



Faculty of Science and Information Technology

Department of Environmental Science and Disaster Management

**Project (Thesis)**

**Impact of Brick Field on Environment, Socio-Economic, and Human  
Health at Dhamrai Upazila, Dhaka**

**Course code: ESDM 410**

**Course Title: Project(Thesis)**

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This report is being submitted to partially fulfill the requirements of the bachelor's degree of  
Science in Environmental Science and Disaster Management.

## DECLARATION

I thus certify that I, underneath the guidance of **Dr. A. B. M. Kamal Pasha**, Professor and Head of the Department of Environmental Science and Disaster Management at Daffodil International University, have prepared this project (Thesis) report. Furthermore, I certify that neither this project nor any portion of it has been submitted for consideration for a degree or diploma elsewhere.



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## LETTER OF APPROVAL

Md. Roni (ID:201-30-017) prepared this project report, which has been approved as a partial fulfillment of the Bachelor of Science in Environmental Science and Disaster Management degree requirements. Under my guidance, the students above finished their project work. They were earnest, diligent, and zealous during the research phase.



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## **Acknowledgment**

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## Abstract

This study examined brickfields' environmental, socio-economic, and human health impacts at Dhamrai upazila of Dhaka district, Bangladesh. Burning bricks pollute the environment, harm ecosystems, and emit greenhouse gases into the atmosphere. Deforestation and decreased crop productivity are among the short-term repercussions; ozone depletion, global warming, and declining land fertility are long-term effects. Because of their challenging working postures and large loads, brick kiln workers often have health problems. This study examines resource mapping, environmental change, socioeconomic situations, human health, and questionnaire surveys. It collects data from mobile apps, data management tools, and surveys. Regression and descriptive statistics are used in statistical analysis. An area map and questionnaire are used in the initial phase, along with primary and secondary data sources from books and unofficial conversations. Findings and research limits are examples of outcomes. According to the report, the brick industry is labor-intensive, has a moderate pay distribution, and most employees work 12 hours daily. Respiratory issues, skin conditions, and ocular irritation are noted among the respondents. Brickfields affect agricultural productivity and soil fertility. Toxic emissions caused by the world's fastest population growth in brick manufacture impact the environment, public health, society, and economy.

**Keywords:** Agriculture, Brickfields, Environmental Pollution, Socio-Economic Impact, and Human Health Ha

# Table Of Contents

<b>Contents</b>	<b>Page No.</b>
DECLARATION.....	i
LETTER OF APPROVAL.....	ii
Acknowledgment.....	iii
Abstract.....	iv
Table Of Contents.....	v
List of Figure.....	vii
<b>Chapter 1. Introduction.....</b>	<b>1</b>
1.1. Background.....	1
1.2. A Description of the Problem.....	2
1.3. The Importance of Research.....	2
1.4. Objectives.....	3
1.5. Literature Review.....	3
<b>Chapter 2. Methodology.....</b>	<b>5</b>
i. Human Health Assessment.....	6
ii. Socio-Economic Condition Evaluation.....	6
iii. Environmental Change Analysis.....	6
iv. Resource mapping Or FGD.....	6
v. Questionnaire Survey.....	7
vi. Data collection.....	7
vii. Data Processing.....	7
viii. Statistical Analysis (SPSS).....	7
ix. Outcomes.....	7
2.1. Study Area.....	8
<b>Chapter 3. Survey Instrument.....</b>	<b>9</b>
3.1. The questionnaire's construction:.....	9
3.2. Data collection procedures.....	9
3.3. Data processing and analysis.....	9
3.4. Data Collection.....	9
<b>Chapter 4. Result and Discussion.....</b>	<b>11</b>
4.1. Socioeconomic condition of brick field workers.....	11
4.2. Health risks with the vulnerability of brick field workers.....	18
4.3. Brickfield Effects on the Environment.....	21
i. Impact on the fertility of the soil.....	21
ii. Effect on agricultural production.....	21

iii.	Effects on vegetation.....	21
iv.	Air Pollution.....	22
4.4.	Findings.....	22
4.5.	Possible Remedies .....	22
<b>Chapter 5.</b>	<b>Conclusions.....</b>	<b>23</b>
<b>5.1.</b>	<b>Recommendations .....</b>	<b>24</b>
i.	Impact of Environmental .....	24
ii.	The Impact of Socio-Economic .....	24
iii.	Human Health Impact.....	24
iv.	Community Engagement and Collaboration.....	25
v.	Policy and Regulations.....	25
<b>5.2.</b>	<b>References .....</b>	<b>26</b>
<b>5.3.</b>	<b>Appendix.....</b>	<b>27</b>
i.	Survey Question Pattern Health.....	27
ii.	Survey Question Pattern Economy .....	28
iii.	Key Information Interview (Survey).....	29
iv.	Survey picture 1 .....	30
v.	Survey picture 2 .....	31
vi.	Survey picture 3 .....	32

<b>List of Figure</b>		
<b>Figure No.</b>	<b>Figure Title</b>	<b>Page No.</b>
Figure-1	Methodological framework	05
Figure-2	Diagram of the research area	08
Figure-3	Data Collection Map	10
Figure-4	Income and Expenditure	14
Figure-5	Relation between Family members and earning member	15
Figure-6	Main Task of Workers	16
Figure-7	Working Hour	16
Figure-8	Social Security at work	17
Figure-9	Distribution of respondents by Respiratory, skin disease, and an Eye irritation	18
Figure-10	Relation about disease, treatment, and brick authority to see	19
Figure-11	Facing or Dying Cancer	20
Figure-12	hydrocarbon and sulfur dioxide contamination surpasses the permissible standard for human health	20



## **Chapter 1. Introduction**

### **1.1. Background**

Brickmaking is a big business in Bangladesh, even though the government will not admit it. Because there is not enough stone debris, brickfield. Over the last ten years, more people have wanted bricks. The nation has around 8,000 brick kilns, including registered and unregistered ones (ILO, 2014). In addition to increasing pollution, burning bricks is harmful to ecosystems. Environmental impacts from brick kilns are immediate and widespread. Enumerates the chronic consequences of ozone depletion, global warming, photochemical smog, and diminished soil fertility. After 25 to 30 years of topsoil being removed for brick production, the land becomes fertile again. Total suspended particulate matter (TSP) or refers to all airborne aerosols and other particles smaller than 100 micrometers in diameter. A significant number of brick kilns in Bangladesh need to be constructed properly, which results in the incomplete combustion of coal (Ahmed, 2007). Carbon monoxide (CO) gases are produced when fuel burns are incompletely created, which increases the risk of heart disease. The fuel type used by brickfields is mainly dictated by availability. Most of the brick fields are found in rural areas. Lots of people, including kids, are toiling away in the field. The stooped postures that brick factory workers often experienced contributed to the prevalence of musculoskeletal disorders (Sajan et al., 2017a). They suffered numerous health issues as a result of working with heavy things for extended periods without resting. For example, monotonous duties and biomechanical variables, such as vibration and physical activity, add to the risk. Working in environments with high temperatures, dust, and particulate matter can harm workers' health, like those in Nairobi (Monga et al., 2012). Chronic respiratory and sicknesses experienced by brickfield workers. Mainly attributable to the smoke and dust. Working conditions and environmental factors heavily influence workers' health. This study examined how the participants' views of the local socioeconomic and ecological factors changed before and after the Brickfield. We hoped that by compiling this data, we might see if the brickfields positively or negatively impacted the study area's economic situation, aquaculture, and agriculture. Many in Bangladesh are concerned about the future of the country's economy, ecology, and population health due to the building industry's explosive growth, particularly the brick kiln sector. A large industry in the construction sector produces bricks, which both accelerates economic growth and significantly

contributes to environmental degradation. This study sheds light on the intricate relationships between brick field operations and the issues in Bangladesh. Brickmaking is both an essential and contentious industry in Bangladesh. Bangladesh is committed to achieving a careful equilibrium between conflicting goals of fostering economic development and preserving the natural world. Various sectors, including construction, chemicals, manufacturing, transportation, and textiles, have positively and negatively impacted people's well-being, ecological balance, and financial stability. These sectors are essential to the economy because they guarantee the economic security of businesses and nations, increase GDP, and improve living standards. However, these industries also harm the economy, the environment, and health. All forms of life are negatively impacted by the erosion of soil and ozone layers, the loss of resources, and economic instability caused by these sectors (Sajan et al., 2017a). Bangladesh does not think the construction industry (CI) needs more research, even though most countries try to reduce CI's negative impacts (Mazumdar & Goswami HOD, 2018). The brick industry thrives in many countries, such as China, Bangladesh, Pakistan, and India.

## **1.2. A Description of the Problem**

This study analyzes health, economic, and environmental issues that brickfield workers in Dhamrai Upazilla face.

