INSTITUTE OF HEALTH ECONOMICS
UNIVERSITY OF DHAKA

PKSF

INTERNSHIP REPORT

Palli Karma-Sahayak Foundation (PKSF)

Bangladesh Rural Water Sanitation and Hygiene for Human Capital Development Project

Assessing Economic Loss of Flood-Affected Safely Managed WASH Facilities in Noakhali Region:

A Study on BD Rural WASH for HCD Project of PKSF

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EXECUTIVE SUMMARY

Bangladesh's performance in improving sanitation under the MDGs set a solid foundation for continued SDG efforts. Yet, a fraction of the population utilizing a safely managed drinking water and sanitation facility has plunged drastically, which is a regrettable consequence of the poor performance of Bangladesh in satisfying the SDG-6 goals. In the aftermath, the government launched the "Bangladesh Rural Water, Sanitation and Hygiene for Human Capital Development (BD Rural WASH for HCD)" project to strengthen institutional capacity and facilitate access to WASH facilities. Targeting 1.12 million rural households, it was designed to assist in safely managed twin pit toilets and safely managed piped water supply infrastructural development to accomplish SDG Targets 6.1 and 6.2.

In August 2024, a devastating flood occurred in the southeast regions of Bangladesh, which damaged around 12,000 toilets as per PKSF-PMU report in the districts of Noakhali, Lakshmipur, and Feni. With a previously declining sanitation ratio and poor hygiene conditions, this current devastation made it worse and more difficult to meet SDG-6 targets. To emphasize the financial, social, behavioral, and health-related expenses that individuals and communities endured, the study attempts to assess the economic loss of flood-affected damaged toilets.

Incorporating SMART (Specific, Measurable, Attainable, Realistic, and Timely) indicators, the study conducted qualitative and quantitative methods to accomplish specific objectives, including primary and secondary data collection. The primary target respondents were the members of Partner Organizations (POs) of PKSF, who established WASH facilities through credit support under BD Rural WASH Project. To design the study, we developed sample framing and chose the study region. The study conducted ramdomly selected household sample survey with structured questionnaire, FGD, KII for data collection. Finally, the collected data have been analysed with statistical tools and presented with tabular and graphical formats. The PMU members and technical experts conducted site inspections, review sessions, and continuous monitoring carefully, which guaranteed the integrity of the data.

This study evaluates the economic impact of flood-induced loss to WASH facilities by affected communities, as well as the health degradations faced, particularly in Noakhali region. Findings revealed that the majority of the population has limited education and low income, which influences their hygiene behaviors. Waterborne diseases like diarrhea, and skin itching surged due to contaminated water during and after the flood. Approx. 98.6% of surveyed households were reported as having an affected toilet, either mild or severe or minor. Only 37.9% of households repaired their severely damaged twin-pit toilet facilities post-flood with saved money or borrowed loans. Additionally, 9.2% of affected households shifted to open defecation during that flood period, bringing significant public health risks. To mitigate future risks, it underscores the necessity for advanced flood preparedness and calls for substantial investment in robust WASH infrastructure as well as targeted financial support for sanitation restoration.

Although twin-pit toilets built by the WASH project are found to be flood resilient, they need to be raised to enhance perception. Clients need to be educated about the benefits of safely managed toilets through the POs. Additionally, we can focus on lessening the financial stress, ensuring financial aid programs to fix the flood-affected broken toilets. Emergency shelters must be equipped with water and sanitary amenities to prevent further calamities. Broken sanitary infrastructure can lead to a high ratio of open defecation, which would result in waterborne diseases and skin infections. To enlighten people about these hazardous consequences of poor sanitation and hygiene and encourage them to use nearby toilets or emergency shelters, informative campaigns and awareness programs should be put into place.

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ACRONYMS

AIIB – Asian Infrastructure Investment Bank
BBS – Bangladesh Bureau of Statistics
CHCP – Community Healthcare Professional
DPHE – Department of Public Health Engineering
FGD – Focus Group Discussion
GoB – Government of Bangladesh
GDP – Gross Domestic Product
HCD – Human Capital Development
HHWL – Household Water Loan
HHSL – Household Sanitation Loan
HIES – Household Income & Expenditure Survey
IFAD – International Fund for Agricultural Development
IPCC – Intergovernmental Panel of Climate Change
IVC – Independent Verification Consultants
KII – Key Informant Information
LE – Local Entrepreneur
LIFT – The Learning and Innovation Fund to Test New Ideas
MDG – Millennium Development Goals
MHM – Menstrual Health Management
MICS – Bangladesh Multiple Indicator Cluster Survey
NGO – Non-Government Organization
OBA – Outcome-Based Aid
PKSF – Palli Karma-Sahayak Foundation
PMU – Project Management Unit
PO – Partner Organization
SDG – Sustainable Development Goals
SMART – Specific, Measurable, Attainable, Realistic, and Timely
UHC – Union Health Complex
UN – United Nations
WASH – Water, Sanitation and Hygiene
WB – World Bank
WHO – World Health Organization

1. INTRODUCTION

Since its independence in 1971, Bangladesh has transitioned from a war-torn state to a steady state of economic success. Once referred to as a “bottomless basket”, Bangladesh defied the odds to reach its current state. The country achieved significant advancement in economic development and poverty reduction. According to the World Bank, GDP per capita increased from $87.8 in 1972 to $2,551 in 2023. In addition, based on the international poverty line of $1.90 per person per day, poverty declined from 44.2 percent in 1991 to 13.8 percent in 2016/17. The country also improved key social indicators, including health, sanitation and hygiene, education, and gender equality.

The economic growth and development in Bangladesh came hand in hand with achieving the Millennium Development Goals (MDGs) under the supervision of the United Nations. The MDGs, established in 2000, outlined eight global targets to address critical development challenges by 2015, including improving access to sanitation. Bangladesh showed remarkable progress in achieving sanitation-related targets, increasing the proportion of the population with access to improved sanitation facilities from 45.4% in 2000 to 60.6% in 2015 (World Bank).

However, the MDGs, with time, seemed to be outdated and inefficient in some cases. This set the stage for their successor framework, the Sustainable Development Goals (SDGs). The SDGs are 17 interconnected objectives established in 2015 by the United Nations as part of the 2030 Agenda for Sustainable Development. The sixth Sustainable Development Goal (SDG 6) seeks to guarantee universal access to and sustainable management of water and sanitation by 2030. This aims to provide universal access to safe and affordable drinking water and achieving equitable sanitation and hygiene, especially for vulnerable populations.

Bangladesh's performance in improving sanitation under the MDGs set a solid foundation for continued efforts under the SDGs. However, the performance in achieving the SDG-6 goals are not met as per its expectation. From 2015 to 2022, the proportion of the population using a safely managed drinking water service increased from 56.4% to 59.1%. In the same time, the proportion of the population using a safely managed sanitation service increased from 22.7% to 31% (World Bank). If the persisting trends continue, the country may fall well short of achieving the SDG-6 goals of providing safe drinking water, sanitation and hygiene to the population.

