collected from the Upazila Agricultural office, Union Parishad Secretary, and local farmers. The sample size of the study was determined by applying the following formula [7]:

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

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 ~~formed the sample size which would be representative of the population. 107 farmers were~~The sample was randomly and proportionately selected as captured in Table 1 below from the population (table 1). ~~Face to face interview schedule was used by a pre-prepared structured interview schedule to gather the needed information for the study.~~

Table 1: No. of farmers from each village

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

2.3 Data collection instruments and Data collection

Structured interview schedule was used for data collection through face to face medium. 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, marital status, etc. Scales were used to measure the effect of COVID-19, problems faced by the farmer, etc. Data was collected from the farmers through personal interviews.

2.4 Null hypothesis

The null hypothesis reflects that there are 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 of the farmers to effect of COVID-19 on socio-economic conditions of the farmers.”

Comment [ACO13]:

2.5 Measurement of variables

The methods for measuring the variables are given below:

2.5.1 Measurement of independent variables

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

2.5.1.1 Age

Age-The ages of the farmers were measured in terms of the time difference between when they were born and when the interview was conducted~~the birth to the time period of carrying out of the interview schedule on-~~. This was extracted on the basis of respondent's statement. A score of one (1) was assigned for each year of one's age.

2.5.1.2 Marital status

Marital status was measured as by using 4 items, which were married (1), /-unmarried (2), /-divorced (3) and /-widowed (4). It was measured by giving 1 point for married, 2 points for unmarried, 3 points for divorced and 4 points for widowed.

2.5.1.3 Family type

Family type was measured as by whether the farmer had a nuclear family (1), or a joint family (2). For the nuclear family, it was given 1 point and for the joint family, it was given 2 points.

2.5.1.4 Family size

Family size of a respondent was measured on the basis of ~~the actual number~~ 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.~~

2.5.1.5 Number of earning members

Number of earning members was measured by the total number of members of the respondent's family who earned money. ~~For example, 2 points for 2 earning members.~~

2.5.1.6 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.

2.5.1.7 Serviceability of the farmers:

2.5.1.7.1 Condition of house

The condition of the house was measured by giving ~~nominal values of the farmer~~ 1 point for kacha, 2 points for semi-pacca, and 3 points for pacca.

2.5.1.7.2 Source of drinking water

It was measured by ~~assigning nominal values of giving the farmer~~ 1 point if ~~the respondent/she~~ uses ~~his~~ own tube well, 2 points if ~~he~~ uses a joint tube well, and 3 points if ~~he~~ uses another tube well.

2.5.1.7.3 Sanitation practice

It was measured by ~~assigning nominal values of scoring~~ 1 for katcha, 2 points for sanitary, and 3 points for open field.

2.5.1.8 Knowledge on COVID-19

~~The farmer's knowledge of 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, the total points for all questions became 14. The point was given according to the answer by the respondents. For a correct answer, a person is given 2 points was given, while wrong answer attracted 0 point but if his/her answer was wrong, they did not get any points. And his score is 0. A partial score was given for a partially correct answer. So, the respondent's score ranges from 0 to 14, where 0 indicates low knowledge and 14 indicates sound knowledge.~~

Comment [ACO14]: Mention some of the questions asked

Comment [ACO15]: What constituted a partial score? Mention it

2.5.1.9 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 earnings Taka was converted into a score. 1 score was assigned for every 1000 Taka.

2.5.2.5.1.10 Measurement of the dependent variable

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

Extent of effect	Score
Severe effect	4
High effect	3

Medium effect	2
Low effect	1
Not at all	0

The effect of COVID-19 on the socioeconomic conditions of a farmer was measured by adding the scores of 10 items. So, the effect score could range from 0 to 40. Here, 0 indicates the effect is not at all and 40 indicates the severe effect of COVID-19 on the socio-economic conditions of a farmer.

2.6.5.1.11 Statistical analysis

Regression analysis was used to determine the contribution of the selected characteristics of the farmers to the effect of COVID-19 on the socio-economic conditions of the farmers. In this study 0.05 percent level of significance was used as the basis for rejecting a null hypothesis.