The following are the main issues faced by brick kiln workers:

- Much work is to be done for the rainy season.
- Pay is low, and there are no bonuses or gifts.
- Lack of water, mud, and clay.
- Uncovered by a worker's insurance policy.
- There is no social security at work.

## **1.3. The Importance of Research**

This research analyzes the health issues and economic impact that brickfield workers face. Many different kinds of research have been done on brickfields' health risks and environmental pollution; however, researchers have not looked into the health issues and economic impact brickfield workers in Dhamrai Upazilla face. In this sense, the current study closes the research gap and becomes more critical.

## 1.4. Objectives

\* Analyze the current socioeconomic status of the labor force in the study area's brick manufacturing sector. Determine the area of concern's current environmental and socioeconomic issues.

\* To determine the study area's health risk issue.

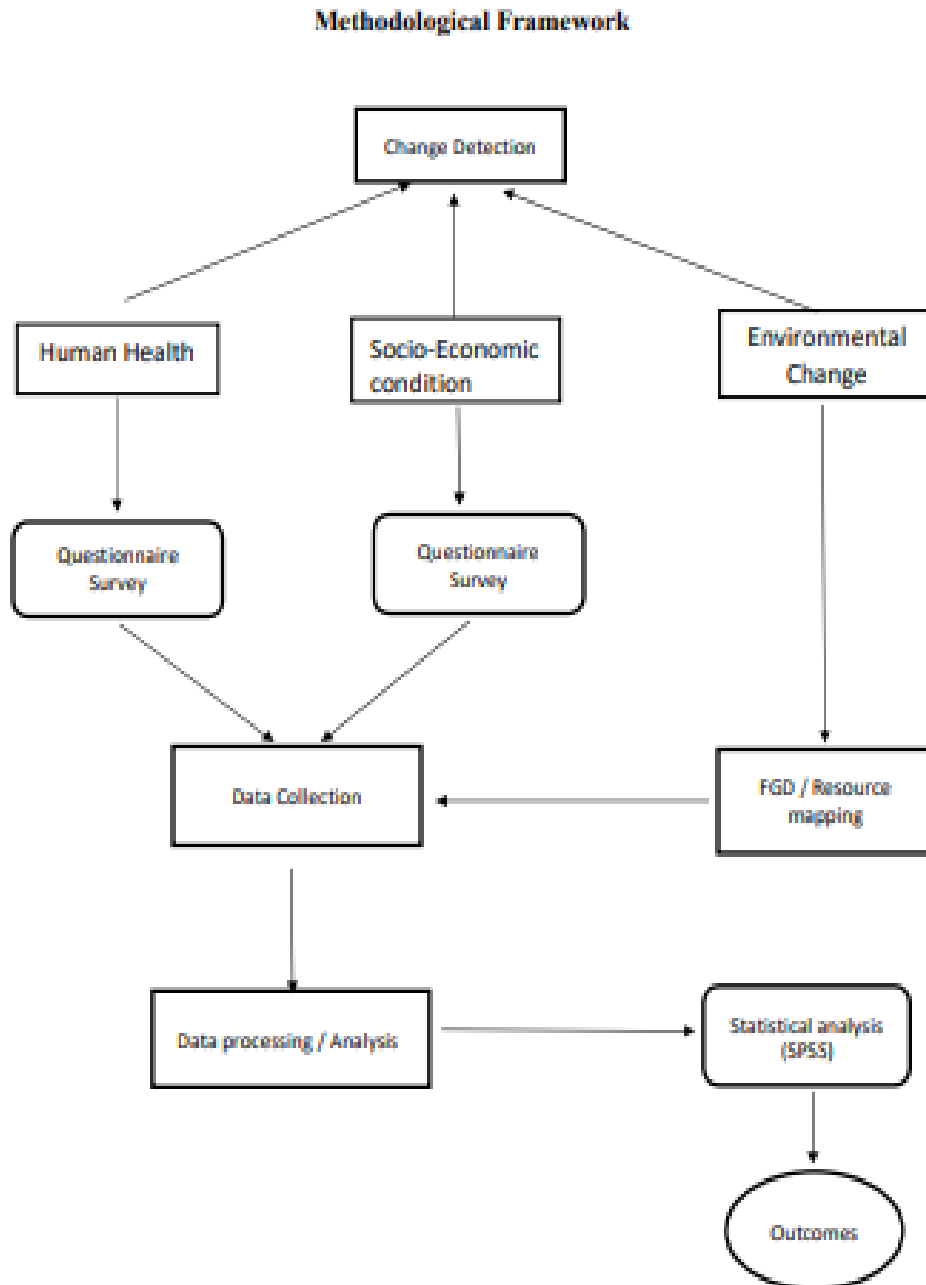
## 1.5. Literature Review

Approximately 8,000 brick fields are established in Bangladesh without proper environmental regulations (The Financial 2013's Express). Roughly 25–26% of the nation produces about 18 billion bricks annually in Bangladesh. It emits many particulate matter and hazardous gases that harm the environment (Saha and Hosain, 2016). So, we can say that bricks are one of the most essential building materials. Bangladesh's brick industry contributes significantly to air pollution by releasing large amounts of carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), and particulate matter into the atmosphere.

According to studies by Hossain et al. (2020) and Rahman et al. (2019), brick kilns are primarily to blame for Bangladesh's air pollution, which results in poorer air quality, the development of smog, and respiratory ailments. Additionally, brick kilns use a lot of wood and topsoil, which depletes natural resources and exacerbates ecosystem disruption, soil degradation, and deforestation. Uncontrolled topsoil excavation causes agricultural productivity to fluctuate and leads to land subsidence, creating long-term environmental problems. The primary ingredient in bricks is soil, to which additional ingredients are added to boost strength. For a certain amount of time, the bricks are fired in a brick field (Khan et al., 2019). The purpose of the study was to compare the socioeconomic and environmental aspects that respondents saw before and after brickfields were established (Thirupathi & Anthonisamy, 2015), besides, all around them. Information that emerged was anticipated to show the advantages or disadvantages of the brickfields, on socioeconomic issues, agriculture, and aquaculture state of the research area. Since the brick industry continues to be a key player in the construction sector, this study aims to understand how brick field activities affect.

Bangladesh thoroughly. Through an analysis of the complex relationships between environmental conservation and economic growth, the project hopes to provide insightful information that will help shape policy and promote sustainable building methods in Bangladesh. Employing millions of people and producing millions of dollars, the brick industry is vital to Bangladesh's economy. On the other hand, brick field emissions have significant socioeconomic effects. Brick kilns hurt nearby communities, as evidenced by research by Islam et al. (2021), which includes social disintegration, job loss, and displacement. Further aggravating poverty and food insecurity in rural areas is the environmental damage that brick fields cause to agricultural yields. Air pollution from brick kiln emissions severely threatens the surrounding community's health. Demonstrates that getting up close to brick fields is linked to a high risk of respiratory problems like asthma, bronchitis, and lung cancer. The well being problems of air contamination are particularly harmful to children and the elderly because of their higher mortality rates and lower quality of life.

## Chapter 2. Methodology



**Figure 1:** Methodological Framework

**i. Human health assessment**

- a. Determining essential health metrics, including life expectancy, disease prevalence, and death rates.
- b. Data gathering from surveys, public health records, and healthcare facilities.
- c. Examining historical patterns to comprehend shifts in health status.
- d. Consider diet, lifestyle choices, hygienic conditions, and healthcare accessibility. They integrated focus groups and interviews with qualitative data to understand community perspectives.

**ii. Socio-Economic Condition Evaluation**

- a. Analysing socioeconomic data, such as housing circumstances, employment rates, income levels, and educational attainment.
- b. The application of household surveys, economic reports, and census data.
- c. Evaluation of differences and unfairness among various demographic groupings.
- d. Examination of social mobility, poverty incidence, and access to essential services. They are using participatory techniques to help communities identify opportunities and challenges related to socioeconomic status.

**iii. Environmental Change Analysis**

- a. Assessment of environmental factors, including biodiversity, water and air quality, and land use patterns.
- b. Tracking the effects of climate change, such as variations in temperature, precipitation patterns, and extreme weather occurrences.
- c. Analysis of human-caused environmental deterioration factors like pollution, deforestation, and habitat loss.
- d. Interacting with local communities and environmental stakeholders to learn about their perspectives and worries about environmental change.

**iv. Resource mapping Or FGD**

- a. identify sources that are pertinent to health and wellness.
- b. To create use of local databases, satellite imagery, and GIS.
- c. Evaluate the adequacy and accessibility of resources.

