ADVERSE EFFECTS OF TRADITIONAL BRICKFIELD ON AGRICULTURE

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CERTIFICATE

This is to certify that the thesis entitled **"**ADVERSE EFFECTS OF TRADITIONAL BRICKFIELD ON AGRICULTURE**"** *submitted to the Department of Agricultural Extension and Information System, 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 authentic research work carried out by* ***Md. SHAHADAT HOSSAIN,*** *Registration No.* ***15-06568*** *under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.*

I further certify that any help or source of information, received during the course of this investigation has been duly acknowledged.

Dated:

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DEDICATED TO

MY

BELOVED PARENTS

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABBREVIATIONS

Ag. Ext. Ed.	Agricultural Extension Education
Ag. Ext. Info. Sys.	Agricultural Extension and Information System
BBS	Bangladesh Bureau of Statistics
BUET	Bangladesh University of Engineering and Technology
DAE	Department of Agricultural Extension
EI	Effectiveness Index
ESMAP	Energy Sector Management Assistance Program
et al.	All Others
FAO	Food and Agriculture Organization
ICT	Government of Bangladesh
NGOs	Non-Government Organizations
SAAO	Sub Assistant Agriculture Officer
SAU	Sher-e-Bangla Agricultural University
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences
WHO	World Health Organization

ADVERSE EFFECTS OF TRADITIONAL BRICKFIELD ON AGRICULTURE

BY

MD. SHAHADAT HOSSAIN

ABSTRACT

The purposes of the study were to assess the adverse effect of traditional brickfield on agriculture; to compare item-wise effects of traditional brickfields; to describe some selected characteristics of the farmers and to explore the relationships between each of the selected characteristics of the respondents to their perceived effects of traditional brickfields on agriculture. The study was undertaken purposively in Sadarpur upazila under Faridpur district. Validated and well-structured interview schedule was used to collect data from 96 farmers during 15 November to 14 December, 2022. The highest proportion (61.5%) of the farmers perceived medium effects as compare to 3.1 percent perceived low effects and 35.4 percent perceived high effects of traditional brickfield on agriculture. On the basis of SEI, it was observed that "reducing top fertile soil" ranked first followed by "reducing crop production area", "reducing biodiversity", "reducing crop production", "reducing local forest and trees area", and "reducing livestock production", "reducing fisheries production" and "reducing poultry production" were the least effects of traditional brickfield on agriculture. Pearson's Product Moment Correlation revealed that education, farm size, annual family income and agricultural farming experience of the farmers had positive significant relationship with their perceived adverse effects of traditional brickfield on agriculture. Based on the findings, it is recommended that traditional brickfield should be stopped or transfer to eco-friendly brick manufacturing to reduce the adverse effects of traditional brickfield on agriculture.

CHAPTER-I
INTRODUCTION

1.1 General Background of the Study

Bricks are becoming a significant building material in both urban and rural areas of Bangladesh as the demand for bricks is steadily rising at an annual rate of approximately 5.3% (BBS, 2021). The total number of households in Bangladesh is 31.7 million, of which 26.1% are using bricks as construction material, while 73.9% are using mud or unburned bricks, tin (CI sheets), wood, straw, bamboo, polythene, plastic, and canvas (BBS, 2021). The fired clay bricks are the major demand for materials used as major building blocks for all infrastructure projects such as roads, bridges, and buildings. There are approximately 6,335 brick manufacturing kilns in Bangladesh (BUET, 2007) and the total brick production in Bangladesh is estimated to be over 17 billion bricks annually with an estimated sale value of approximately US$ 1.2 billion (ESMAP, 2011).

Negative environmental impacts of brick industries over the environment with respect to air quality, soil conditions, and in particular, on vegetation have been indicated in many studies (Fatima, 2011; Gupta and Narayan, 2010; Guttikunda, 2009; Guttikunda *et al.*, 2013; Le and Oanh, 2010). The brick industry in Bangladesh is one of the largest coal users in the country and therefore the industry has been considered to be one of the most extreme sources of air pollution due to its carbon emissions (Elampari *et al*., 2010). The gas-based Hoffmann kilns and coal-based zigzag kilns, which represent only a few percent of all kilns in Bangladesh, are relatively effective in keeping the surrounding environment clean compared to the fixed chimney kiln (World Bank, 2008). The fixed chimney kiln dominates the brick sector of Bangladesh and many studies have reported that fuel consumption, particulate emissions, and greenhouse gas emissions are the highest for fixed chimney kilns (BUET, 2007; ESMAP, 2011). Different studies have revealed that considerable areas of productive and potential agricultural lands have been rented out to the brick industry (Bhanarkar

et al., 2002; Parvez *et al.*, 2019) and the removal of fertile topsoil for clay renders the land infertile (Vanish, 2008; Rajonee and Uddin, 2018; Tripathi and Gautam, 2007). Moreover, the release of harmful gases from brick kilns to the environment changes nitrogen cycle and other natural processes, which results in decreasing fertility and nutrient contents in the soil (Das, 2015) and reduces overall soil quality (Krishna and Govil, 2007) as well as decreases both the organic carbon content and water holding capacity (Guttinkunda, 2009). As a result the yield of the crop decreases (Agrawal *et al*., 2003; Bisht and Neupane, 2015; Gupta and Narayan, 2010; Ozolincius *et al*., 2005; Rajput and Agrawal, 2005). Moreover, dust deposition on plant leaves hampers photosynthesis which also reduces agricultural crops yields (Agrawal *et al*., 2003; Begum *et al*., 2013; Bisht and Neupane, 2015; Emberson *et al.*, 2001; Guttinkunda, 2009; Kumar and Thambavani, 2012).

The negative impact of pollution on the surrounding environment from brick industries varies with increasing distance from the pollutant source (Hassan *et al.*, 2012; Ismail *et al*., 2012). Thus, it is important to test the hypothesis that location, in this case, the distance of human settlements from a brick kiln, is an important factor to understand the magnitude of environmental degradation caused by brick kilns. Therefore, it was predicted that the attitudes of local residents living adjacent to a brick industry would be negative because they understand that they are paying a high cost and receiving few benefits from such industries (Boholm and Löfstedt, 2004). If such infrastructural development initiatives are not sustainable, conflicts may arise between the local people and the development partners (Gillingham and Lee, 2003; Roe and Elliott, 2006). Rearch on human attitudes towards the presence of a brick industry near human settlements have not been found and reviewed studied. This study therefore attempts to explore the effects that such industries have on the surrounding environment with respect to soil quality as well as crop yields from agricultural lands and home gardens, and the attitudes of local people towards brick industries. The information gained from this study would be helpful in

formulating an effective policy to halt the environmental degradation caused by brick industries in human settlements.

1.2 Statement of the Problem

Effects refer to one's involvement in an events, thing or situation. Adverse effects of traditional brickfields on agriculture is very bad to agricultural development of Bangladesh, where an overwhelming majority of them live in rural areas who are very close to agricultural production system.