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 = Effect of COVID-19 on the socio-economic conditions of the farmers

a = Constant value of the equation

X₁ = Farmer's age

X₂ = Marital status

X₃ = Family type

X₄ = Family size

X₅ = Number of earning members

X₆ = Educational qualification

X₇ = Serviceability of the farmers

X₈ = Knowledge on COVID-19

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

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

3. RESULTS AND DISCUSSION

3.1 Socio-economic characteristics of the farmers

The behavior of one person is determined by one's personal characteristics. There are various characteristics of the farmers that might have consequences for the socio-economic conditions of the farmers. But in this study, eight (8) characteristics of the farmers were selected as independent variables, which included their age, family type, family size, number of earning members, educational qualification, serviceability of the farmer, knowledge of COVID-19 that might be greatly influenced to the effect of COVID-19 in Bangladesh on their socio-economic conditions are presented in a Table 2.

Table 2. Socio-economic conditions of the farmers

Variables	Categorization	Observed Range	Number of farmers	Percent	Mean	SD
Age	Young aged		24	22.30		

Comment [ACO16]: There was no mention of how other variables were analyzed

Comment [ACO17]: This cannot stand considering the topic. Effect of COVID-19 is meant to be the independent variable according to the topic while socio-economic conditions will be the dependent variable

Aside from that, effect of COVID-19 cannot stand as a dependent variable for a multiple regression. It is a categorical variable whereas a continuous variable is required

Comment [ACO18]: This can only stand if the topic is rephrased

	< 32.22 < (Mean-SD)					
	Middle aged 32.22-55.13 (Mean ± SD)	18-70	68	63.30	43.67	11.46
	Old aged > 55.13 > (Mean+SD)		15	14.40		
Family type	1	1-2	77	72		
	2		30	28	1.28	0.45
Family size	Up to 3	2-10	27	25.20		
	4-6		75	70.10	4.36	1.40
	Above 6		5	4.70		
Number of earning members	Small (1)	1-3	77	72.00		
	Medium (2)		25	23.40	1.33	0.56
	Large (3)		5	4.60		
Educational qualification	Illiterate (0)		28	26.20		
	Can sign only (0.5)	0-11	11	10.30	4.78	4.14
	Primary (up to 5)		37	34.60		
	Secondary (6-10)		20	18.70		
	Above secondary (above 10)		11	10.30		
Service ability of the farmers:	Kacha (1)		17	15.90		
	Semi pacca (2)	1-3	67	62.60	2.06	0.61
a. Condition of house	Pacca (3)		23	21.50		
b. Source of drinking water	Own tube-well (1)	1-3	74	69.20	1.32	0.49
	Joint tube-well (2)		32	29.90		
	Others tube-well (3)		1	0.90		

Comment [ACO19]: You do not calculate mean and standard deviation for a nominal variable

Comment [ACO20]: The variables under this should be treated as nominal and so the mean and standard deviation estimate should be deleted

c. Sanitation practice	Katcha (1)	1-3	27	25.20	1.75	0.44
	Sanitary (2)		80	74.80		
	Open field (3)		0	0		
Knowledge on COVID-19	Low knowledge (< 3.19)	1-13	24	22.40	6.15	2.96
	Medium knowledge (3.19-9.11)		67	62.70		
	High knowledge (>9.11)		16	14.90		
Effect of COVID-19	Low effect (< 5.87)	0-27	14	13.30	11.17	5.30
	Medium effect (5.87-16.47)		77	71.80		
	High effect (> 16.47)		16	14.90		

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

Table 3. Multiple linear regression showing the contribution of selected characteristics of the farmers to the effect of COVID-19 on their socio-economic conditions

Dependent variable	Independent variable	β	p	R^2	Adj. R^2	F
Effect of COVID-19	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			
	Source of drinking water	0.198	0.039*			
	Sanitation practice	-0.196	0.040*			
	Knowledge on COVID-19	0.097	0.380			

** Significance at $p < 0.01$;

* Significance at $p < 0.05$

From the hypothesized relationship, five (5) variables namely, age, source of drinking water, sanitation practice, food item intake by the farmer, and problem faced by the farmer in crop cultivation during COVID-19 were found significantly contribute to the effect of COVID-19 on farmer's socio-economic conditions. Among them, age, and source of drinking water had a positive significant contribution and sanitation practice had a negative significant contribution. All the factors cooperatively contribute 51.3% of the variance of the effect of COVID-19 ($R^2=0.513$).

Comment [ACO21]: How were variables like family type, condition of house, source of drinking water and sanitation operationalized for the multiple regression?