Because of these faltering outcomes, the government of Bangladesh is adamant about improving its sanitary status drastically and achieving the SDGs within the allotted timeline, especially in the rural areas. The government, therefore, undertook the "Bangladesh Rural Water, Sanitation and Hygiene for Human Capital Development (BD Rural WASH for HCD) project". Palli Karma-Sahayak Foundation (PKSF), along with the Department of Public Health Engineering (DPHE), has been tasked to adopt a demand-driven strategy to promote hygienic toilets using lending instruments. The BD Rural WASH for HCD project began with a fund of 328.8 million USD, co-financed by the Government of Bangladesh, the World Bank, and AIIB, and aims to improve access to WASH facilities and strengthen institutional capacity.

With a target of 0.12 million households, the project is supporting the construction of a safely managed pipeline water supply infrastructure at the rural household level to meet SDG Target 6.1, which calls for universal and equitable access to safe drinking water for all.

The project is also supporting the construction of safely managed twin pit toilets at the rural household level, with a target of 1.0 million households, to meet SDG Target 6.2. This target calls for everyone to have access to adequate and equitable sanitation and hygiene and to end open defecation, with special attention to the needs of women and girls and those in vulnerable situations.

2. AN OVERVIEW OF PALLI KARMA-SAHAYAK FOUNDATION (PKSF)

In 1990, the government of Bangladesh established the Palli Karma-Sahayak Foundation (PKSF), a not-for-profit company that mostly works with non-governmental organizations (NGOs), to contribute actively to poverty reduction by employment generation. The organization magnifies the performance of its partner organizations by providing necessary funding or financial support, skill development training programs, technical expertise, and other essential services.

(Source: Google)

Researchers have critically analyzed the impact of microcredit on poverty reduction over the years. Numerous studies advocate that simply providing access to microcredit is not enough to create a sustainable pathway out of poverty. In 2010, the objective of PKSF significantly changed to include economic advancement of human dignity, moving beyond achieving self-sufficiency and financial sustainability. This transition prompted the organization to launch various programs and initiatives aimed at achieving this vision to establish its role as a key contributor to Bangladesh's comprehensive development efforts.

2.1. CORE OBJECTIVES OF PKSF

The mission statement of PKSF is "sustainable poverty reduction through employment generation." Through microfinance, capacity building, and other interventions at the grassroots, it seeks to improve the standards of living and livelihoods for those who are less privileged.

From “The Memorandum and Article of Association of PKSF,” the following specific fundamental objects of PKSF are mentioned below:

1. PKSF is dedicated to offering a range of financial resources and assistance to different government agencies, non-governmental, semi-government, and voluntary organizations, communities, and local government organizations to create employment opportunities for the economically challenged in our community.
2. Strengthen Partner Organizations' (POs') institutional aptitude to supervise their sustainable poverty alleviation program in a better way.
3. To promote, aid, guide, organize, plan, or develop projects or schemes aimed at all-around development and help creation of productive employment opportunities, promotion of self-reliance and generation of awareness for improvement in the quality of the life of the poor.
4. To provide relevant information, advice, and/or other services to the Partner Organizations for reviewing and exchanging experiences in undertaking poverty alleviation programmes and activities.
5. Committed to establishing, promoting, and securing safe jobs for highly impoverished people, small farmers, and micro-business owners.
6. To establish and maintain contact and collaborate with other organizations, institutions, bodies, and societies in Bangladesh and abroad, including relevant international agencies, and constituents of the U.N. System interested in similar objects and to co-operate with such institutions, bodies, and organizations.
7. To initiate, undertake, and arrange training programs for the personnel of the Foundation, POs, and other bodies and for those working for the projects and programs administered and supported by PKSF.
8. Additionally, PKSF promises them training in risk reduction and health support, as well as social, commercial, agricultural, or industrial activities and programs that will help them develop their capacity.

2.2. FUNDING

According to the PKSF mandate, PKSF Management is authorized to receive funding from several sources, including the Government of Bangladesh (GoB), foreign agencies, international donors and lending agencies.

2.3. PROGRAMS

At present, PKSF has 15 programs and 10 ongoing projects. It has completed 14 programs during the last 35 years, achieving its goals, targets, and success.

Both the current and completed programs, alongside their core activities and achievements, are mentioned below in brief—

1. Abason:

   It emphasizes that the government's main responsibility is to guarantee the provision of the essentials of life, such as clothing, food, shelter, healthcare, and education. At present, this program has been running in 67 upazilas of 29 districts with the help of 165 branches of 18 partner organizations. Under the "Abason Credit Programme", 13,993 families received credit of a total BDT 321.67 crore to build new houses until June 2023.

2. Agrosor:

   There is no substitute for enterprise development to guarantee long-term poverty reduction. In 2001, PKSF's Enterprise Development Program—later rebranded as Agrosor—was initiated in response to this insight. The total loan provided under the program is BDT 42,249.31 crore.

3. Buniad:

   The implementation of the 'Buniad' program targets socioeconomic situations and low self-esteem, hence addressing the exclusion of severely poor individuals from microcredit services. The total loan provided under the program is BDT 1,183.67 crore.

4. ENRICH:

   The goal of PKSF's main human-centered program, ENRICH, is to address the multifaceted nature of poverty and provide an environment that empowers the impoverished to live with dignity and exercise their universal human rights. 1.29 million people received health and treatment services from this program.

5. Environment & Climate Change Unit:

   According to the IPCC's Sixth Assessment Report, climate change may drastically cut down on the amount of fresh water available in Bangladesh's coastal regions, which might result in a decline in plant and animal life as well as an increase in floods, droughts, and environmental instability.

6. Integrated Agriculture Unit:

   IAU offers a variety of services to establish value chain interventions and marketing systems, as well as to extend appropriate agriculture, fisheries, and livestock farming technologies to increase farmer capacity.

7. Jagoron:

   PKSF's Jagoron credit instrument aims to support the growth of household-based businesses in Bangladesh's rural and urban areas. The total loan provided under the program is BDT 35,056.06 crore.

8. Kuwait Goodwill Fund (KGF) Program:

   This program's primary objectives are to use technology to connect to sustainable agricultural financial services, to create a flexible repayment plan based on cash flow related to harvesting patterns, and to spread awareness of sustainable farming technologies.

9. LIFT:

   The LIFT initiative creates a variety of new instruments to reduce poverty and provides creative financial and non-financial services for farm and off-farm operations. With the help of 60 implementing organisations, 35 creative initiatives are ongoing in 38 districts.