With a view to conduct an investigation on various aspects of traditional brickfields on agriculture, the researcher undertook this piece of study entitled "Effects of traditional brickfields on agriculture". The purpose of this study was to know the answer of the following research questions:

- What was the extent of adverse effects of traditional brickfields on agriculture?
- What were the extent of item-wise comparative severity of adverse effects of traditional brickfields on agriculture
- What were the characteristics of the farmers?
- What was the relationship between each of the selected characteristics of the farmers with their adverse effects of traditional brickfields on agriculture?

1.3 Specific Objectives

The following specific objectives have been framed out in order to give proper direction to the research work:

- To assess the adverse effects of traditional brickfields on agriculture as perceived by the farmers
- Item-wise comparative severity of adverse effects as perceived by the farmers
- To describe some selected characteristics of the farmers
- To explore the relationship between each of the selected characteristics of the farmers to their perceived adverse effects of traditional brickfields on agriculture

1.4 Justification of the Study

The major focus of the study was to assess the adverse effects of traditional brickfields on agriculture. Government and non-government organizations are currently putting effort and allocating resources for production-oriented research and also encouraging the rural people to understand the effects of traditional brickfields on agriculture. So, evaluation of the effects of traditional brickfields on agriculture was necessary. Considering the above findings, the researcher became interested to undertake a study to determine the extent of adverse effects of traditional brickfields on agriculture.

1.5 Assumptions of the Study

The researcher had the following assumptions in mind while undertaking this study:

- The selected respondents were competent enough to reply the queries made by the researcher.
- The responses furnished by the respondents were valid and reliable.
- Information furnished by the respondents included in the sample was the representative opinion of the whole population of the study area.
- The researcher who acted as interviewer was well adjusted to social and environment condition of the study area. Hence, the data collected by his or her from the respondents were free from bias.
- All the data concerning the variables of the study were normally and independently distributed.

1.6 Scope of the Study

The findings of the study would be particularly applicable to the respondents of the three unions of Sadarpur upazila under Faridpur district. However, the findings may also have implication to other areas of Bangladesh where the physical, socio-economic, cultural and geographical condition is similar with the study area. Thus, the findings are expected to be useful to the students, researcher and extension policy makers of different nation buildings organization to improve techniques and strategies for effective extension work with the rural people.

1.7 Limitations of the Study

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

- The study was confined to three selected unions of Sadarpur upazila under Faridpur district.
- The characteristics of the respondent in the study area were many and varied but only seven characteristics were selected for investigation in this study.
- There were many farmers in three unions but only 96 respondents who were victims of traditional brickfields were considered for this study.
- The researcher relied on the data furnished by the respondent from their memory during interview.
- For some cases, the researcher faced unexpected interference from the over interested side-talkers while collecting data from the target populations. However, the researcher tried to overcome the problem as far as possible with sufficient tact and skill.

1.8 Definition of Related Terms

The terms which have been frequently used throughout the research work are defined and interpreted below:

Adverse effects of traditional brickfields on agriculture

Adverse effects referred to a change that was a result or consequence of an action or other causes. Adverse effects of traditional brickfields on agriculture referred to consequences of traditional brickfields on agricultural production.

Age

Age of a respondent defined as the span of his/her life and was operationally measured by the number of years from his/her birth to the time of interview.

Education

Education referred to the development of desirable knowledge, skill and attitude in the individual through reading, writing, and other related activities. It is measured in terms of successful schooling of individual respondent.

Family size

Family size of household was defined as the number of individuals in the family including himself , his wife, children and other dependent members who live and eat together.

Farm size

It referred to the area of land owned or by him/her on which farming activities are carried out. A respondent was considered to have full benefit from cultivated area either owned by him/her or obtained on share cropping system. The areas are estimated in terms of full benefit to the respondent farmers. The right of the farmers on the land taken on lease or mortgage from others was regarded as ownership in estimating the farm size.

Annual family income

Annual family income was defined as the total earning of the respondent and the members of his/her family from agriculture and other sources during a year.

Duration of facing brickfield effect

Duration of facing brickfield effect of a respondent referred to the years she/he was facing brickfield effect.

Agricultural farming experience

Agricultural farming experience of a farmer referred to the number of years a farmers actively involved in agricultural activities.

CHAPTER II
REVIEW OF LITERATURE

Review of literature gives the direction of the researcher to carry out the research program. So, the rationale of this Chapter is to review the literatures having consequence to the present study. This Chapter deals with a brief review of previous research studies relating to the Effects of traditional brickfields on agriculture or related matters. The relevant information regarding these effects of traditional brickfields on agriculture is limited in number. However, the researcher has tried his best to collect needful information through searching relevant studies. Unfortunately, few research works were found directly related to the effects of traditional brickfields on agriculture. The present research program is concerned with effects. So, directly related literatures were almost readily an available for this study. Therefore, the findings of such related studies and other partial related studies have been reviewed in this Chapter. The reviews are accessibly existed here based on the major objectives of the study. This Chapter consists of three sections. The first section deals with the effect of brickfields or related matters ; the second section deals with the research gap; and third section deals with the conceptual framework of the study.

2.1 Review of Literatures on Adverse Effects of Brickfields or Related Matters

Shama *et al.*(2022) conducted a study at Ashulia, Dhaka to determine heavy metal concentrations in the top soils and their adverse effects on the soil quality from active brick kilns. She reported that the soil sampling within the vicinity of the studied three brick kilns was performed at different radial distances ranging from 0 to 400 m during the brick production period. The concentration level of the analyzed heavy metal contents from the 15 sampling locations was found in the following order of iron > magnesium > calcium > manganese > zinc > nickel > chromium > copper > arsenic > lead > cadmium. The concentration level of

cadmium (mean 2.82 mg.kg−1) resulted to be very high than its threshold limit (1.40 mg.kg−1) in the majority of the sampling locations. A significantly high level of soil pollution was evaluated within the study area through the applied pollution evaluation indices. The study findings indicate prospective damage to the studied soil environment and ecological settings of Ashulia, due to the emissions from the brick kilns which require suggested emission control and soil remediation actions, and implementation of eco-brick manufacturing technologies without further delay.

Sarker *et al.* (2021) Conducted a study in Chittagong district of Bangladesh to explore the impact of emissions from brick kilns on crop yields from agricultural lands which were located at distances of 100, 101-500, 501-1000, and 1001-2000 m from brick kilns. The survey was conducted by using a semi-structured questionnaire during the period from January to March 2019. It also included soil sampling on farmlands located at distances of 0, 150, and 300 m from brick kilns to evaluate impact of brick kilns on the soil properties of agricultural fields. On the other hand, the impact of emissions from brick kilns on the yield of crops and fruits from agricultural lands and home gardens was tested at distances of 0.30 m. However, in practice, brick industries collect clay from depths of 0.9 to 2.4 m. For all distances of farmlands from brick industries to human settlements, the available P, K and MC in soil varied significantly. The farmland areas, soil fertilities, crop yields, and status of fruit production increased significantly while the quantity of fertilizers used in agricultural fields and periods of land leasing decreased with increasing distances from brick industries. These relationships affected attitudes, as people living further from brick industries were more positive towards these industries than people living closer to brick kilns.