Comment [ACO22]: Effect of COVID-19 cannot stand as a dependent variable for a multiple regression. It is a categorical variable whereas a continuous variable is required

3.2.1 Contribution of age to the effect of COVID-19 on the socioeconomic Conditions of the Farmers

Contribution of age was calculated by testing the following null hypothesis, "There is no contribution of age to the effect of COVID-19 on the 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 effect of COVID-19 on the socio-economic conditions of the farmers.
- III. The null hypothesis could be rejected.

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

3.2.2 Contribution of Source of drinking water to the effect of COVID-19 on the socio-economic conditions of the farmers

Contribution of the Source of drinking water was calculated by testing the following null hypothesis, "There is no contribution of the source of drinking water to the effect of COVID-19 on the socio-economic conditions of the farmers".

The p-value of the concerned variable was found 0.039 with $\beta = 0.198$.

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 source of drinking water was 19.8% at a 5% significant level.
- II. It was an important contributor to the effect of COVID-19 on the socio-economic conditions of the farmers.
- III. The null hypothesis could be rejected.

The source of drinking water had a positive influence on the effect of COVID-19 on the socio-economic conditions of the farmers. So, it was concluded that a better source of drinking water lead to more effect of COVID-19 on the socio-economic conditions of the farmers.

3.2.3 Contribution of Sanitation Practice to the Effect 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 effect of COVID-19 on the 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 a 5% significant level.
- II. It was an important contributor to the effect of COVID-19 on the socio-economic conditions of the farmers.
- III. The null hypothesis could be rejected.

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

Based on the results some discussion may be drawn as 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 (72%) had a nuclear family. Most (70.10%) of the

farmers had medium family sizes. Regarding the education level, the majority (34.60%) of the farmers had primary education. Most (62.60%) of the farmers had semi-pucca houses. The majority (69.20%) of them had their own tube-well and use sanitary latrines (74.80%). The majority (62.70%) of the farmers had medium knowledge of COVID-19. The majority (85.60%) of the farmers were young to middle-aged and it had a positive significant contribution to the effect of COVID-19 on their socio-economic conditions. Thus, it can be said that the more age of the farmers, the more effect COVID-19 has on their socio-economic conditions because of their less physical strength. The majority (69.20%) of the farmers had their own tube-well and it had a positive significant contribution to the effect of COVID-19 on their socio-economic conditions. When the source of drinking water quality will be increased the effect of COVID-19 also will be increased. The majority (74.80%) of the farmers had sanitary latrines and it had a negative significant contribution to the effect of COVID-19 on their socio-economic conditions. So, the better sanitation practice of the farmers leads to less effect of COVID-19 on their socio-economic conditions. Finally, the effect of COVID-19 can be decreased by increasing better sanitation practices among the farmers.

Comment [ACO23]: Needs to be reworked since the analysis is wrong

4. CONCLUSION

The inclination of the COVID-19 pandemic has gradually reduced now a day but the effects on farmers' socio-economic condition are inevitable. The socioeconomic circumstances of the farmers may have a favorable or negative influence to the COVID-19 pandemic.

In conclusion, this study aimed to investigate the contribution of age, source of drinking water, and sanitation practices to the effect of COVID-19 on the socio-economic conditions of farmers. The results indicated that age, source of drinking water, and sanitation practices are important factors that affect the socio-economic conditions of farmers during the COVID-19 pandemic. The study also found that age had a positive influence on the effect of COVID-19 on the socio-economic conditions of farmers. As farmers age, their physical strength decreases, making them more susceptible to the negative effects of the pandemic on their socio-economic conditions. Similarly, the source of drinking water had a positive influence on the effect of COVID-19 on the socio-economic conditions of farmers, indicating that a better source of drinking water leads to more effect of COVID-19 on the socio-economic conditions of the farmers.

On the other hand, sanitation practices had a negative influence on the effect of COVID-19 on the socio-economic conditions of farmers. Farmers who practiced better sanitation had less effect of COVID-19 on their socio-economic conditions. Overall, the study emphasizes the importance of adopting better sanitation practices to reduce the impact of COVID-19 on the socio-economic conditions of farmers. The findings have significant implications for policymakers and public health officials in developing strategies to reduce the impact of the pandemic on the socio-economic conditions of farmers.

Finally, the study concludes that by adopting better sanitation practices, improving the quality of drinking water, and providing support to older farmers, the negative impact of COVID-19 on the socio-economic conditions of farmers can be reduced.

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Comment [ACO24]: Be consistent with a particular referencing style especially the one adopted by the publisher, and ensure that articles details are complete and well presented