10. Livelihood Restoration Loan (LRL):

    Beginning in September 2020, a specialist-lending program, titled Livelihood Restoration Loan (LRL), was introduced with a budget of BDT 600 crore.

11. Program for Adolescents:

    "Investment in Adolescents for Sustainable Development" is the motto of this program.

12. Risk Mitigation:

    To lower the risk of livestock morbidity and mortality and boost the effectiveness of "Good Farm Management," it offers financial services as well as a range of extension services through the Risk Mitigation Unit.

13. Social Advocacy and Knowledge Dissemination Unit:

    It was established by PKSF in 2013 to actively raise awareness of significant issues at all societal levels and distribute development knowledge.

14. Sufolon:

    The Seasonal Loan Program was started by PKSF to provide farmers with financial services based on seasonal fluctuations. The total loan provided under the program is BDT 7,493.26 crore.

15. Uplifting the Quality of the Lives of the Elderly People:

    The “elderly population livelihood improvement program” began in 2016 and is currently being implemented in 212 unions through 101 POs. Under this program, elderly individuals outside the scope of the government’s senior citizen allowance scheme are provided with various services such as stipends, healthcare, life-supportive materials, and other services.

2.4. PROJECTS

There are 10 mega projects that are currently ongoing in this current fiscal year. Their activities and achievements are mentioned below with a short brief in each-

1. BD Rural WASH for HCD :

   The BD Rural WASH project, co-financed by the Government of Bangladesh, the World Bank, and the Asian Infrastructure Investment Bank, aims to improve access to safely managed water supply and sanitation in rural areas.

   The project is currently implemented in 182 Upazilas of 30 Districts under all 8 Divisions by 88 Partner Organizations (PO) of PKSF. To achieve SDG Target 6.1, universal access to safe drinking water for all, safely managed pipeline water supply systems at the household level are being provided by setting a target of 0.12 million households. To achieve SDG Target 6.2, access to adequate sanitation and hygiene for all, the project is also providing support to construct safely managed twin-pit toilets with a target of 1.0 million households.

2. Climate-resilient Haor Project

   PKSF is implementing a project in the Haor region of Bangladesh to combat climate change, focusing on climate-resilient infrastructure. The project is funded by the IKI Small Grants Funding Scheme, and is aimed at protecting Haor settlements from wave erosion. The project, overseen by GIZ Bangladesh, aims to protect villages from the adverse impacts of climate change.

3. Extended Community Climate Change Project- Drought (ECCCP- Drought)

   By emphasizing effective water management, adaptable technology, infrastructure maintenance, and planning for irrigation, drinking and household usage, the project targets to mitigate the aforementioned drought-related issues. Additionally, the project anticipates lower water consumption by up to 70% during the winter monsoon, by encouraging the production of crops with low water requirements during the dry season.

4. Microenterprise Financing and Credit Enhancement Project (MFCE Project)

   The microenterprise sector plays a significant role in the nation's economic advancement by providing jobs for low-income people and supporting in reducing poverty. Even after including more than 200 businesses, however, its growth is limited due to both financial and non-financial challenges, with only 16% of its working capital deriving from external funding sources.

5. Pathways to Prosperity for Extremely Poor People-European Union (PPEPP-EU) Project

   PKSF is implementing the "Pathways to Prosperity for Extremely Poor People- European Union (PPEPP-EU)" project to eradicate poverty in 215,000 households in climatically vulnerable regions nationwide. The EU itself funds it.

6. Recovery and Advancement of Informal Sector Employment (RAISE)

   The RAISE project facilitates employability, increases informal sector productivity, and provides financial assistance to 175,000 low-income youths, micro-entrepreneurs, and COVID-19-affected micro-entrepreneurs in urban and periurban areas across the BD.

7. Resilient Homestead and Livelihood Support to the Vulnerable Coastal People of Bangladesh (RHL) Project

   The coastal region of Bangladesh is vulnerable to calamities because of its low elevation and climate change patterns. Climate-sensitive livelihoods, low-lying settlements, and scarcity of safe drinking water make coastal people susceptible. The GCF has approved a 5-year project, "RHL", to develop climate-adaptive coastal communities.

8. Rural Microenterprise Transformation Project (RMTP)

   PKSF launched RMTP project with four other projects, financed and supported by IFAD, including Microfinance and Technical Support Project.

9. Sustainable Microenterprise and Resilient Transformation (SMART)

   The SMART project focuses on ensuring aids to micro-enterprises operating in agribusiness, manufacturing, and services, with a specific emphasis on environmentally stressed areas susceptible to climate change and natural disasters.

10. The Project for Developing Inclusive Risk Mitigation Program for Sustainable Poverty Reduction (IRMP)

    IRMP aims to determine sustainable financial and non-financial services and identify the implementation strategy to mitigate the risks caused by climate change and other natural calamities to the low-income group.

3. AN OVERVIEW OF BD RURAL WASH FOR HCD PROJECT

The journey of Output-Based Aid (OBA) sanitation in Bangladesh has evolved over time. It transitioned from early World Bank-supported projects to a structural WASH initiative with technical input from organisations like the WHO.

Earlier, the World Bank initiated its OBA Pilot Program here in Bangladesh with an aim of expanding accessibility of hygienic sanitation for low-income households, implemented by its local implementing agency PKSF in (2012-2016). With technical support under the Global Partnership on Output-Based Aid (GBOBA) program, over 170,000 hygienic toilets were installed in rural areas. The households co-financed 70% of the total costs, which ensured sustainability, while private sector employment was introduced, and sanitation business growth was encouraged.

After achieving success in the OBA Pilot, Bangladesh planned to expand sanitation projects under broader WASH initiatives in 2017-2020. Today, one of its mega projects, "BD Rural WASH for HCD," is working by following a convergence approach with another two world bank-funded individual projects on IGA and nutrition. The total project volume is of USD 328.8 million and PKSF is implementing a part of USD 184.4 million. The other implementing agency, the Department of Public Health Engineering (DPHE) is implementing another part of the project simultaneously.

3.1. PROJECT DEVELOPMENT OBJECTIVES

The core development objectives of the project are mentioned below:

- To increase access to "safely managed" water supplies and sanitary facilities in certain rural Bangladeshi communities
- To strengthen the institutional capacity of the sector for sanitation and water.

3.2. CORE COMPONENTS OF THE PROJECT

The prime significant components of the project are mentioned below:

- **Component 1: Investments in Water Supply**
- **Component 2: Investments in Sanitation and Hygiene**
- **Component 3: Institutional Strengthening**
- **Component 4: Project Implementation and Management**
- **Component 5: COVID-19 Emergency Response**
- **Component 6: Contingent Emergency Response (CERC)**

3.3. CORE FUNCTIONING SYSTEM

The BD Rural WASH for HCD is a significant project presently functional in the public health sector of Bangladesh, working on a behavioural change in human living standards with a new and scientifically beneficial WASH facility. At the beginning of the project, PKSF started to implement the safely managed toilet facility and provision of safe water in 78 upazilas of 18 districts. The project initially has a potential plan of five years for conducting the full implementation process. Currently, the project is being implemented in 182 Upazilas of 30 Districts under all eight divisions of the country by 88 Partner Organizations (PO) of PKSF. The timeframe of the project will end on 31 October 2025.