Siddika *et al*. (2020) reported that most of the brickfields of the study area were located near agricultural lands and residential areas those were responsible for loss of agricultural production, fish cultivation, local community's health

problems and violation of environmental laws specifically Brick Burning Acts in great extent. Improving technology, development of policy and proper regulations of this act may be the best recommendation for the betterment of urban and rural environment.

Hossain, *et al.* (2019) conducted a study found that farmers reported adverse effect of brick kilns on homestead plantation and field crops. They also reported that bearing of fruit trees is hampered; immature fruits are damaged, less fruiting in vegetables. Capacity of the surveyed brick kilns was found ranged from 0.45 million to as high as 0.78 million bricks per year. The average capacity was 2.89 million bricks per year and the total production per annum were 31.70 million bricks. Bangladesh produces 50 billion bricks per year. Use of quality topsoil of agricultural land as raw material for bricks is a substantial environmental and economic concern as evidenced from results of brick kiln survey. The government decided to prohibit previously profitable brick exports to neighboring country India as per law of the lands, which was a competent decision.

Jerin *et al.*(2016) the study investigated environmental and socio-economic impacts of brick fields at Bagatipara upazila of Natore district, Bangladesh. A questionnaire survey was conducted with the selected community members living at or near brick field areas with aim to assess impacts of brick fields on air, water, soil, vegetation as well as socio-economic conditions. Findings of this study were based on randomly selected respondents' perception on change of any resource or condition. Crop loss, decreased soil fertility and subsequent reductions in crop production were reported. Trees around brickfields were dusted badly and water quality of nearby water bodies deteriorated because of emerged dust and ash from brick fields. Noticeable negative impacts on aquaculture were found. Except few, majority of the respondents were suffering from various diseases like eye irritation, skin diseases and respiratory problems.

Despite creating work opportunities for local people, brick fields of the study area adversely affected environment and social economy.

Talukder *et al.*(2015) studied on the impact and consequences of Brickfields on the environment and agriculture around 4km within a union of Badarganj upazilla under the Rangpur district, Bangladesh. Mentionaly the negative impact on arable land, agricultural crops, plants and trees were very serious and dangerous. Most of the people of the study area are either illiterate or less educated because of which, they are not aware of the negative impact of Brickfields. Brickfields were using topsoil from the nearby agricultural land for making bricks and consequently contributing to lower productivity and soil degradation which was in the complete violation of various environmental laws. Besides, Brickfields is producing black smoke and poisonous gaseous substances that contribute to air pollution seriously damaging agricultural crops, plants, and public life. This violation of environmental law is obviously a crime. This study also offered a few suggestions to check these hazardous impact caused by Brickfields.

2.2 Research Gap

Based on the review of literatures, mentioned in section 2.1 of the chapter, it was found that some studies tried to find out the heavy metal concentration in the surrounding area of brickfields, impact of emissions from brickfields, losses of agricultural production due to brickfields, adverse effects of brick kilns on homestead plantation and field crops etc. No literatures were found to find out the overall effects of traditional brickfields on agriculture regarding reducing top fertile soils, reducing crop production area, reducing biodiversity, reducing crop production, reducing local forest and trees area, reducing livestock production, reducing fisheries production and reducing poultry production.

2.3 Conceptual Framework of the Study

In scientific research, selection and measurement of variables constitute an

important task. The conceptual framework of Rosenberg and Hoveland (1960) was kept in mind while framing the structural arrangement of the variables. The present study tried to focus two concepts: the first, the selected characteristics of farmers and the second, effects of traditional brickfield on agriculture. In view of prime findings, the researcher constructed a conceptual framework of the study which is presented in Figure 2.1

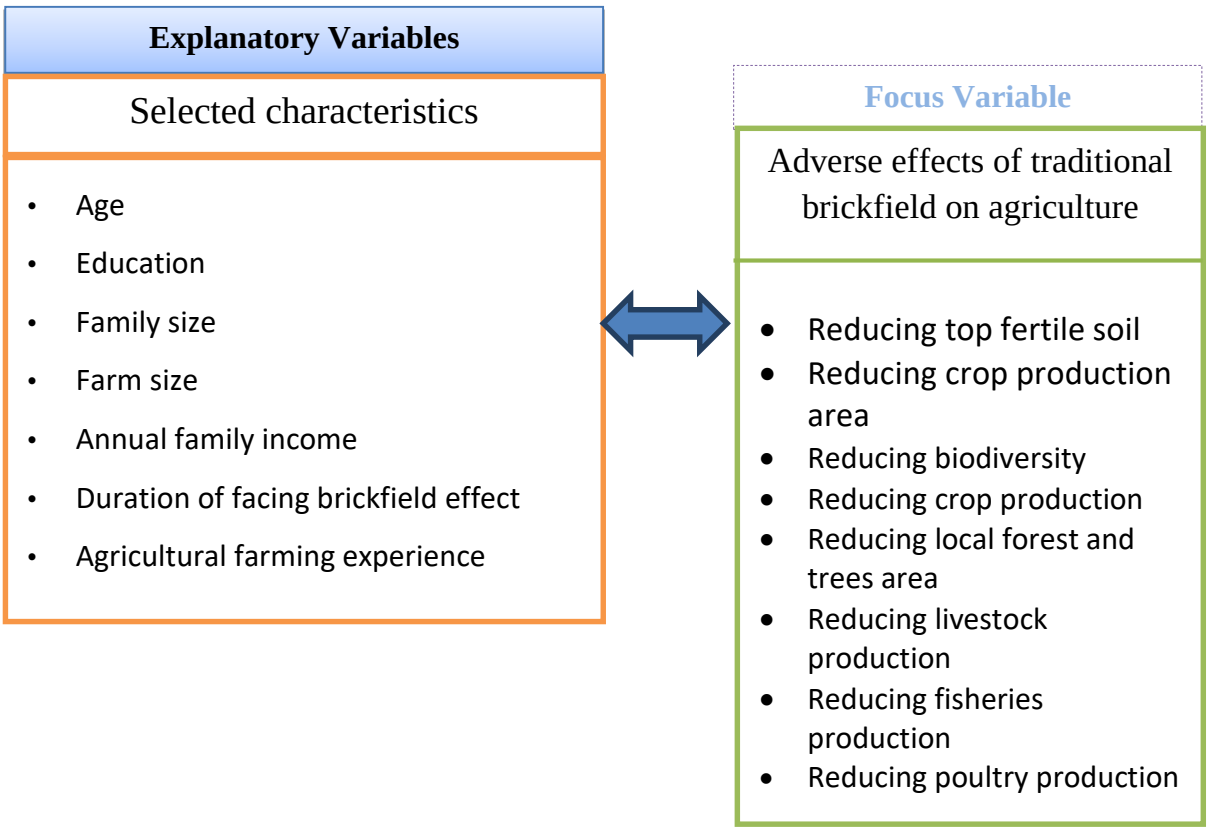

Figure 2.1 Conceptual framework of the study

CHAPTER III
METHODOLOGY

Methodology enables the researcher to collect valid information. It is impossible to conduct research work smoothly without proper methodology and it is very difficult to address the objectives with a scientific manner. It requires a very careful consideration on the part of the researcher to collect valid and reliable data and to analyze the same for meaningful conclusion. A sequential description of the methodologies followed in conducting this research work has been presented in this chapter.