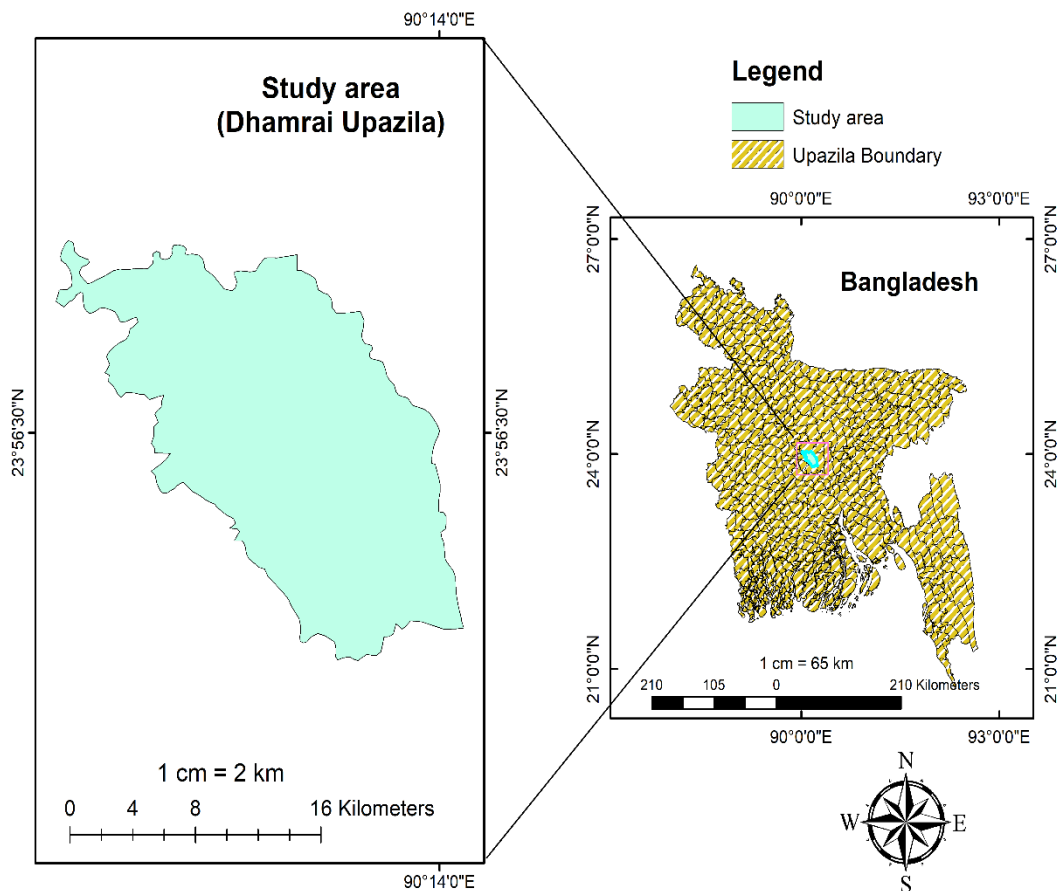
- v. Questionnaire Survey**
  - a. instruments for surveys designed with research goals in mind.
  - b. Surveys are pilot-tested for relevance and clarity.
  - c. Use different channels to administer surveys (e.g., in-person, online).
  - d. Assure informed consent and confidentiality.
  
- vi. Data collection**
  - a. Primary data sources.
  - b. Employees are responsible for gathering data.
  - c. Technology (such as mobile apps and sensors) for effective data collection.
  
- vii. Data Processing**
  - a. Data gathered should be cleaned and organized.
  - b. Set uniform variables and formats.
  - c. Take care of any incorrect or missing data points.
  - d. For efficiency, use data management software.
  
- viii. Statistical Analysis (SPSS)**
  - a. Suitable statistical techniques, such as regression analysis and descriptive statistics.
  - b. Data analysis with SPSS or a related program.
  - c. Analyze data in light of research theories.
  - d. Test the significance of the relationships between the variables.
  
- ix. Outcomes**
  - a. Clearly and understandably present findings.
  - b. Talk about the consequences of practice and policy.
  - c. Draw attention to research gaps and limitations.

An area map was created in the preliminary stage using the base map as a guide, and a topic was chosen. A pre-designed structure questionnaire has already been prepared. Various references and data regarding the study area's brick fields are gathered during this stage. A structural questionnaire administered to local respondents was the basis for an intermediate stage perception study. A systematic random sampling technique has been used. Primary and secondary data are both used in this study. Informal discussions with workers in the brick field served as the primary source of data collection. The price of establishing a brick field and justification for that expense were

the topics of discussion. Books, journals, and newspapers were the sources of the secondary data. Various cartograms have been used to represent processed data graphically.

## 2.1. Study Area

Dhamrai covers 307.41 sq km (118.69 sq mi) and is located at 23.9179° N and 90.1546° E. Farming employs 35.03 percent more people in this region than in any other sector. As per 2011 Bangladesh census, 412,418 people called Dhamrai Upazila home out of 94,776 households. Of these, 81,402 (19.74%) were children younger than 10. Dhamrai had a lower literacy rate than the national average of 51.8% among adults (those aged seven and up), with 992 out of 1000 males being literate. Nearly one-third, or 60,802 individuals, made their homes in urban areas. An area of 23,000 hectares is under cultivation, with an additional 220 hectares being farmed intensively. The research was carried out close to a Dhamrai brick field, as shown in Figure 1.



**Figure 2:** Diagram of the Research Area



## **Chapter 3. Survey Instrument**

The principal method of data collection in this study is a survey. The researchers drew on a semi-structured survey to obtain primary data from the target population. A questionnaire with some open-ended questions was used to collect data for the study.

### **3.1. The questionnaire's construction:**

This survey aimed to gather information about the socioeconomic conditions and health risks brick field laborers face in the study area. A total of eighteen surveys were sent out to collect this data. Several operational and statistical factors are taken into account when designing the questionnaire. These factors include the needed data types, how the data will be collected, the unit the respondents will need to process and tabulate, and how well the data will be collected about their capacity. At the time of the interviews, each participant completed a questionnaire by hand.

### **3.2. Data collection procedures**

For this study, semi-structured interviews make sense because employees are constantly busy and supervised by senior employees and supervisors. For these reasons, a self-employed, semi-structured questionnaire with relevant questions regarding the study's goals has been used.

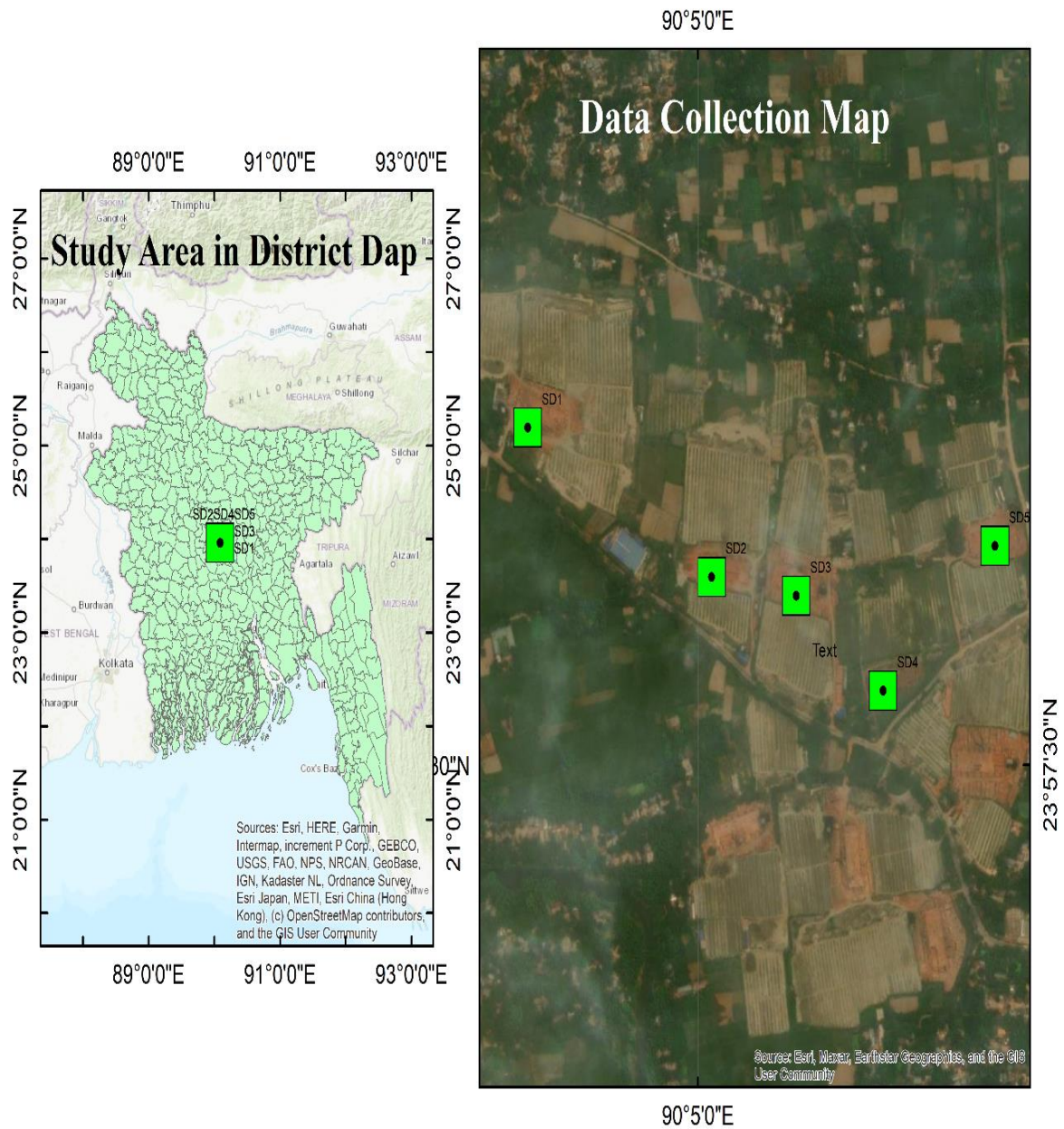
### **3.3. Data processing and analysis**