(Source: Google)

The whole implementation process is done mainly by two major organizations named DPHE and PKSF. The role of DPHE is to enhance the provision of safe water supply and sanitation and to reduce the environmental consequences. To achieve the goals, firstly, DPHE sets in two types of water treatment schemes as large piped and small-piped schemes, by which they can ensure safe water in the rural households. There are 78 large water plants and 2930 small water schemes planned to establish in different areas of the WASH project. Secondly, DPHE offers approximately 2.20 lacs safely managed sanitation facilities to extremely poor groups in rural settings free of cost. Finally, they aimed to set hand-washing stations in the rural health complexes and rebuild the existing public toilets as well to ensure improved sanitation.

On the other hand, PKSF acts as a prior organization to establish the safely managed sanitation facilities to households in the rural surroundings. It takes account of the funding for the

establishment when the partner organizations complete the necessary fieldwork under the perfect supervision of PKSF. Note that the project strictly maintains the hygiene status of a toilet to be constructed. All the safely managed toilets have a double-pitted waste management system, which has some scientifically beneficial evidence. As Bangladesh faces a problem of decreasing underground water levels, this project discouraged the extraction of groundwater for safely managed sanitation. Before further proceeding, we need to have a conceptual clarity about some related terms of sanitation strategies used in this project. In the past few years, the sanitation facilities of rural areas in Bangladesh have been called improved sanitation.

"Improved Sanitation" facilities refer to sanitation facilities designed to separate human excreta hygienically from human contact. These facilities are essential for promoting health, preventing the spread of diseases, and ensuring a clean and safe environment. Improved sanitation includes systems that effectively capture and contain waste, such as flush toilets connected to sewers or septic systems, ventilated improved pit latrines, and composting toilets (National Strategy for WASH, Revised and Updated Ed. 2021).

The term "improved" distinguishes these facilities from "unimproved" options, such as open defecation or basic pit latrines without proper containment. By providing a more reliable and hygienic approach to waste management, improved sanitation reduces the risk of waterborne diseases and enhances overall quality of life, particularly in communities with limited access to clean water and healthcare.

"Safely Managed Sanitation" refers to sanitation systems that ensure the safe management of human waste from the point of use to the final disposal or treatment. This includes the containment, transportation, treatment, and disposal of human waste in a manner that protects public health and the environment. Safely managed sanitation ensures that waste is handled without exposure to contaminants and that it is treated or disposed of in ways that minimize risks to the environment and human health. This approach is typically monitored to ensure that it meets regulatory standards and promotes hygiene, safety, and sustainability.

In the context of the United Nations' SDG 6, "safely managed sanitation" is a critical indicator of progress in improving global sanitation services, aiming for universal access to such systems by 2030. Thus, this project is significant in safely managed sanitation over unmanaged sanitation.

A **"Two-Pit Sanitation Facility"**, also known as a twin-pit latrine, is a sustainable and hygienic system designed to manage human waste effectively. It consists of two underground pits that are used alternately for waste collection. The structure typically includes a single toilet seat or squatting pan connected to a Y-junction pipe that directs waste to one pit at a time.

Table-3.1: Tabulation of Classifications of PKSF Safely Managed Twin-Pit Toilets

Toilet	Pit	Platform	Pan	Wall	Roof	Door Type
Shulov	Twin-Pit	RCC	Ceramic	Tin	Tin	Tin with ventilation
Bilash	Twin-Pit	Hut &CI sheet roof	Ceramic	Tin	Tin	Tin with ventilation
Shovon	Twin-Pit	CI sheet roof	Ceramic	Brick	Tin	Tin with ventilation
Shoukhin	Twin-Pit	CI sheet roof	Ceramic	Brick	RCC	Tin with ventilation

When the first pit fills up, it is sealed and left to rest while the second pit is used. During the resting period, typically 12–24 months, the waste in the sealed pit undergoes natural decomposition and transforms into safe, nutrient-rich compost that can be used as a soil conditioner. Once the resting period is complete, the contents of the first pit can be safely removed, and the process is repeated with the second pit.

This system is cost-effective, easy to maintain, and suitable for areas without centralized sewage systems. It promotes environmental sustainability, reduces health risks by preventing direct contact with waste, and minimizes groundwater contamination when constructed properly. Twin-pit latrines are widely recommended as a practical solution for safely managed sanitation in rural and peri-urban areas.

PKSF aims to bring a significant change in hygiene behavior, especially for rural people. As the rural population of our country is often ignorant about the provision of safe water, sanitation, and hygiene in the household, they are less likely to practice new or improved facilities in sanitation. In most of the rural areas, sanitation facility gets the least priority over other social needs. Nevertheless, it ultimately harms them, causing various health hazards in the long run. Therefore, PKSF encourages the rural people to lead a much healthier, disease-free, and productive life by establishing the twin-pit safely managed toilets, which can fetch a positive behavioural change throughout the society.

The partner organizations of PKSF offer financial services in terms of two types of credits - Household Sanitation Loan (HHSL) & Household Water Loan (HHWL) to make the sanitation facility easier, especially for the poorer quintile of the society. An individual who wants to get access to a safely managed sanitation or provision of safe water in his/her household can claim an HHSL, HHWL, or both, respectively, to get certain financial support. The loan can get up to BDT 60,000. If an individual constructs a twin pit toilet according to the given sanitation catalogue and reimburses the loan amount, they can get an incentive of BDT 3000. This may encourage the rural people to habituate to healthy behaviours. It can also play a vital role in improving hygiene behavior among the next generation.

3.4. MANAGERIAL PANEL OF WASH PROJECT

A 21-member panel of the Project Management Unit (PMU) of PKSF operates the activities of the project. There are five core members under the leadership of a Project Coordinator. Besides, 16 more employees have been hired for the project period. Among them, seven members are Independent Verification Consultants (IVC). This team consists of one Senior IVC and six IVCs, respectively. Most importantly, the Additional Managing Director (AMD) takes overall control of the whole project.

4. RATIONALE OF THE STUDY

In August 2024, Bangladesh's southeast region experienced major flooding due to excessive rains. Among the districts affected by the flood, Noakhali, Lakshmipur, and Feni were severely affected. These districts were also included in the regions chosen for the PKSF-led project. According to early assessments by the PMU, over 12,000 toilets were damaged because of the floodwaters. In this case, the flood exacerbated the already-deteriorating situation. The damage was widespread. In addition to losing access to safely managed toilets, the people's health was seriously threatened by waterborne illnesses, and their behaviors were more likely to revert to their previous patterns of inadequate sanitation and hygiene. Thus, the purpose of this study is to evaluate the socioeconomic cost of flood-related toilet damage.