3.1 Locale of the Study

The study was conducted purposively selected Sadarpur upazila under Faridpur district of Bangladesh. Three unions from this upazila namely Sadarpur, Bhashanchar and Dheukhali were also selected purposively as the locale of the study because there were a large number of brickfields in these unions. A map of sadarpur upazila showing sadarpur, Bhashanchar and Dheukhali unions were presented in Figure 3.1.

3.2 Population and Sampling Procedure

Separate lists of the farmers of the study unions were prepared by the researcher with the help of Sub-Assistant Agriculture Officers (SAAO) of the respective blocks of Sadarpur Upazila Agriculture Office. The lists comprised of 19988 famers which was considered as the population of the study. Among 19988 farmers, 96 farmers were determined as the sample size of the study by using 'Sample Size Calculator' developed by Creative Research System (1984) by taking 95% confidence level and 10 as confidence interval.

Figure 3.1 Map of Sadarpur Upazila showing the study unions

Sample was selected by using proportionate random sampling method from the population of the three selected unions by using random number generator apps. Ten (10) farmers were also kept in reserve lists and farmers of those lists were interviewed when the sample farmers were unable to contact at the time of interview.

Distribution of the population, sample and reserve list size are shown in Table 3.1.

Table 3.1 Distribution of the population, sample and reserve list size

Upazila	Unions	Population size	Samples size	Reserve list size
Sadarpur	Sadarpur	5157	25	3
	Bhashanchar	7876	38	4
	Dheukhali	6955	33	3
Total		19988	96	10

3.3 Development of Data Collecting Instrument

The face to face interviewing method was used for data collection. A structured interview schedule containing both closed and open form questions was prepared in this purpose. To finalize the interview schedule, following steps were followed:

Drafting questionnaire: After thorough consultation of relevant literatures and discussion with experts, a draft questionnaire was developed based on the objectives of the study.

Pre-testing: The questionnaire was pre-tested with 10 farmers from the population but excluded from the sample.

Finalizing interview schedule: Necessary corrections, modifications, additions and deletions were made on the pre-tested interview schedule based on pre-test results. Final interview schedule was then made and multiplied as much as necessary for data collection. English version of the interview schedule may be seen in Appendix-A of this thesis.

3.4 Data Collection Procedure

Data were collected from the selected 96 sample farmers by face to face interview by the researcher himself. Questions were asked systematically and explanations were made whenever necessary. The respondents were interviewed at their leisure time to get accurate information in a cool mind. The investigator faced no serious problems during the data collection period from the respondent farmers. To establish rapport with the respondents, the researcher endeavoured to provide trust interest and minimized status difference. Data were collected from the respondent farmers during the period from 15 November to 14 December, 2022.

3.5 Measurement of Adverse Effects of Traditional Brickfields on Agriculture

Adverse Effects of traditional brickfield on agriculture was the focus variable of the study. After thorough consultation with the relevant experts, advisory committee members and relevant literatures following items were considered to measure the perception of the farmers on the effects of traditional brickfields on agriculture:

- Reducing top fertile soil
- Reducing crop production area
- Reducing bio-diversity
- Reducing crop production
- Reducing local forest and trees area
- Reducing livestock production
- Reducing fisheries production
- Reducing poultry production

Respondent farmers were asked to indicate his/her level of perception on the effects of traditional brickfields on agriculture on each of the flowing items with

four alternatives responses with the flowing scoring system:

Nature of effects	Score assigned
No effective	0
Low effective	1
Medium effective	2
High effective	3

As eight statements were selected for the study, score of effects of traditional brickfields on agriculture of the respondents could range from 0 to 24, while 0 indicating no effects and 24 indicating the highest effects of traditional brickfields on agriculture.

3.6. Measurement of Standardized Effects Index

To compare item-wise effects of traditional brickfields on agriculture, Effect Index (EI) of each of the eight (8) selected items were measured by using the following items as used by Moonmoon (2021) and Malek (2021):

$$EI = f_h \times 3 + f_m \times 2 + f_l \times 1 + f_n \times 0$$

Where, EI = Effect Index

f_h = frequency of respondents faced high effect

f_m = frequency of respondents faced medium effect

f_l = frequency of respondents faced low effect

f_n = frequency of respondents faced no effect

Thus EI of the item could range from 0 to 288, where '0' indicated no effect and '288' indicated highest effect. Standardized Effect Index (SEI) of each item was measured by using the following formula:

$$SEI = \frac{\text{EI of the item}}{\text{Highest possible EI of the items}} \times 100$$

Where, Highest possible EI of the items = 3 × 96 =288.

Thus, SEI of the items could range from 0 to 100, where '0' indicated no effect and '100' indicated highest effect. Based on descending order of SEI, rank order was made to compare the effects among the items.

3.7 Measurement of Experimental Variables

For conducting the study, in accordance with the objectives, it was necessary to measure the experimental variables like age, education, family size, farm size, annual family income, duration of brickfield affection and agricultural farming experience. Procedures for measuring these variables are described below:

3.7.1 Age

Age of the farmers was measured in terms of actual years from his/her birth to the time of interview, which was found on the basis of the verbal response of the respondent farmers. A score of one (1) was assigned for each year of one's age.

3.7.2 Education

Education was measured as the ability of an individual respondent to read and write or the formal education received up to a certain standard. If a respondent did not attain formal education, his/her score was assigned as zero (0). A score of 0.5 was given to a respondent who only could sign his/her name. A score of one (1) was assigned for each year of successful schooling. If a respondent passed the S.S.C examination, his/her education score was given as 10.

3.7.3 Family size

Family size was operationally measured by assigning a score of one for each member of the family who jointly lived and ate together. The members included the respondent himself/herself spouse, wife, children and other dependent members.

3.7.4 Farm Size

Farm size of a respondent referred to his total area of land in terms of ownership

and benefit obtained from the land. It was measured in hectares using the following formula:

Farm size = A+B+1/2**(**C+D**)** +E

Where,

A = Homestead area including pond

B = Own land under own cultivation

C = Land given to others as half share basis (borga)

D = Land taken from others as half share basis (borga)

E = Land taken from others as lease

3.7.5 Annual family income

Annual family income indicates total earning of a farmer and the members of his/her family both from agriculture and other socially acceptable regular means such as business, service etc. during last year. The value of all the agricultural products encompassing crops, livestock, vegetables etc. were taken into consideration. For calculation, a score of one (1) was assigned for each one thousand (1000) taka of the annual income of a family

3.7.6 Duration of facing brickfield effect

Duration of facing brickfield effect was operationalized by counting the number of years a respondent faced brickfield effect. For each year of facing brickfield effect, one (1) score was assigned.