The data was evaluated using SPSS and MS Excel (Version 2019). The data was summarised using detailed statistical information, including percentages and frequencies. Driven by data An aspect of the analysis of smoking characteristics included calculating the standard deviation and mean.

### **3.4. Data Collection**

A survey questionnaire was the principal data collector and was sent to brickfield workers and locals. Seventy study region residents were randomly selected to fill out the survey. Field observation led to the discovery of five brickfields in the vicinity. The survey was conducted in this study region, specifically in these brickfields and the surrounding area. We examined the participants' occupations, incomes, health, and housing situations to assess Brickfield's societal and economic impacts. Soil changes, including those to fish productivity, vegetation, fertility, air and water quality, and

agricultural output, were considered when assessing the effects of Brickfield, according to how respondents found them after the construction of the fields. References for this study came from a wide range of secondary sources, including scholarly publications, online resources, and daily national newspapers.



**Figure 3: Data Collection Map**

## Chapter 4. Result and Discussion

### 4.1. Socioeconomic condition of brick field workers

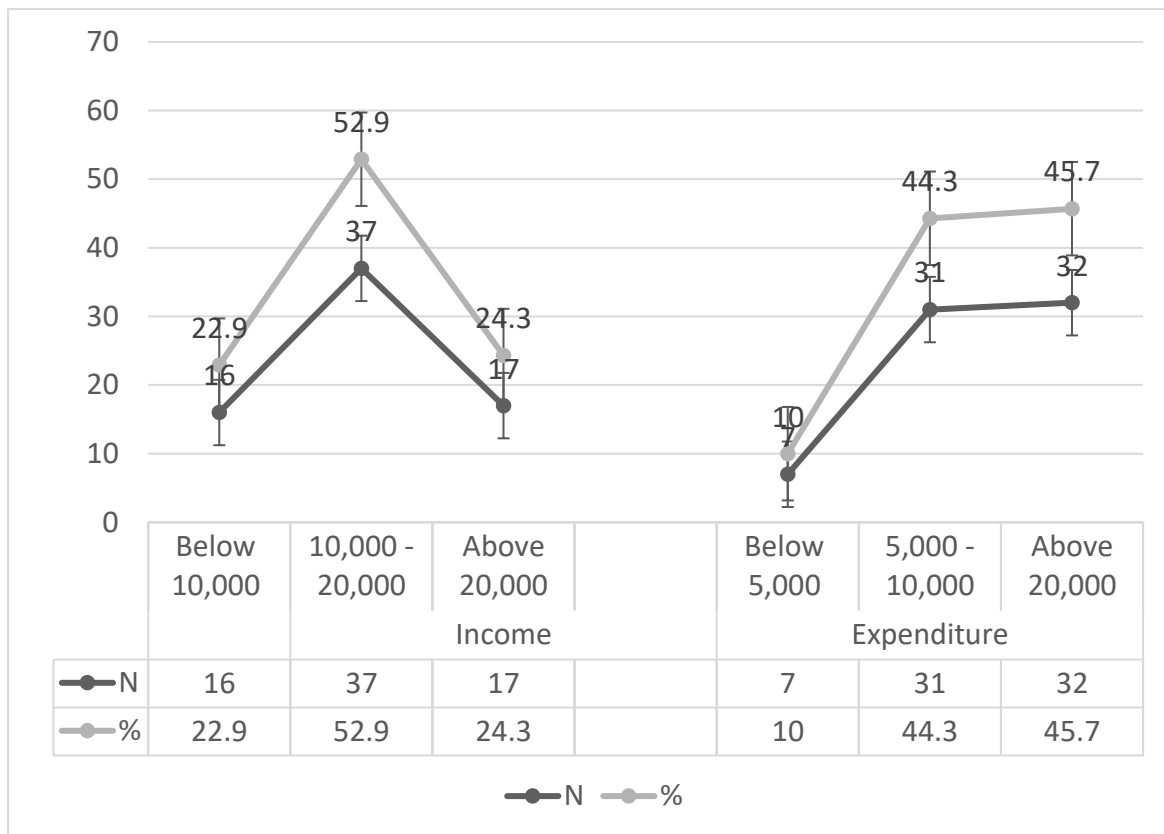
Many of the population has a moderate income, as 52.9% of respondents fall into the bracket of 10,000 BDT to 20,000 BDT per year. While 24.3% of the sample earns over 20,000 BDT per year, 66.3% earn less than 10,000 BDT. It shows that there is a wide range of incomes. The spending pattern indicates that a considerable portion of the revenue goes towards living expenses, as 45.7% of respondents spend more than 20,000 BDT. A substantial number of respondents (44.3%) indicated that they spent between 5,000 BDT and 10,000 BDT, suggesting that the levels of spending by respondents are modest. Families have five or more members. Fifty percent of households only have one breadwinner, which could indicate that some family members are struggling with unemployment or dependency issues. Brickmaking is labor-intensive, with physical labor accounting for 31.4% of the total and raw material preparation for 34.3%. Ensuring the efficacy and quality of brick manufacture is equally dependent on the quality control percentage (7.1%) and maintenance percentage (14.3%). Tracking and packaging (30%) and record-keeping (18.6%) are crucial brick manufacturing steps requiring a well-structured workflow and documentation. Important mixing and blending tasks add 17.1% to the production process. Workdays in the brick manufacturing sector are long, as most respondents (71.4%) put in 12 hours. While some work 10 hours per week (14.3%), fewer than 10% work 8 hours (8.6%), and 5.7% work 6 hours. Safety training (65.7% of all types) and entrepreneurial education (34.3%) are the two most popular forms of professional development. Many (55.7%) still need social security, raising concerns regarding healthcare access and financial security. Respondents' low and moderate incomes, as shown by their spending habits and income distribution, shed light on their socioeconomic status. Larger families and the prevalence of single earners highlight possible difficulties in providing for home needs and maintaining financial stability. Brick manufacture is a labor-intensive process, and extended work hours add to the risk to worker health, welfare, and tiredness. Putting more emphasis on safety training will improve working. Condition and lower occupational dangers. Interventions are necessary to guarantee financial protection and access to healthcare services because a sizable minority of respondents do not get social security. The consequences of these findings for labor

rights, occupational safety precautions, poverty alleviation, and sustainable development initiatives in the brick production sector should be further studied and debated.

Policy ideas and actions to resolve the socio-economic and occupational issues should be investigated further to improve the well-being of brick production workers and communities. Brickfield workers' socioeconomic circumstances mirror systemic injustices and exploitation in the unorganized labor market. Governments, companies, and civil society organizations must work together to address these issues and guarantee these vulnerable workers fair compensation, secure working conditions, social service access, and legal protections. Likewise, programs that support education and skill development can enable brick field workers to escape the cycle of poverty and enhance their standard of living.