A fundamental component of individual dignity and public health is having access to adequate sanitation and hygiene. However, the vulnerability of sanitation infrastructure in flood-prone areas has been brought to light by the growing frequency and severity of floods, which are made worse by urbanization and climate change.

Despite the effects that are laid bare in front of our eyes, very little research work has been done on the broader socioeconomic consequences of toilets damaged by floods. Without conducting studies, we cannot judge the true extent of the impact there is, and it will not allow policymakers and planners to make reasoned judgments regarding hindering effective disaster management and resource allocation to mitigate such damages.

This study attempts to cater to the demand for estimates of the socioeconomic consequences of toilets damaged due to flooding. It will help shed light on the various economic, social, behavioral, and health-related costs borne by individuals and society. Given the increased risk of climate-related disasters and the global push for improved sanitation and hygiene, such a study is timely and important. This will be the case because the actual cost of toilets damaged by flooding can inform investment in disaster-resilient infrastructure, while improving community preparedness will ensure that sanitation services are accessible and functional during and after disasters.

4.1. OBJECTIVES

Two types of objectives are established for the study, and those are noted below—

4.1.1. Broad Objective:

To assess the economic cost due to the damage of safely managed WASH facilities in the post-flood period.

4.1.2. Specific Objectives:

- To assess the disease pattern and healthcare-seeking behaviour of households, resulting from the loss of sanitation facilities.
- To estimate the cost of households due to the damage of safely managed WASH facilities in the post-flood period
- To analyze the behavioral changes due to the unavailability of proper sanitation and hygiene.

5. LITERATURE REVIEW

Floods cause great economic damage as they can destroy settlements and the livelihood of people. The current global damage can be estimated at US$ 119 billion per year. It is the developing countries that face the majority of the impact due to socioeconomic vulnerabilities (Dottori et al., 2018). Floods can devastate the economy through a diversified impact, ranging from output loss to noteworthy income and employment loss. This loss is maximum for the agriculture sector for any region, and most importantly, such higher order effects are unrecoverable through the current state of overall investment (Haque & Jahan, 2015).

Flooding and riverbank erosion in Bangladesh displace at least 1 million people every year, thus leaving them homeless and creating a socioeconomic impact. Bangladesh is primarily an agrarian country and depends much on crop agriculture. In 1998, floods reduced the Aman crop by 2 million tons. Due to the intensity of the flood problem, loss of life, injuries, homelessness, infrastructure damage, and disruption to education and agriculture have increased in recent decades (Rumana et al., 2018).

In a similar study conducted in 2008, the author sought to determine the damage done by floods to sanitation facilities provided under BRAC's WASH programme. According to the study, 73% of the latrines in the surveyed areas had been damaged in floods, with 62% of these turning into unusable units within one week. Approx. 55% of the respondents reported passing stool on boats and rafts and hanging latrines. Among them, 19% defecated in open spaces. However, the study also found that despite the significant cost of repair, the respondents showed awareness and willingness to repair the sanitation facilities (Ahmed, 2008).

Flooding also causes several waterborne diseases due to the serious disruption of sanitation and water supply. About two-thirds of the tube wells and all toilets become unusable during every flood. The majority of people damage water bodies by using hanging latrines or boats and defecating straight into them. Even though the majority of people have various waterborne illnesses, no noteworthy adaptation strategy is used. Before flooding, few people stock up on emergency medications and, at times, go for consultations with nearby rural physicians (Shimi et al., 2010).

In addition, the risk of gastroenteritis post-floods is considered highest in settings with poor hygiene or an inadequate supply of clean drinking water. Massive outbreaks of bacterial gastroenteritis occurred after extensive flooding in Bangladesh; enterotoxigenic Escherichia coli and Vibrio cholerae were the most frequently isolated pathogens. In Bangladesh, cholera outbreaks often start eight days after floods (Paterson et al., 2018). Another study found that psychological distress among flood survivors also exacerbates their physical illness (Alderman et al., 2012).

In terms of Menstrual Health Management (MHM), the lack of awareness and affordability creates barriers to access for rural women in low-income countries. Because of this, they are mostly dependent on using washable cloth pads, which may result in infections and skin irritations. In the absence of adequate availability of water, privacy, and appropriate drying facilities, girls have many challenges maintaining good menstrual hygiene. Poor MHM exacerbates health problems, such as urinary tract infections and reproductive disorders. Taboo associated with menstruation and reluctance to discuss the issue openly create barriers in the way of addressing these problems in Pakistan. Stigmatization of menstruation, high costs of sanitary products, and inadequate facilities have negative implications for girls' health, dignity, and participation in education and employment (Tufail et al., 2023).