3.7.7 Agricultural farming experience

Agricultural farming experience was operationalized by counting the number of years a respondent actively involved in agricultural activities. For each year of experience, one (1) score was assigned.

3.8 Hypothesis

The following null hypothesis was undertaken for the present study. There was no significant relationship between each of the selected characteristics of farmers

with their perceived effects of traditional brickfield on agriculture. The selected characteristics were: age, education, family size, farm size, annual family income, duration of brickfield affection and agricultural farming experience.

3.7. Data Processing and Analysis

The collected raw data were examined thoroughly to detect errors and omissions. Having consulted with the research Supervisors, the Investigator prepared a detailed coding plan. In case of qualitative data, putting proper weight against each of the traits to transfer the data into quantitative forms followed suitable scoring techniques. Collected data for the study were compiled, recorded, tabulated and analyzed in accordance with the objectives of the study. Various statistical measures such as number and percentage distribution, range, mean, standard deviation and rank order were used in describing the variables of the study. Tables and figures were used in presenting data for clarity of understanding. The relationships between each of the selected individual characteristics of the farmers with their perceived effects of traditional brickfield on agriculture were estimated by using Pearson's Product Moment Correlation analysis with the help of SPSS (version 24) software. Five percent (0.05) level of probability was used for rejecting any null hypothesis. Coefficient of correlation values significant at 0.05 level is indicated by one asterisk (*) and that at 0.01 level by two asterisks (**).

CHAPTER IV
RESULTS AND DISCUSSION

In this chapter the findings of this study have been discussed in relation to the present findings with logical interpretation and compare with other relevant studies. The study investigated the effects of traditional brickfield on agriculture. In accordance with the objectives of the study, presentation of the findings has been made in four sections. The first sections deals with the extent of effects of traditional brickfield on agriculture. The second deals with the comparative severity among the effects items as perceived by the farmers, third section deals with the selected characteristics of the farmers and the fourth section deals with relationship between each of the selected characteristics of the farmers with their perceived effects of traditional brickfield on agriculture.

4.1 Adverse Effects of Traditional Brickfield on Agriculture

Adverse effects of traditional brickfield on agriculture was the focus variable of this study. Score of adverse effects of traditional brickfields on agriculture ranged from 6-22, against the possible range of 0 to 24 with the mean and standard deviation of 14.43 and of 4.20, respectively. On the basis of effects scores, the respondents were classified into three categories namely, low, medium and high effects. The distribution of the respondents according to effects under the study is given in Table 4.1.

Table 4.1 Distribution of the farmers according to their perceived adverse effects of traditional brickfields on agriculture

Categories (scores)	Respondents farmers	
	Number	Percent
Low effects (0-8)	3	3.1
Medium effects (9-16)	59	61.5
High effects (17-24)	34	35.4
Total	96	100.00

Table 4.1 indicates that among the respondents the highest proportion (61.5%) of the farmers perceived medium effects as compare to 3.1 percent perceived low effects and 35.4 percent perceived high effects of traditional brickfield on

agriculture. The result was quite logical which was supported by the studies of Hossain *et al.* (2019) and Sarker *et al*. (2021).This means that most of the farmers (96.9%) perceived medium to high effects of traditional brickfield on agriculture. Hossain *et al.*,(2019) revealed that farmers reported adverse effects of brick kilns on homestead plantation and field crops. Sarker *et al*. (2021) also found impact of emission from brick kilns on crop yields.

4.2 Item-wise Comparative Effects

The observed standardized Effects Index (SEI) of the items ranged from 26.73% to 97.97% against the possible range of 0-100.standardized Effects Index (SEI) of the selected items is shown in Table 4.2 with rank order.

Table 4.2 Rank order of Effects index

Problems	Numbers of farmers				EI	SEI	Rank order
	High	Medium	Low	Not at all			
Reducing top fertile soil	72	22	2	0	262	97.97	1
Reducing crop production area	58	34	4	0	246	85.41	2
Reducing biodiversity	49	34	12	1	225	78.12	3
Reducing crop production	38	43	14	1	214	74.30	4
Reducing local forest and trees area	23	52	20	1	193	67.03	5
Reducing fisheries production	3	18	38	37	83	28.81	7
Reducing livestock production	2	23	33	38	85	29.51	6
Reducing poultry production	2	26	19	49	77	26.73	8

On the basis of descending order of SEI, it was observed that “reducing top fertile soil” ranked first followed by “reducing crop production area”, “reducing biodiversity”, “reducing crop production”, “reducing local forest and trees area”, “reducing livestock production”, “reducing fisheries production”, and “reducing poultry production” as shown in Table 4.2. Jerin *et al*., (2016) also reported crop loss, decrease soil fertility and decrease agricultural activities due to impact of nearer brickfields.

4.3 Selected Characteristics of the Farmers

Seven characteristics of the farmers were selected for this research. The characteristics include: age, education, family size, farm size, annual family income, duration of facing brickfield effect and agricultural farming experience. Some descriptive statistics of these characteristics are given in Table 4.3. Data contained in the Table 4.3 reveal the salient features of the characteristics of the farmers in order to have an overall picture of these characteristics at a glance. However, for ready reference, separate Tables are provided while presenting categorizations, discussing and/or interpreting results concerning each of the characteristics.

Table 4.3 The salient features of the selected characteristics of the farmers

Categories	Measuring Unit	Range		Mean	S D
		Possible	Observed		
Age	Years	Unknown	24-80	51.67	11.75
Education	Year of schooling	”	00-16	4.51	4.49
Family size	Number	”	2-13	5.61	2.03
Farm size	Hectare	”	0.10-2.74	0.82	0.54
Annual family income	‘000’ Tk.	”	50-580	197.76	80.83
Duration of facing brickfield effect	Years	”	3-10	8.89	1.05
Agricultural farming experience	Years	”	2-63	27.99	13.45

4.3.1 Age

Age of the farmers ranged from 24 to 80 years, the mean being 51.67 years and the standard deviation was 11.75. According to age, the respondent were categorized based on the classification provided by the Ministry of Youth and Sports, Government of the People’s Republic of Bangladesh. The distribution of

the farmers according to their age is shown in Table 4.4.

Table 4.4 Distribution of the farmers according to their age

Categories	Farmers	
	Number	Percent
Young aged (up to 35 years)	9	9.4
Middle-aged (36-50 years)	42	43.7
Old (>50 years)	45	46.9
Total	96	100

Table 4.4 showed that the highest proportion (46.9) percent of the farmers were old, while 43.7 percent of them were middle aged and 9.4 percent of the farmers were young aged. The findings indicate that a large proportion (90.6) of the farmers were middle to old aged.