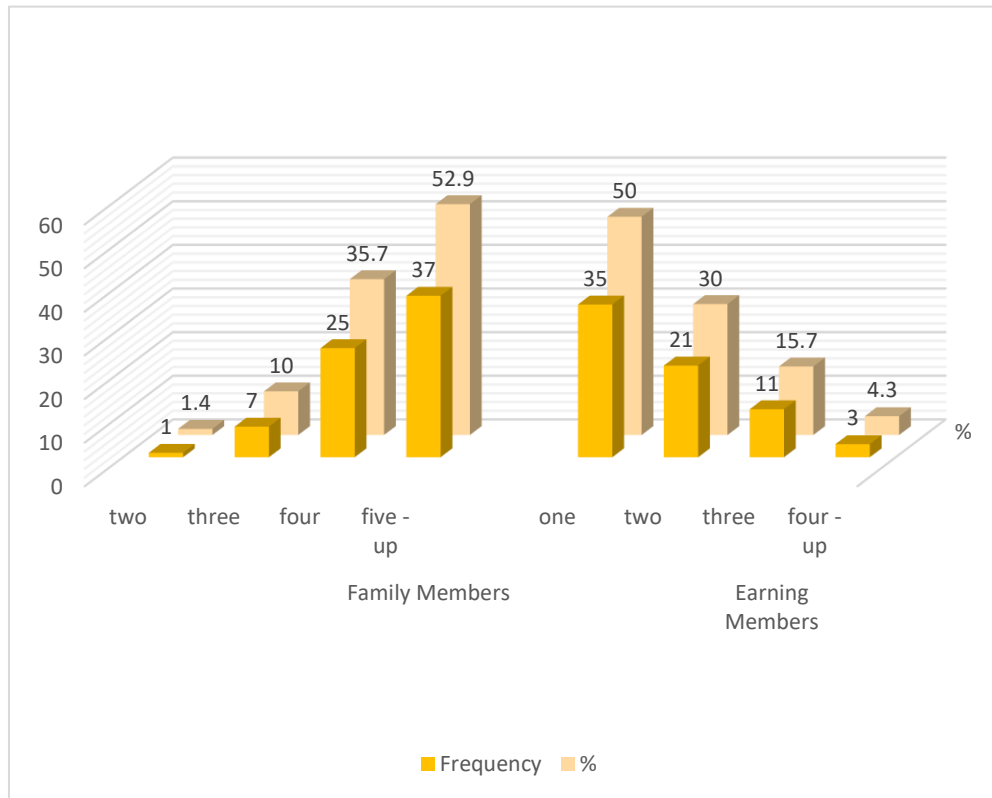
*Table- 1 the respondents of distribution through income, expenditure, household member, Earning member, social security, types of work, how many hours, professional development (N = 70)*

<b>Variables</b>		<b>Frequency</b>	<b>%</b>
Income	Below 10,000	16	22.9
	10,000 -20,000	37	52.9
	Above 20,000	17	24.3
Expenditure	Below 5,000	7	10
	5,000-10,000	31	44.3
	Above 20,000	32	45.7
Family Members	Two	1	1.4
	Three	7	10
	Four	25	35.7
	Five-Up	37	52.9
Earning Members	One	35	50
	Two	21	30
	Three	11	15.7
	Four-Up	3	4.3
Main Task	Brick production	26	37.1
	molding/Firing	7	10
	Quality control	5	7.1
	Maintenance	10	14.3
	Physical Labor	22	31.4
Types of Work	Raw material Preparation	24	34.3
	Record Keeping	13	18.6
	Stacking & Packaging	21	30
	Mixing and blending	12	17.1
Working hours	6 hours	4	5.7
	8hours	6	8.6
	10hours	10	14.3
	12hours	50	71.4
professional development	Certificate	0	0
	Continuing education	0	0
	Entrepreneurship	24	34.3
	Safety training	46	65.7
Social security	Yes	31	44.3
	No	39	55.7



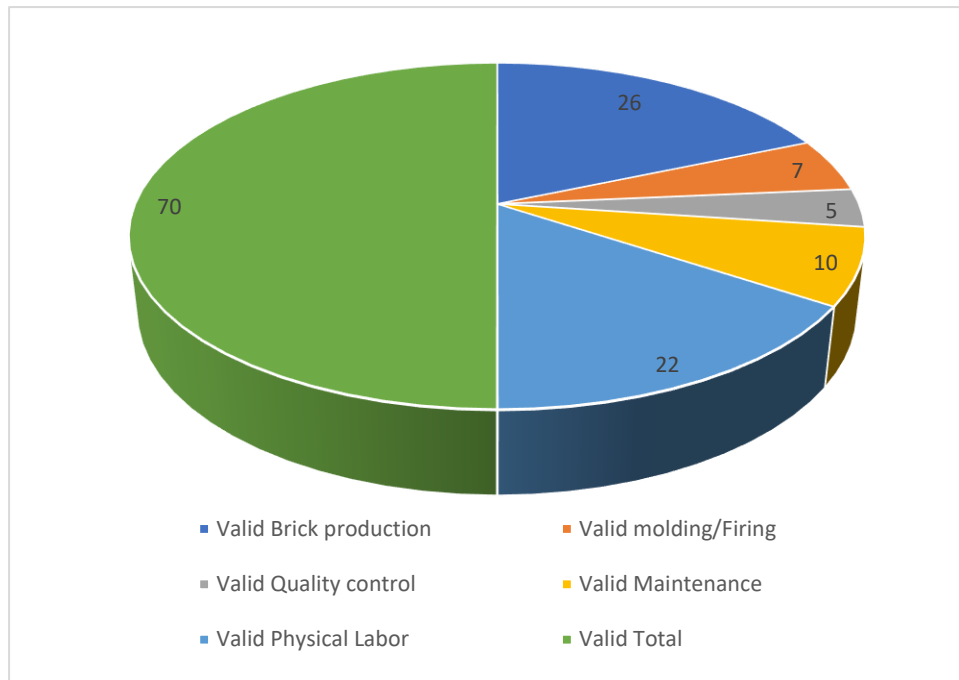
**Figure 4: Income and Expenditure**

As shown by the correlation coefficient of 0.560. Given that the creation is statistically significant at the 0.05 level and the relevance level is 0.000, it's highly improbable that the two are coincidental. We have 70 samples (N) for revenue and expenditures.

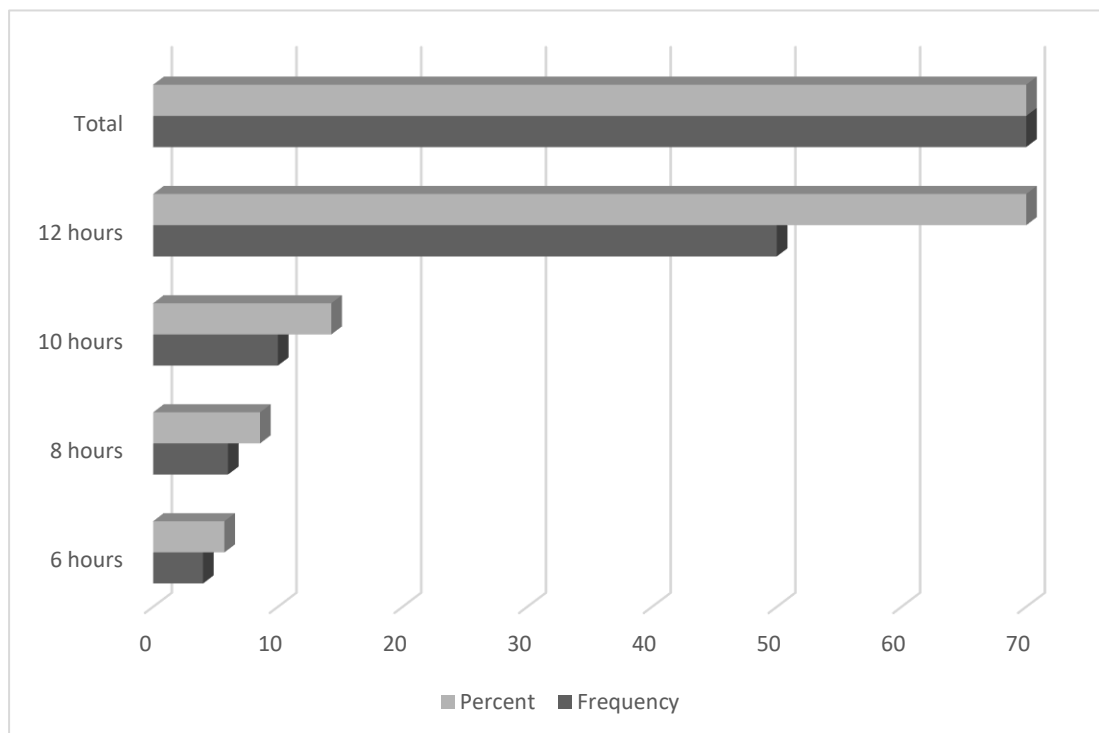


**Figure 5:** Relation between Family members and earning member

The correlation coefficient 0.012 indicates a fragile positive linear relationship between income and daily hours worked. The correlation does not meet the standard significance level of 0.05, as evidenced by the p-value of 0.924. In other words, more than the available data is needed to disprove the alternative hypothesis that there is no correlation between daily work hours and income. Overall, provided information indicates no apparent correlation between the income of the individuals surveyed and the number of hours they work daily.