6. METHODOLOGY

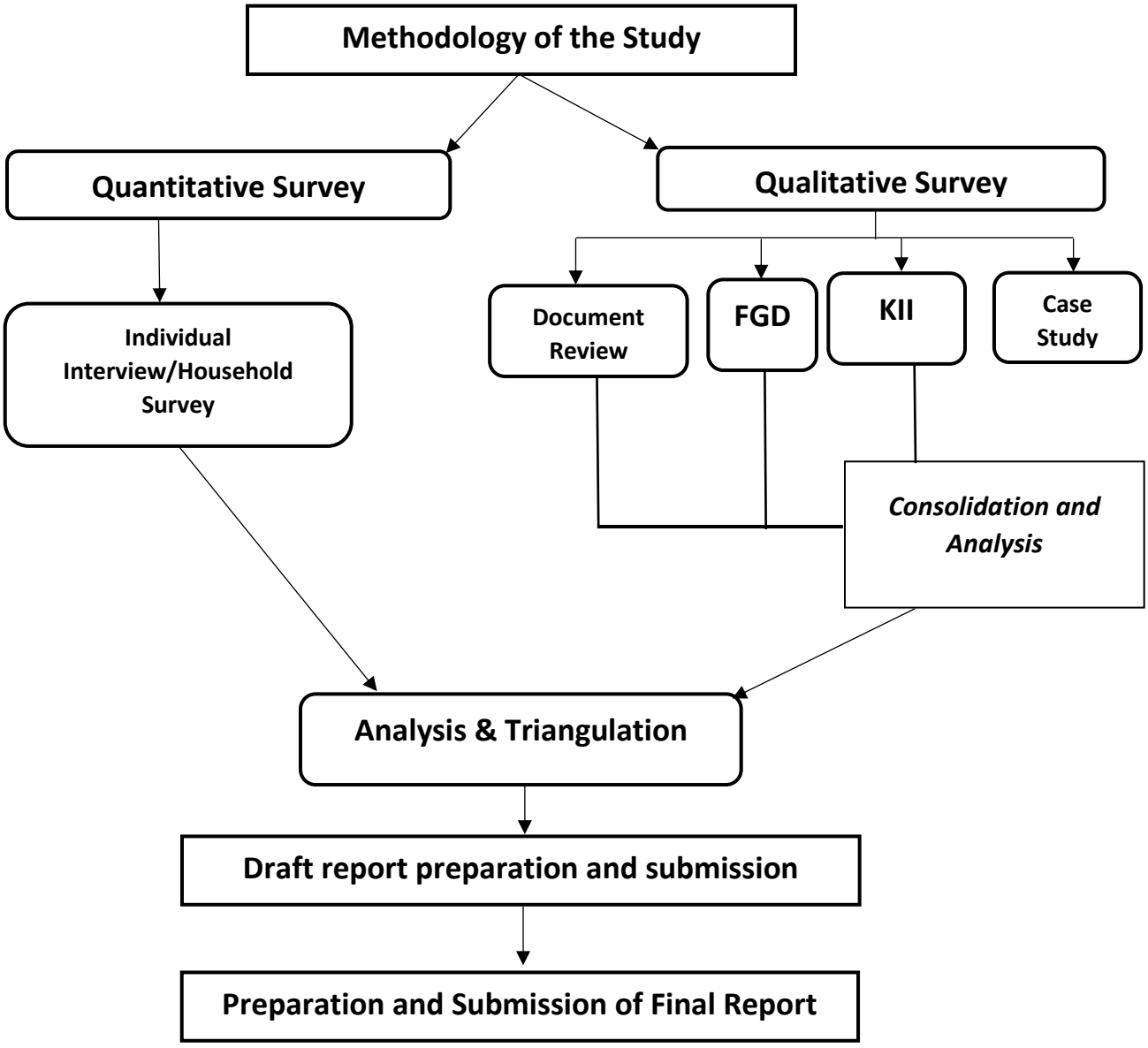
The approach for the assignment is to be very specific in achieving the objectives, as expected and specified by the proposal. Therefore, the approach to the study is to follow the objectives strictly and the responsibilities of the consultants, following the ***SMART (Specific, Measurable, Attainable, Realistic, and Timely)*** indicators. Our strategies for applying the approaches include several specific steps and activities for accomplishing them.

The research method is quantitative and qualitative in nature. Therefore, ideally, both quantitative data and qualitative information have been generated to support this. During the 'mobilization and design' phase, the study team decided what would be feasible based on how accessible and reliable different inputs are and how they will be used. The study team also suggested adopting Participatory Assessment for the present study.

6.1. METHODOLOGY OF THE STUDY

The study is conducted using quantitative and qualitative methods that include primary and secondary data collection, considering the project objectives, geographic location, climatic risk, and gender dimensions. The qualitative technique includes Key Informant Interviews, Focus Group Discussions, and Case Studies collection by using a semi-structured interview guideline and the data was collected through face-to-face interviews administered questionnaires from the selected stakeholders.

Figure – 6.1: Methodology of the Study



6.2. TARGET RESPONDENT GROUPS AND RESPONDENT SELECTION PROCEDURES

The main target respondents was the members of PKSF's Partner Organizations (POs) who received the WASH Loan for constructing the WASH facilities designed by BD Rural WASH for HCD Project. Also, the family members of the respective members and the neighbors Quantitative Methods.

6.2.1. Sample Size Determination for Quantitative Survey

To design the study, first, we selected the study area. Then, we defined the sampling frame and determined the exact sample size from the total population of the program. All sections are discussed below–

6.2.1.1. Sampling Frame

The sample size for this survey is calculated by using the following formula:

$$n_0 = \frac{z^2 pq}{d^2}$$

Where,

n_0 = Desired sample size

Z = Standard normal deviate usually set as 1.96 which corresponds to the 95% confidence interval

p = Proportion in the target population estimated to have a particular characteristic, and here it takes to be 0.50 such that $p + q = 1$

d = Desire precision (here desire precision is to be considered as 7% i.e. 0.07)

Putting those values in above formula, we get,

$$n_0 = \frac{z^2 pq}{d^2} = \frac{(1.96)^2 \times 0.50 \times 0.50}{(0.07)^2} = 196$$

Since the number of flood-affected toilets was 11,580, which is known and finite, the final sample size determination used the following finite population correction factor:

$$n = \frac{n_0 N}{n_0 + (N-1)}$$

Here,

$n_0 = 196$ & $N = 11580$

$$n = \frac{196 \times 11580}{196 + (11580 - 1)} = 202 \approx 210$$

A total of 210 respondents were selected from 210 households, i.e., in every household, 1 respondent was selected for interview.

6.2.1.2. Sample Area Determination

To design the study, at first, we selected the study area. Then, we defined the sample frame and determined the exact sample size from the study area. These sections are discussed below:

Table-6.1: Distribution of Survey Sample (Area wise)

District	Upazila	Sample Number
Noakhali	Kabirhat	25
		25
	Noakhali Sadar	50
Lakshmipur	Lakshmipur sadar	10
		30
	Raypur	30
Feni	Feni Sadar	5
		35
3	5	210

Note: The sample was taken randomly, proportionately, and purposively, and the above-selected number of respondents was covered under the study from geographic areas like flood-affected, less-flooded, and most-flooded toilets, etc.

6.3. DATA COLLECTION AND ANALYSIS

Before deploying the data collection team in the field, the study team developed a dynamic Data Entry Form by using KoboToolbox. After data collection, necessary measures such as data coding, random checking, and minor editing were accomplished. Data analysis was done by using the SPSS program.

6.4. DATA QUALITY CONTROL MECHANISM

The data collection (quantitative and qualitative) activities were carried out concurrently, monitored consistently, and supervised professionally to secure the quality of data collection, correction of possible errors, and recollection of data, if need be, etc. Mechanisms to ensure the quality of data included the following:

- Every day of data collection, the PMU Member and technical specialists, as applicable, monitored the behaviors of at least two data collectors and provided them/feedback on the spot.
- At least 5%-10% spot check was undertaken.
- At the end of each day of data collection, the field team had a review session in which they reviewed the validity, consistency, and inconsistencies of the data collected and then took corrective measures as required.