4.3.2 Education

The education scores of the farmers ranged from 0 to 16. The mean is 4.51 and the standard deviation is 4.49. On the basis of their education scores, the farmers were classified into four categories, namely illiterate (0-0.5), primary (1-5), secondary (6-10) and above secondary (above 10). This distribution was supported by Hoque (2016) and Masud (2007) and shown in the Table 4.5.

Table 4.5 Distribution of the farmers according to their education

Categories	Farmers	
	Number	Percent
Illiterate (0-0.5)	40	41.7
Primary level (1-5)	19	19.7
Secondary level (6-10)	30	31.3
Above secondary level (>10)	7	7.3
Total	96	100

Table 4.5 indicated that the majority (41.7 percent) of the farmers were illiterate compared to 7.3 percent of them had above secondary, 19.7 percent of the farmers had primary, while 31.3 percent of the farmers had secondary level of education. Thus, the majority (51.0 percent) of the farmers had primary to secondary level of education. Similar result was observed by Nasreen *et al.* (2013.

4.3.3 Family size

Family size scores of the fanners ranged from 2 to 13 with an mean of 5.61 and standard deviation of 2.03. According to family size, the respondents were classified into three categories as shown in Table 4.6.

Table 4.6 Distribution of the farmers according to their family size

Categories	Farmers	
	Number	Percent
Small family (up to 4)	32	33.3
Medium family (5-6)	56	58.4
Large family (above 6)	8	8.3
Total	96	100

Data contained in Table 4.6 indicates that (58.4%) of the farmers had medium family size 8.3 percent of them had large family and 33.3 percent of them had small family. Thus, the overwhelming majority (91.7 percent) of the farmers had small to medium family size which is consistent with national scenario.

4.3.4 Farm size

Farm size of the farmers ranged from 0.10 to 2.74 hectares and the mean is 0.82 hectares with standard deviation of 0.54. According to the farm size of the respondents, they were classified into three categories as suggested by DAE (1999) such as "marginal (up to 0.2)", "small (0.21-1.0)" and "medium (1.1-3.0)". The distribution of the farmers according to their farm size is shown in Table 4.7.

Table 4.7 Distribution of the farmers according to their farm size

Categories	Farmers	
	Number	Percent
Marginal farm (up to 0.2 ha.)	19	19.8
Small farm (0.21-1.0 ha.)	66	68.7
Medium farm (1.01-3.0 ha.)	11	11.5
Total	96	100

The Table 4.7 shows that highest proportion (68.7 percent) of the farmers had small farm size (68.7 percent) compared to 19.8 percent of them having marginal farm size and only 11.5 percent of them having medium farm size.

4.3.5. Annual family income

Annual family income score of the respondents ranged from 50 to 580 thousands taka with a mean of 197.76 thousands taka and standard deviation 80.83. On the basis of the observed scores, the respondents were classified into three categories as shown in Table 4.8.

Table 4.8 Distribution of the farmers according to their annual family income

Categories(Thousands Taka)	Farmers	
	Number	Percent
Low income (< 100)	10	10.4
Medium income (> 100- 300)	79	82.3
High income (>300)	7	7.3
Total	96	100

Data presented in Table 4.8 indicated that the highest proportion (82.3 percent) of the respondent had medium annual family income, while (10.4 percent) had low annual income and (7.3 percent) had high annual family income. Finding again revealed that overwhelming majority (92.7 percent) of the farmers had low to medium annual family income.

4.3.6. Duration of facing brickfield effect

The score of duration of facing brickfield effect of the farmers ranged from 3 to 10 years, the mean being 8.89 and standard deviation is 1.05. Based on duration of brickfield effect faced, the farmers were classified into three categories namely ‘low’, ‘medium’ and ‘high ‘duration. The distribution of the farmers according to their duration of facing brickfield effect is presented in Table 4.9.

Table 4.9 Distribution of the farmers according to their duration of brickfield affection

Categories **(Years)**	Respondents farmers	
	Number	Percent
Short duration (1-5)	1	1.0
Medium duration(5-8)	37	38.5
High duration (>8)	58	60.5
Total	96	100

Data contained in Table 4.9 indicate that majority (60.5 percent) of the farmers faced high duration effect, while 38.5 percent faced medium duration effect and 1.0 percent of the farmers faced short duration effect of brickfields.

4.3.7 Agricultural farming experience

Scores of farmers' about agricultural farming experience ranged from 2 to 63 years with a mean of 27.99 and standard deviation of 13.45. On the basis of farming experience, the respondents were classified into three categories as follows in Table 4.10.

Table 4.10 Distribution of the farmers according to their experience

Categories	Farmers	
	Number	Percent
Low experience ((<Mean-SD i.e. <14.54)	11	11.5
Medium experience (Mean±SD i.e.14.55-41.44)	21	21.8
High experience (>Mean+ SD i.e. >41.44)	64	66.7
Total	96	100

Data contained in Table 4.10 showing that 66.7 percent of the farmers had high agricultural farming experience, whereas 11.5 percent had low agricultural farming experience and 21.8 percent had medium agricultural farming experience. Experience in agriculture is helpful to increase knowledge, improve skill and change attitude of the farmers. It also builds confidence of the farmers for making appropriate decisions at the time of need. The findings of the present study again revealed that overwhelming majority (88.5 percent) of the farmers in the study area had medium to high agricultural farming experience.

4.3 Relationships between each of the Selected Characteristics of the Farmers and Their Perceived Adverse Effects of Traditional Brickfield on Agriculture

Coefficient of correlation was computed in order to explore the relationship between each of the selected characteristics of the farmers and their perceived effects of traditional brick field on agriculture. The selected characteristics

constituted the experimental variables and effects of traditional brick field on agriculture constituted the focus variable.

In order to determine the relationships each of the seven selected characteristics (explanatory variables) of the farmers viz. age, education, family size, farm size, annual family income, duration of brickfield affection, and agricultural farming experience with the focus variable i.e., perceived effects of traditional brick field on agriculture, Pearson's Product Moment Correlation was used. Co-efficient of correlation (r) has been used to test the null hypothesis concerning the relationship between the concerned variables. To reject or accept the any null hypothesis 0.05 level of probability was used. A statistically significant and non-significant relationship was observed when the computed value of "r" was greater or equal and smaller than the tabulated value, respectively.

From this correlation test, it was found that education, farm size, annual family income and agricultural farming experience of the farmers had positive significant relationship with their perceived effects of traditional brick field on agriculture. Beside these four (4) characteristics, rest three characteristics of the farmers (age, family size and duration of brickfield affection) had non-significant relationship with their perceived effects of traditional brick field on agriculture. Interco-relation among all the variables may be seen in Appendix-B.

The summery of the results of the Co-efficient of Correlation indicating the relationship between each of the selected characteristics of the farmers and their perceived effects of traditional brickfield on agriculture are shown in Table 4.11.