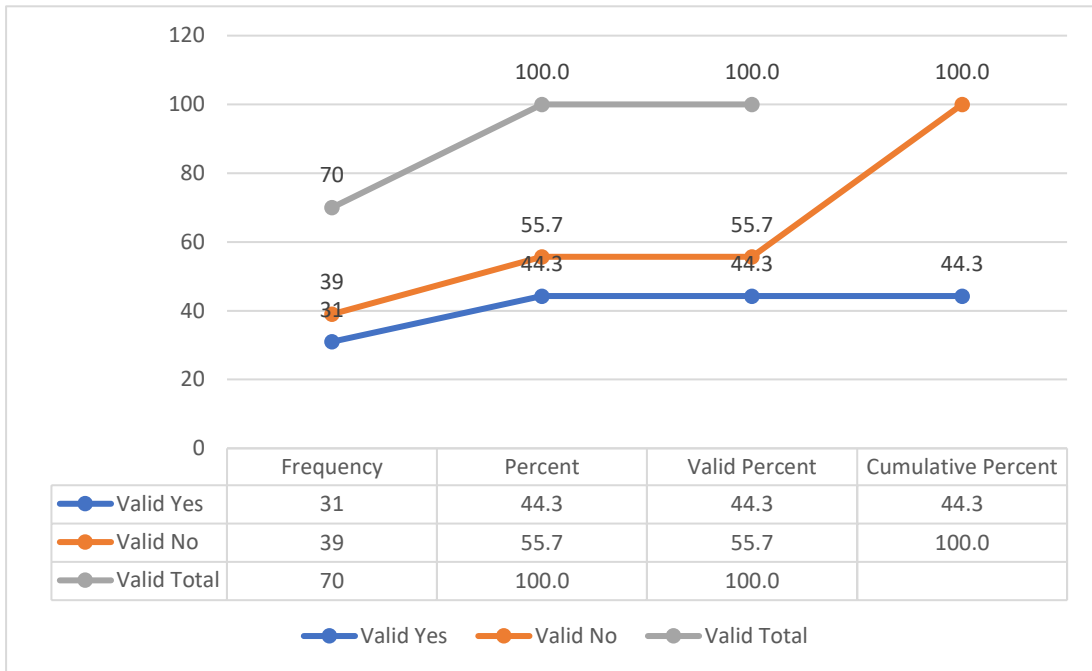


**Figure 6: Main Task of Workers**



**Figure 7: Working Hour**

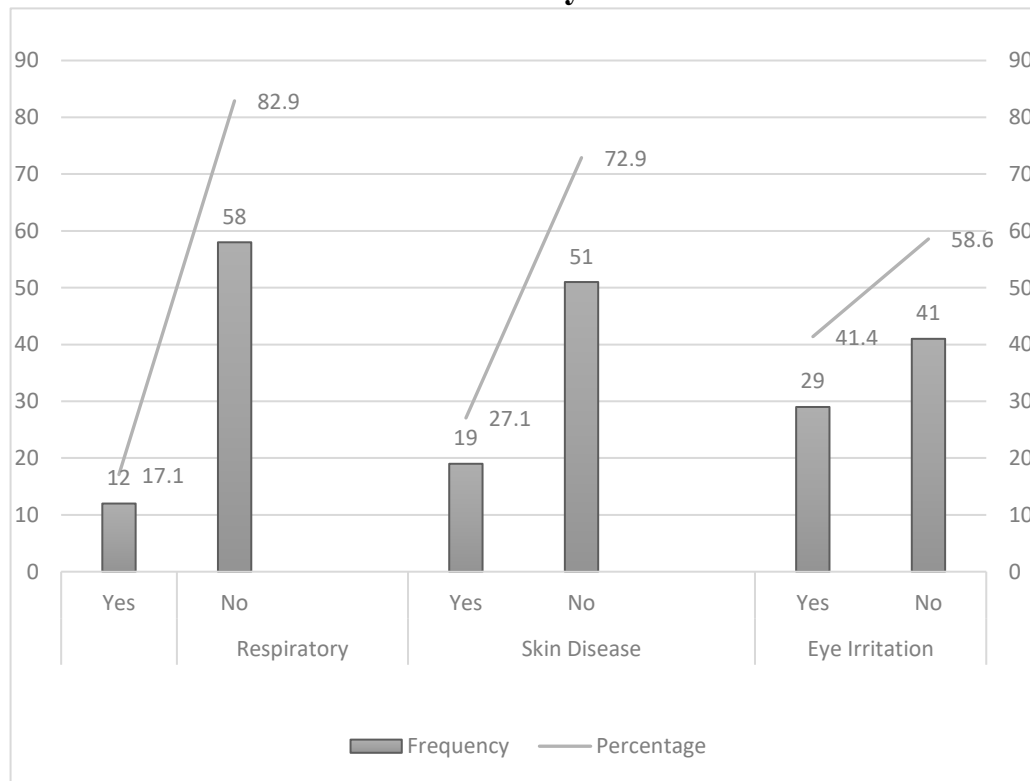




**Figure 8: Social Security at work**

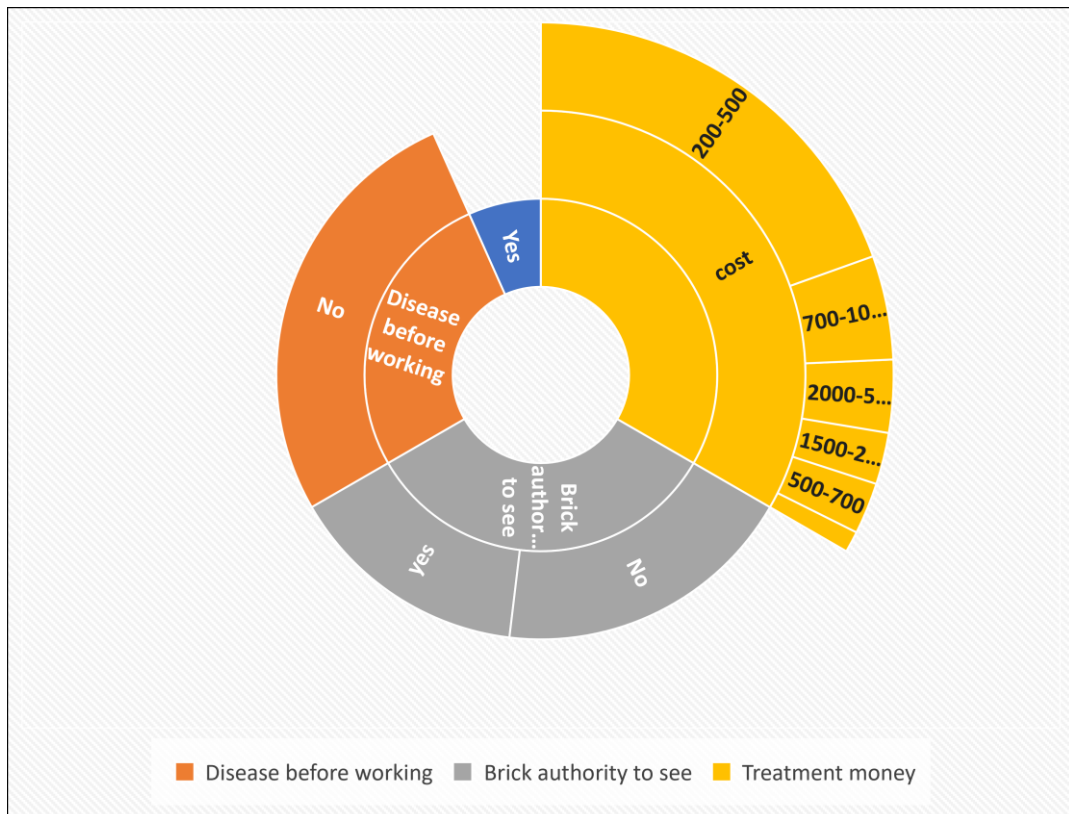
According to survey results, 44.3% of participants said they receive social security benefits at work, while 55.7% do not. According to this distribution, a sizable section of the sample population may not be eligible for social security payments through their place of employment. Social Security benefits significantly influence employees' retirement planning, financial security, and general well-being. Employers who offer social security benefits to their staff members frequently provide retirement plans, health insurance, disability benefits, and other types of financial support as part of their safety net.