6.5. QUALITATIVE METHOD

In this study, the most appropriate methods used are suggested as follows:

a) Key Informant Interviews (KII)
b) Focus Group Discussion (FGD)
c) Observation/Field Visit
d) Case Study

Table-6.2: Data Collection Methods and Respondents (Quantitative & Qualitative)

a) A list of methodological tools and their corresponding participant is given below-

SI	Methodological Tools	Type of Participant	Number of Participants
1.	**Desk Review**	▪ Existing Document of Pilot National Service Project, Previous Pilot Project Document and Reports, Baseline Survey of WASH, Published Study Reports; Relevant Survey Reports, Journal, Publication, Newspapers, etc.	▪ Available Documents
2.	**Individual Interview**	▪ Direct stakeholders of the selected household level	210
3.	**Sub-total**		210
4.	**Key Informant Interview (KIls)**	▪ Civil Surgeon ▪ CHCP	2 1
		▪ Health Worker	1
		▪ PO's Senior Management Professional	1
	Sub-total		**5**
5.	**FGDs**	Representatives of female borrowers and branch managers	5 FGDs
6.	**Visit/Observation**	Selected potential youth development and capacity building opportunities	• As randomly
7.	**Case Studies**	Stories of selected participants, highlighting individual journeys and impacts.	• 2 Case studies

6.6. ETHICAL CONSIDERATION

The higher ethical guidelines were adhered to when conducting this investigation. Before beginning any research effort, it is crucial to consider a few key ethical issues. These included—

1. Obtaining informed consent
2. Ensuring that the privacy and confidentiality of all participants are maintained
3. Refraining from fabricating or manipulating data
4. Considering potential outcomes
5. Understanding our role as a researchers.

Prior to the surveys, KIIs, or FGDs, every participant verbally agreed. To safeguard the participants' rights, this attempt was made. No information was used to make public, and all personal information was kept private. Before granting their agreement, each study participant received comprehensive information regarding the purpose and methodology of the study.

7. KEY FINDINGS

The study is conducted to assess the economic loss of flood-affected safely managed WASH facilities in specific areas like Feni, Lakshmipur & Noakhali. A well-furnished household survey was conducted to maintain the quality of the study. Some key findings and factors are addressed which are relevant with the causation of water borne health hazards and the disruption of sanitation facility in post flood period as well.

7.1. DEMOGRAPHIC ASPECT

The demographic analysis of the study is mainly described in several aspects. Such as the household education level, occupation, and family size & earnings. As the education level mostly affects the hygiene practice of a household, it is a prior factor in the study. Besides, household healthcare-seeking behavior is very much dependent on the overall income status.

7.1.1. Education Level & Occupation

According to the field survey, most respondents are seen to have at least the primary level of education (43%), so they have minimal literacy. One-fourth of the total respondents have no access to education. On the other hand, 32% of the respondents have secondary-level knowledge, and most of them are middle-aged. The respondents who have at least the primary level of education are more aware of better hygiene practices.

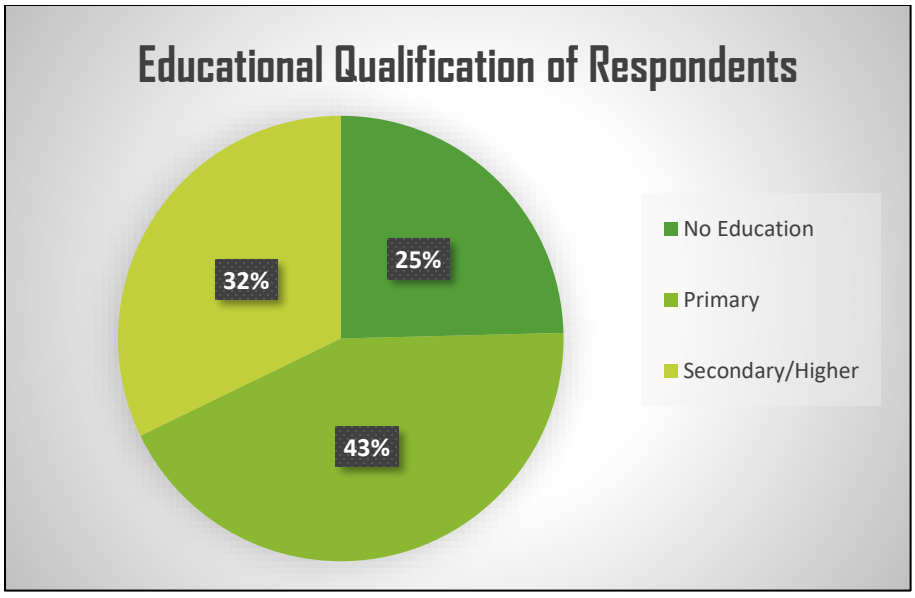


Figure-7.1: Distribution of Respondents according to their Education Qualification in Noakhali Region.

A notable portion of the people of the Noakhali region are occupied in farming (21%). Besides, 16.5% of people continue some small business, where a moderate portion engaged in driving or

labor work. A small portion are found who work as carpenters, fishermen, or other workers. An interesting fact is that almost 11% of the respondents have a migrant worker in their family, and as per the primary questioning, the youngsters (18-25 age group) are more likely to occupy themselves abroad.

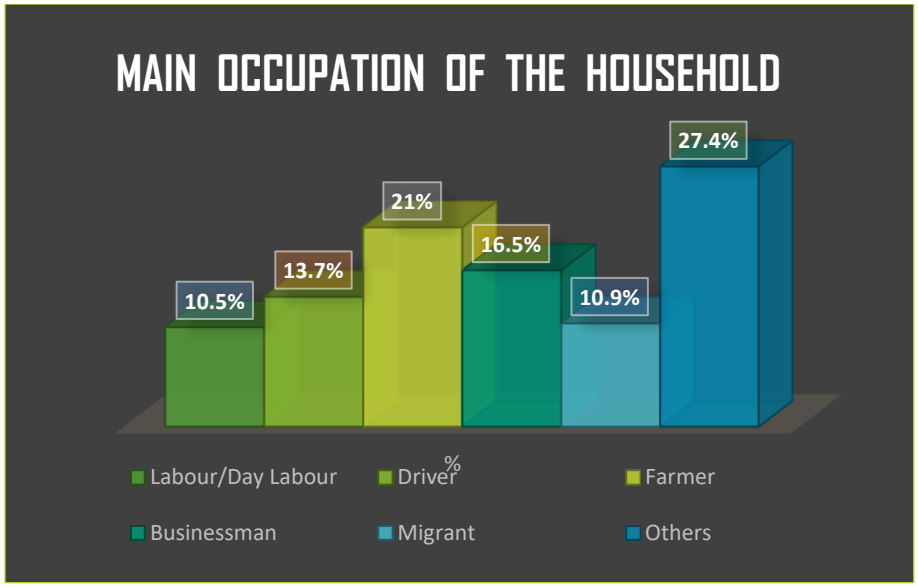


Figure-7.2: Distribution of Respondents as per the Main Occupation of the Household.

7.1.2. Family Size & Earnings

In most cases, the family size of the study area is five. However, we found 31.3% of families consist of members from two to four, and 38.8% have larger families with more than five members. The large families are mostly the joint family having under 5 children, adolescents, or older groups. In the majority, the household heads are seen as the only earning members to run the whole family. In some cases, two or more earners are found. The median of the monthly household earnings is BDT 20000, which shows the poor economic status in these areas.