Table 4.11 Pearson's product moment co-efficient of the correlation showing Relationships between focus and explanatory variables

Focus variable	Explanatory variables	Tabulated value		Value of coefficient correlation with 94 df
		0.05	0.01	
Effects of traditional brick field on agriculture	Age	0.192	0.251	0.163^{NS}
	Education			0.226*
	Family size			-0.041^{NS}
	Farm size			0.257**
	Annual family income			0.257**
	Duration of facing brickfield effect			0.046^{NS}
	Agricultural farming experience			0.213*

* Significant at 0.05 level of probability

** Significant at 0.01 level of probability

4.4.1 Age and adverse effects of traditional brick field on agriculture

The computed value of 'r'(0.163) was smaller than that of the tabulated value (r=0.192) with 94 degrees of freedom at 0.05 level of probability as shown in Table 4.11. Hence, the concerned null hypothesis was accepted and it was concluded that age of the farmers had no significant relationship with their perceived effects of traditional brickfield on agriculture.

4.4.2 Education and adverse effects of traditional brickfield on agriculture

The coefficient of correlation between level of education and effects of traditional brick field on agriculture is presented in Table 4.11. The coefficient of correlation between the concerned variables was found to be 0.236. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study:

a. The observed coefficient of correlation (r = 0.236) value between the concerned variables was found to be greater than the tabulated value (r = 0.192) with 94 degrees of freedom at 0.05 level of probability.
b. The null hypothesis could be rejected.
c. The relationship between the concerned variables was statistically significant

at 0.05 level of probability.

d. The relationship showed a positive trend between the concerned variables.

Based on the above findings it was concluded that level of education of the farmers had significant positive relationships with their perceived effects of traditional brick field on agriculture. This represents that level of education of the farmers was an important factor in effects of traditional brick field on agriculture and with the increases of education, effects of traditional brick field on agriculture increases.

4.4.3 Family size and adverse effects of traditional brickfield on agriculture

The computed value of "r" (-0.041) was smaller than that of the tabulated value (r=0.192) with 94 degrees of freedom at 0.05 level of probability as shown in Table 4.11. Hence, the concerned null hypothesis was accepted and it was concluded that family size of the farmers had no significant relationship with their perceived effects of traditional brickfield on agriculture.

4.4.4 Farm size and adverse effects of traditional brickfield on agriculture

The coefficient of correlation between farm size and effects of traditional brick field on agriculture is presented in Table 4.11. The coefficient of correlation between the concerned variables was found 0.257. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study:

a. The observed coefficient of correlation value (r = 0.257) between the concerned variables was found to be greater than the tabulated value (r = 0.251) with 94 degrees of freedom at 0.01 level of probability.
b. The null hypothesis could be rejected.
c. The relationship between the concerned variables was statistically significant at 0.01 level of probability.
d. The relationship showed a positive trend between the concerned variables.

Based on the above findings it was concluded that farm size of the farmers had

significant positive relationship with their perceived effects of traditional brick field on agriculture. This represents that farm size of the farmers was an important factor in effects of traditional brick field on agriculture and with the increases of farm size of farmers effects of traditional brick field on agriculture also decreases.

4.4.5 Annual family income and adverse effects of traditional brickfield on agriculture

The coefficient of correlation between annual family income and effects of traditional brick field on agriculture is presented in Table 4.11. The coefficient of correlation between the concerned variables was found 0.257. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study:

a. The observed coefficient of correlation value (r = 0.257)between the concerned variables was

   Found to be greater than the tabulated value (r = 0.251) with 94 Degrees of freedom at 0.01 level of probability.

b. The null hypothesis could be rejected.
c. The relationship between the concerned variables was statistically significant at 0.01 level of probability.
d. The relationship showed a positive trend between the concerned variables.

Based on the above findings, it was concluded that annual family income had significant positive relationship with their perceived effects of traditional brick field on agriculture. This represents that annual family income of the farmers was an important factor in effects of traditional brick field on agriculture and with the increases of annual family income, effects of traditional brickfield on agriculture also increases.

4.4.6. Duration of facing brickfield effect and adverse effects of traditional brickfield on agriculture

The computed value of "r" (0.046) was smaller than that of the tabulated value (r=0.192) with 94 degrees of freedom at 0.05 level of probability as shown in Table 4.11. Hence, the concerned null hypothesis was accepted and it was concluded that duration of facing brickfield effect faced by the farmers had no significant relationship with their perceived effects of traditional brick field on agriculture.

4.4.7. Agricultural farming experience and adverse effects of traditional brick field on agriculture

The coefficient of correlation between Agricultural farming experience and effects of traditional brick field on agriculture is presented in Table 4.11. The coefficient of correlation between the concerned variables was found (0.213). The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study:

a. The observed coefficient of correlation value (r =0.213) between the concerned variables was found to be greater than the tabulated value (r = 0.192) with 94 degrees of freedom at 0.05 level of probability.
b. The null hypothesis could be rejected.
c. The relationship between the concerned variables was statistically significant at 0.05 level of probability.
d. The relationship showed a positive trend between the concerned variables.

Based on the above findings it was concluded that agricultural farming experience of the farmers had significant positive relationships with their perceived effects of traditional brick field on agriculture. This represents that Agricultural farming experience of the farmers was an important factor in effects of traditional brick field on agriculture and with the increases of Agricultural farming experience, effects of traditional brick field on agriculture increases.

CHAPTER V
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter deals with the summary of findings, conclusions and recommendations of this study.

5.1 Summary of Findings

5.1.1 Adverse effects of traditional brickfield on agriculture

Adverse effects of traditional brickfield on agriculture range from 6-22 against the possible range of 0-24 with the mean and standard deviation of 14.43 and of 4.20 respectively. The highest proportion (61.5 percent) of the farmers had medium effects as compare to 3.1 percent had low effects and 35.4 percent had high adverse effects of traditional brickfield on agriculture.

5.1.2 Item-wise comparative effects

Based on descending order of standardized effect index (SEI), it was observed that "reducing top fertile soil" ranked first followed by "reducing crop production area", "reducing biodiversity", "reducing crop production", "reducing local forest and trees area", "reducing livestock production", "reducing fisheries production" and "reducing poultry production" were the least adverse effects of traditional brickfield on agriculture.

5.1.3 Selected characteristics of the farmers

Age: The highest proportion 46.9 percent of the farmers were old, while 43.7 percent of them were middle aged and 9.4 percent of the farmers were young aged.

Education: The majority (41.7 percent) of the farmers were illiterate compared to 7.3 percent of them having above secondary. About 19.7 percent of the farmers were primary, while 31.3 percent of the farmers were secondary level of education.

Family size: The majority (58.4 percent) of the farmers had medium family while 8.3 percent of them had large family and 33.3 percent of them had small family.

Farm size: The highest proportion of the farmers had small farm size category (68.7 percent) compared to 19.8 percent of them having marginal farm size and only 11.5 percent of them having medium farm size.

Annual family income: The highest proportion (82.3 percent) of the respondent had medium annual family income, while (10.4 percent) had low annual income and (7.3 percent) had high annual family income.