## 4.2. Health risks with the vulnerability of brick field workers



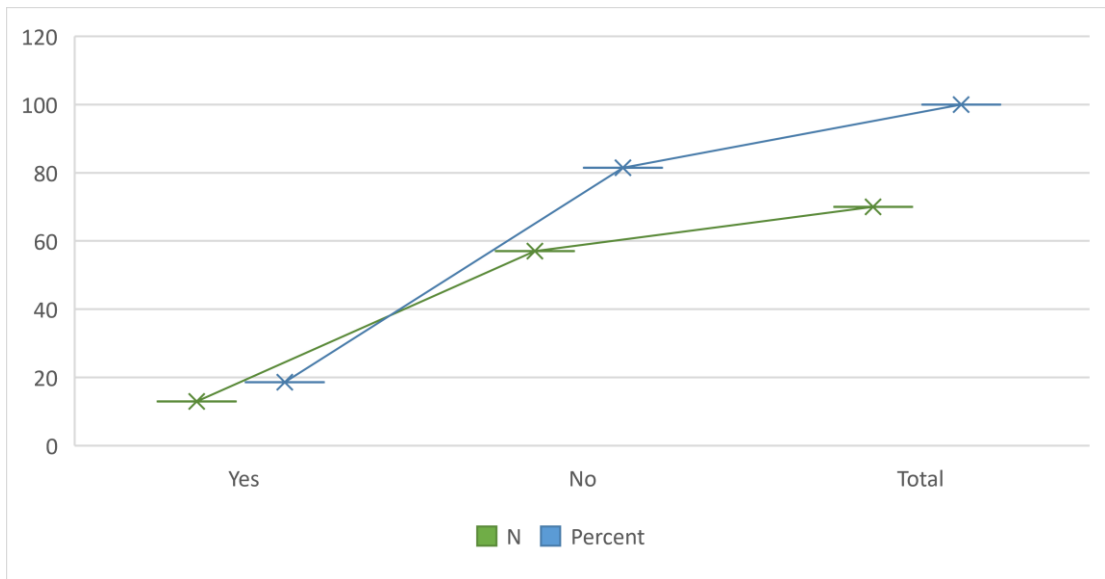
**Figure 9:** Distribution of respondents by Respiratory, skin disease, and Eye irritation

Of all the respondents, 17.1% said they had respiratory problems, whereas the majority (82.9%) said none. Approximately 27.1% reported having skin diseases, whereas the majority (72.9%). The most significant percentage (41.4%) said they had eye irritation, while 58.6% said they had no such problems. The present study offers valuable perspectives on the frequency of these variables in the population under investigation. Among the variables listed, eye irritation is the most frequently reported problem, followed by skin conditions and respiratory problems. Remembering that there may be limited room for further interpretation without an additional context about the variables and the surveyed population is essential.

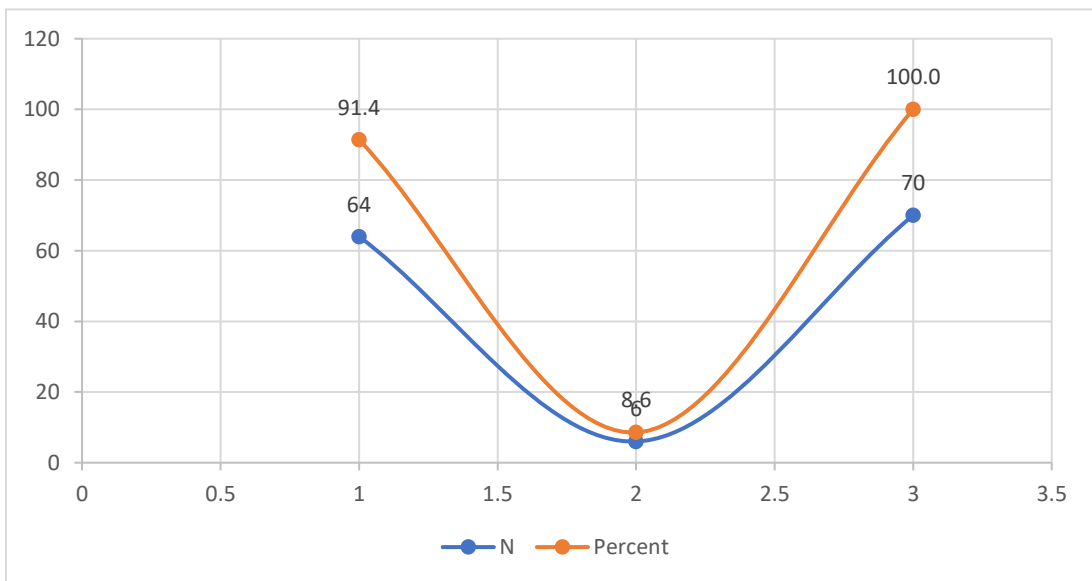


**Figure 10:** Relation between disease, treatment, and brick authority to see

Only 20% of the sample's members have ever had the disease, with the remaining 80% not having any history. The data suggests possible differences in susceptibility or exposure, as a sizable portion of the sample population does not have a history of the disease. One noteworthy finding is that, of the population, 44.3% have access to brick authority for consultation, compared to 55.7% who do not. Access to brick authority for consultation is spread relatively evenly, with a slightly higher percentage having such access. This may indicate different degrees of referral networks or healthcare infrastructure. There is a significant variation in treatment costs, with some individuals paying higher fees, up to 5000 units. Most treatments (58.6%) are within the 200- 500 unit range. Most treatment costs fall within a lower cost range, indicating variability in the distribution of costs. On the other hand, the existence of more expensive treatments raises the possibility of differences in the accessibility of healthcare or the range of options available to patients. To guarantee equitable healthcare access and affordability, the data offers insights into history, access to medical consultations, and treatment costs. It also highlights potential areas for additional research and intervention.



**Figure 11: Facing or Dying Cancer**



**Figure 12: hydrocarbon and sulfur dioxide contamination surpasses the permissible standard for human health**

### **4.3. Brickfield Effects on the Environment**

#### **i. Impact on the fertility of the soil**

Approximately 80% of respondents agreed that brickfields substantially influenced agricultural productivity and soil fertility. The individuals who responded were the proprietors. The emission of ash and black smoke from brickfields resulted in the pollution of adjacent agricultural regions, leading to crop destruction. In contrast, 8% of participants believed there was no impact on soil fertility, whereas 12% reported experiencing only minor effects. Furthermore, as per agricultural department in the upazila, there has been a recent decline in agricultural production near the Brickfield area. Soil burning leads to a reduction in pH, an elevation in sand content, and a decrease in clay content. It profoundly impacts soil's chemical, biological, and physical properties, leading to a sharp decline in soil productivity and fertility.

#### **ii. Effect on agricultural production**

A small percentage of respondents, 30%, thought brickfields had no bearing on agricultural output. 70% of the majority claimed that the emission of black smoke was to blame for the decline of agricultural production. A few years ago, all kinds of crops and vegetables could grow on some of the nearby lands, which was another point raised by some farmers. However, crop productivity decreased after the brick kiln was installed close to that crop field. Throughout the survey, we witnessed firsthand how overuse of the topsoil had rendered many agricultural lands unfit for growing any crop.

#### **iii. Effects on vegetation**

The majority of respondents (79%) claimed that brickfields had a significant impact on agricultural production, which was declining over time due to lower production and poor development, various illnesses, etc.) on plants (fruits and vegetables), and 12% of respondents said that brickfields had a negligible impact on the vegetation, while 9% said they were unaware of any adverse effects.

#### **iv. Air Pollution**

The study area had visible air pollution because of dust and emissions from brickfields. Trees with their leaves covered were discovered in certain residential areas, with dust from the fields of bricks. Acute air pollution in those areas caused many people to suffer from different respiratory diseases.

#### **4.4. Findings**

Significant conclusions have been drawn from the long-term study, which included a field survey. Consider the fact that many married women work in brick kilns. The workers' offspring are mainly illiterate, as well. There is a significant migrant labor force. The worker's family's annual and monthly income must be increased to support them. They primarily engaged in agricultural activities while the brick kiln was closed. The kilns employ women workers because of their severe poverty. Making bricks and molding soil entails the majority of laborers. Furthermore, every brick field in this research area negatively influences the environment.

#### **4.5. Possible Remedies**

- The current situation can be improved by following these steps:
- To overcome the issue level, careful planning must be implemented.
- It should be suggested that proper regulations be implemented to end child labor.
- The brick kiln's infrastructure needs to be upgraded.
- Implementing an equal wage system for male and female workers should be necessary.
- When collecting sand and soil from the riverbank, the brick field must adhere to specific scientific procedures to monitor riverbank erosion and land degradation.
- Brickfields would have to collect soil from the fallow or wasteland instead of fertile agricultural land.
- Assistance from the government is imperative in mitigating the adverse effects caused by the brick field.

## Chapter 5. Conclusions

The study emphasizes the substantial adverse effects brickfield workers in Bangladesh face on the environment, the socioeconomic system, and their health. The industry, essential to the construction sector, carries several risks, such as low pay, long hours, and no social security benefits. Common health problems include skin conditions, respiratory disorders, and irritation of the eyes. Deterioration of soil fertility and decreased agricultural productivity are examples of environmental effects. Thorough planning, rules, infrastructure improvements, fair wage structures, and conscientious soil collection techniques are among the recommendations.

The rapid increase in population is causing brick manufacturing to increase daily all over the world. Increased production of toxic emissions that are detrimental to the nation's economy, society, environment, and public health resulted from this increase in brick manufacturing. According to the study, most of the brickfields in the study area were close to residential areas and agricultural lands, which contributed to the loss of the health issues facing the local community, fish farming, and agricultural production. In addition, brickfields were thought to be the leading cause of the area's topsoil degradation and environmental pollution. The state of the brick kiln industry, since the workers' living conditions are not subpar, they face numerous health risks. All employees are compelled to perform their tasks by hand for brief periods, frequently resulting in severe or minor mishaps. They are negatively impacted both physically and psychologically as a result of multiple injuries and severe health issues. There needs to be a better setup for workers' living quarters, hygienic restrooms, nutritious food, and pure drinking water.

## **5.1. Recommendations**

### **i. Impact of Environmental**

- To Encourage greener technologies for making bricks, like hybrid Hoffman kilns or Zigzag kilns, which use less energy and produce fewer pollutants.
- To reduce air and water pollution, enforce stringent emissions and waste disposal laws from brickfields.
- Encourage reforestation and afforestation initiatives to counteract the deforestation brought on by brick manufacturing.
- Use appropriate waste management techniques in brick fields to reduce solid waste production and shield water and soil from contamination.

### **ii. The Impact of Socio-Economic**

- Supply brick industry workers with alternative livelihood opportunities using job placement and skills training programs.
- To aid in the shift to cleaner and more sustainable livelihoods, small-scale loaning and credit facilities should be made more accessible.
- Investing in small-scale businesses and agricultural projects will encourage entrepreneurship and the diversification of local economies.
- Social safety nets and welfare initiatives should be strengthened to assist marginalized communities impacted by the shift away from brick production.

### **iii. Human Health Impact**

- Conduct routine health assessments and monitoring programs for brick field workers and the surrounding communities to identify and address health risks.
- Give people access to medical facilities and services, such as treatment and preventative measures for respiratory conditions and other illnesses linked to the production of bricks.
- Increase public awareness of the health risks associated with brick manufacturing by implementing community outreach and education campaigns.



- Encourage implementing bricklaying occupational safety and health regulations to shield employees from dangerous materials and unsanitary working environments.

#### **iv. Community Engagement and Collaboration**

- Encourage cooperation between public and private sectors and execute all-encompassing solutions that tackle the various issues that brick manufacturing presents.
- Give impacted communities a voice in decision-making and give them the tools they need to actively participate in programs designed to lessen the adverse effects of brick production.
- Encourage discussion and knowledge-sharing forums to share experiences, the finest practices, and lessons discovered in addressing the health, socioeconomic, and environmental problems related to brickfields.

#### **v. Policy and Regulations**

- To guarantee that labor and environmental regulations are followed in the brick industry, regulatory frameworks, and enforcement tools should be strengthened.
- To encourage brick manufacturers to adopt cleaner production technologies and practices and create incentives and disincentives.
- Review and update policies and procedures regularly to reflect changing opportunities and challenges in the brick manufacturing industry.

To implement these suggestions, various parties involved must coordinate their efforts, including local communities, governmental organizations, firms, and civil society organizations. By tackling brickfield ecological, financial, and medical consequences in Dhamrai Upazila, Dhaka, we can construct a more resilient and sustainable future for everybody.

## 5.2. References

- Jerin, M., Mondol, S., Sarker, B., Rimi, R., & Aktar, S. (2017). Impacts of Brick Fields on Environment and Social Economy at Bagatipara, Natore, Bangladesh. *Journal of Environmental Science and Natural Resources*, 9(2), 31–34. <https://doi.org/10.3329/jesnr.v9i2.32148>
- Khan, M. W., Ali, Y., De Felice, F., Salman, A., & Petrillo, A. (2019). Impact of brick kilns industry on the environment and human health in Pakistan. *Science of the Total Environment*, 678, 383–389. <https://doi.org/10.1016/j.scitotenv.2019.04.369>
- Mazumdar, M., & Goswami HOD, H. (2018). *Brick Industry as a Source of Pollution-Its Causes and Impacts on Human Rights: A Case Study of Brick Kilns of Palasbari Revenue Circle*. <http://www.thecho.in>
- Sajan, D., Md., S. Q. H., Rumana, A., Sumaiya, H., Sumana, K., Md., Z. H. G., & Mohammad, S. (2017a). Socioeconomic conditions and health hazards of brick field workers: A case study of Mymensingh brick industrial area of Bangladesh. *Journal of Public Health and Epidemiology*, 9(7), 198–205. <https://doi.org/10.5897/jphe2017.0927>
- Sajan, D., Md., S. Q. H., Rumana, A., Sumaiya, H., Sumana, K., Md., Z. H. G., & Mohammad, S. (2017b). Socioeconomic conditions and health hazards of brick field workers: A case study of Mymensingh brick industrial area of Bangladesh. *Journal of Public Health and Epidemiology*, 9(7), 198–205. <https://doi.org/10.5897/jphe2017.0927>
- Sajan, D., Md., S. Q. H., Rumana, A., Sumaiya, H., Sumana, K., Md., Z. H. G., & Mohammad, S. (2017c). Socioeconomic conditions and health hazards of brick field workers: A case study of Mymensingh brick industrial area of Bangladesh. *Journal of Public Health and Epidemiology*, 9(7), 198–205. <https://doi.org/10.5897/jphe2017.0927>
- Thirupathi, T., & Anthonisamy, M. (2015). *Impact Factor: 5.2 IJAR*. 1(10), 266–269. [www.allresearchjournal.com](http://www.allresearchjournal.com)

### 5.3. Appendix

#### i. Survey Question Pattern Health

#### APPENDIX A

##### Questionnaire of Human Health Survey

##### Demographic Information

Category:	( )Mining ( )Periphery ( ) Residential-Urban/Rural
Name of the respondent:	
Age:	
Gender:	
Village:	

1. Do you face any physical / health related problem?

a) Yes                      b) No

2. Do you have any respiratory problem?

a) Yes                      b) No

c) If yes, how many years.....

3. Do you have any skin disease?

a) Yes                      b) No

c) If yes, what kind of .....

4. Eye irritation problem ?

a) Yes                      b) No

5. How much money to spend on treatment?.....

6. Brick factory authorities see you?

a) Yes                      b) No

7. Did you have this disease before working here?

a) Yes                      b) No

8. Any of your family members is facing or dying cancer?

a) Yes                      b) No

9. Do you believe that hydrocarbon & Sulphur dioxide contamination surpasses the permissible standard for human health?

a) Yes                      b) No

## ii. Survey Question Pattern Economy

Respondent Name	Respondent No	Village / Para	
<b>Case Study 1</b>			
<b>Social Economy</b>			
1. How much your income is?			
i) Below 10,000	ii) 10,000 -20,000	iii) Above 20,000	
2. How much expenditure do you have?			
i) Below 5,000	ii) 5,000-10,000	iii) Above 20,000	
3. How many family members do they have?			
i) 2	ii) 3	iii) 4	iv) 5-Up
4. How many of them are earning members?			
i)1	ii) 2	iii) 3	iv) 4-up
5. What's the main task?			
i) Brick production ii) molding/Firing iii) Quality control iv) Maintenance v) Physical Labor			
6. What type of work do they have to do?			
i)Raw material Preparation			
ii) Record Keeping			
iii) Stacking & Packaging			
iv) Mixing and blending			
7. How many hours do they work daily??			
i) 6 hours	ii) 8 hours	iii) 10 hours	iv) 12 hours
8. Are there opportunities for professional development?			
i)Certificate ii) Continuing education iii) Entrepreneurship iv) Safety training			
9. Is there social security at work?			
i)Yes	ii) No		

### iii. Key Information Interview (Survey)

#### Department of Environment

#### Key Information Interview (KII)

Type of Organization :

Goal of the Organization :

1. Do you face any health-related Problems?

.....

2. What effect does the emission of the brick field have?

.....

3. Any of your family members is facing or dying from cancer?

.....

4. Do you believe that hydrocarbon and sulfur dioxide contamination surpasses the permissible standard for human health?

.....

5. Is there any damage to the economy?

.....

6. Are there any opportunities for professional development ?

.....

7. Is there social security at work ?

.....

iv. Survey picture 1



v. Survey picture 2



vi. Survey picture 3