Duration of facing brickfield effect: That majority (99.0 percent) of the farmers faced medium duration and 1.0 of the farmers faced short duration of brickfield effects.

Agricultural farming experience: The majority 66.7 percent of the farmers had high agricultural farming experience, whereas 11.5 percent had low agricultural farming experience and 21.8 percent had medium agricultural farming experience.

5.1.4 Relationships between each of the selected characteristics of the farmers and their perceived adverse effects of Traditional brickfield on agriculture

Education, farm size, annual family income and agricultural farming experience of the farmers had positive significant relationship with their perceived effects of traditional brick field on agriculture. Rest three characteristics of the farmers (age, family size and duration of brickfield affection) had no significant relationship with their perceived effects of traditional brick field on agriculture.

5.2 Conclusions

Conclusions drawn on the basis of the findings of this study and their logical interpretation in the light of the other relevant factors are furnished below:

- Most (96.9%) of the farmers perceived medium to high effects of traditional brickfields. Based on rank order the effects were reducing top fertile soil, reducing crop production area, reducing biodiversity, reducing crop production, reducing local forest and trees area, reducing fisheries production, reducing livestock production and reducing poultry production. Therefore it may there is need to stop this traditional brickfield or transfer it to eco-friendly brickfield to safe agriculture.
- There was positive significant relationship between farmers' education and their perceived and their perceived effects of traditional brickfield on agriculture. Therefore, it may be concluded that higher educated farmers perceived effects of traditional brickfield on agriculture.
- There was positive significant relationship between agricultural farming experience of the farmers and their perceived effects of traditional brick field on agriculture. Therefore, it may be concluded that farmers having higher agricultural farming experience perceived more effects of traditional brick field on agriculture in the study area.
- There was positive significant relationship between annual family income of the farmers perceived and their perceived effects of traditional brick field on agriculture. Therefore, it may be concluded that with the increase in annual family income of the farmers tends to increase their perceived effects of traditional brick field concluded that with the increase in farm size of the farmers tends to increase their extent of perceived effects of traditional brickfield on agriculture.

- There was positive significant relationship between farm size of the farmers and their perceived effects of traditional brick field on agriculture. Therefore, it may be concluded that with the increase in farm size of the farmers tends to increase their extent of perceived effects of traditional brickfield on agriculture.

5.3 Recommendations

5.3.1 Recommendations for policy implications

Recommendations Based on the findings and conclusions of the study following recommendations are made below:

- Most (96.9 percent) of the farmers perceived medium to high adverse effects of traditional brickfields, it may be recommended that traditional brickfields should be stopped or reduced by transferring to eco-friendly brick manufacturing to decrease the adverse effects of traditional brickfields on agriculture.

- Education, agricultural farming experience, annual family income, farm size of the farmers had significant positive relationship between with their perceived adverse effects of traditional brickfield on agriculture. Therefore, it may be recommended that motivational campaigning should be arrange to the lower educated. Lower experienced farmers having lower family income and low farm size, so that they could perceived actual adverse effects of traditional brickfields on agriculture.

5.3.2 Recommendations for further study

This study investigated effects of traditional brick field on agriculture by the perception of the farmers of Sadarpur upazila under Faridpur District. As a small and limited research has been conducted, the present study cannot provide much information related to this aspect. Further studies should be undertaken to cover more information in the relevant matters. So the following suggestions were put forward for further research:

1. It is difficult to determine the extent of effects of traditional brick field on agriculture. Measurement of effects of traditional brick field on agriculture of the farmers is not free from questions. More reliable measurement of concerned variables is necessary for further study.
2. The present study was conducted only in three unions of Sadarpur upazila under Faridpur district. Findings of the study need further verification through similar research in other parts of the country.
3. The study investigated the relationship of seven characteristics of the farmers with their perceived effects of traditional brickfield on agriculture. So, it is recommended that further study would be conducted with other variables.
4. Research should be undertaken on the effects of traditional brickfield on agriculture and other related organizations in helping farmers for effects of traditional brick field on agriculture.

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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

''ADVERSE EFFECTS OF TRADITIONAL BRICKFIELDS ON AGRICULTURE''

Name of the respondent: …… Serial No: ……

Union: ……..…… Mobile No:

.....

Village: ……..……..……

Please provide the following information. Your information will be kept confidential and will be used for research purpose only.

1. Age

How old are you? _____ years.

2. Level of education

Please mention your level of education.

a) I can't read and write.....

b) I can sign only.....

c) I have passed…….class.

3. Family size

How many members do you have in your family?.....

4. Farm size

Please mention the area of your land according to use.

Sl. No.	Type of land	Land area	
		Local unit	Hectare
A	Homestead land		
B	Own land under own cultivation		
C	Land given to others on borga		
D	Land taken from others on borga		
E	Land taken from others on lease		
Total= A+B+1/2(C+D) + E			

5. Annual family income

Please mention the amount of annual family income from the following sources.

a) Income from agricultural crops

SL. No.	Crop Name	Total Income
1.	Rice	
2.	Wheat	
3.	Maize	
4.	Jute	
5.	Potato	
6.	Pulse crop	
7.	Oil crop	
8.	Spice crop	
9.	Vegetables	
10.	Fruits	
Total		

b) Income from animals and fish resources

Sl. No.	Income resources	Total Income (Tk)
1.	Livestock	
2.	Poultry	
3.	Fish resources	
Total		

Total Income: a + b = ...

6. Duration of facing brickfield effect

How many years do you effected by brickfield?..... Years.

7. Agricultural farming experience

How many years are you engaged in agricultural farming?..... Years.

8. Adverse effects of traditional brickfield on agriculture

Please provide following information on the effects of traditional brickfield on agriculture as perceived by you:

Sl. No.	**Effect Items**	**Extent of effect**			
		High adverse effects (3)	**Moderate adverse effect (2)**	**Minor adverse effect (1)**	**No effect (0)**
1.	Reducing top fertile soil				
2.	Reducing crop production area				
3.	Reducing crop production				
4.	Reducing bio-diversity				
5.	Reducing fisheries production				
6.	Reducing livestock production				
7.	Reducing poultry production				
8.	Reducing local forest and trees area				

Thank you for your kind cooperation.

Dated:……. **Signature of the interviewer**

Appendix –B

Correlation matrix between explanatory variables and focus variable

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	Y
X_1	-							
X_2	-0.165	-						
X_3	0.223*	0.002	-					
X_4	0.087	0.121	0.447**	-				
X_5	0.020	0.030	0.313**	0.648**	-			
X_6	0.080	-0.167	-0.019	-0.060	-0.043	-		
X_7	0.742**	-0.150	0.115	0.065	0.021	0.138	-	
Y	0.163	0.236*	-0.041	0.257*	0.257*	0.046	0.213*	-

*Significant at o.o1 Level, **Significant at o.o5 Level

Legend

X_1 = Age

X_2= Education

X_3= Family size

X_4= Farm size

X_5= Farm Income

X_6= Effect duration

X_7= Farm Experience

Y = Effects of traditional brick field on agriculture