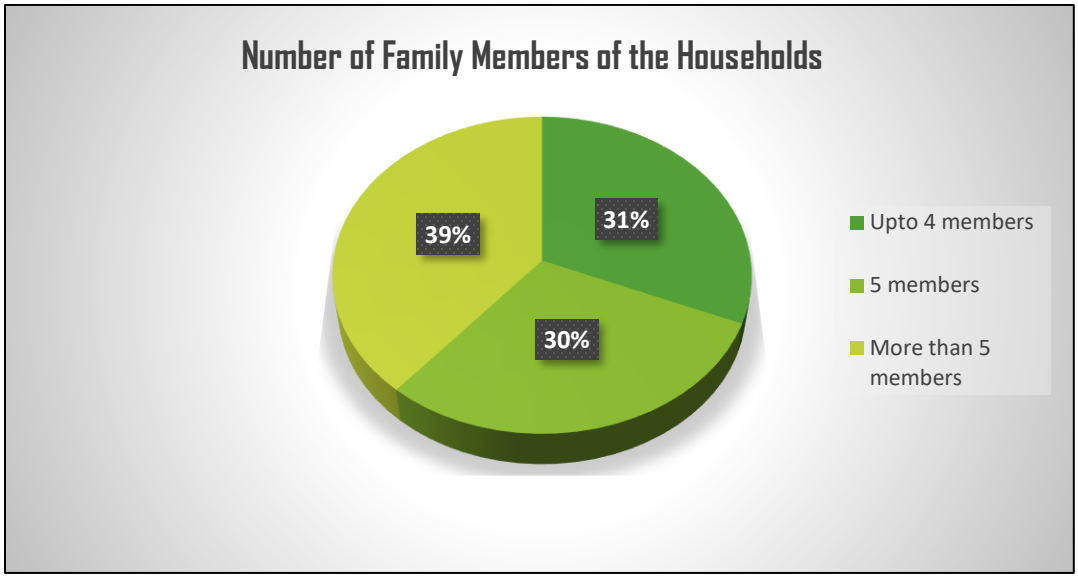


Figure-7.3: Graphical Representation of Number of Family Members of the Households.

An interesting fact is that 63% of the respondents have a single earner in their household. We found a maximum of four working members in a household as the primary question. Therefore, the monthly income varies among households when there exists more than one earner in a household.

Table-7.1: Distribution of Number of Earners in a Specific Household

No of Earning Members	**Frequency**	**Percentage**
One Member	133	63
Two Members	50	24
Three Members	22	10
Four Members	6	3

7.2. HYGIENE BEHAVIOUR & ECONOMIC ASPECT

The hygiene behaviour analysis of the study is mainly described in several aspects. Such as types of toilets, extent of damage, alternatives to damaged toilets, and cost of repair.

7.2.1. Types of Toilets

Among the 211 respondents of the survey, 154 of them constructed a Bilash toilet with the received sanitation loan, which is an overwhelming majority. Shoukhin and Shovon toilets follow this, with 24 and 21 users, respectively. Meanwhile, 12 respondents had subscribed to a sanitation loan deal that built them a Shulov toilet. This can be illustrated by the following figure:

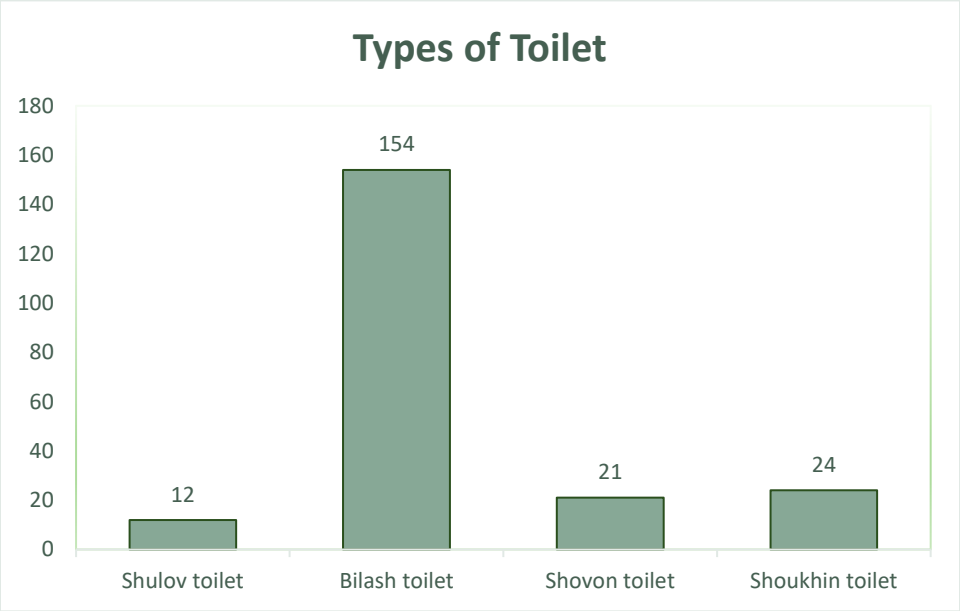


Figure-7.4: Distribution Of The Types Of Toilets Constructed With Received Household Sanitation Loan (HHSL).

7.2.2. Extent of Damage:

Besides, out of the 211 households surveyed, 208 (98.6%) reported toilet damage due to floods. However, the damage levels varied by region. In Noakhali, where the floodwater created waterlogging for approximately two months, most of the toilets had their pits submerged for an extended period. However, some toilets faced further damage. The situation was similar in Lakshmipur, where waterlogging did not last for that long. On the other hand, the extent of the damage was greater in Feni because the flood flow was fierce over there, causing significant damage to the toilets.

In the survey, the damage to the toilets was classified into five categories. The categories included Type 1, where toilets had their twin pits submerged under the floodwater, but they were not damaged. Type 2, where the toilets suffered from broken pits or pipe connections. Type 3, which included toilets with broken platforms. Type:4, where toilets were partially or completely damaged, and finally, Type:5, with toilets that became completely unusable.

Among the 208 households that reported damage to their toilet, four-fifths of the toilets had either type 1 or type 2 damage. More than half of these toilets had type 1 damage. In the meantime, the remaining one-fifth of the toilets suffered significant damage to their infrastructure. Among them, 10.2% of the toilets were reported to have type 3 damage. Only 4.3% and 4.9% of the toilets suffered from type 4 and type 5 damage, respectively. The following table illustrates this:

Table-7.2: Proportion of Toilets Damaged Under Different Classifications.

Type of Damage to the Toilets	Percentage (%)
Type:1, The pit is submerged but not broken.	58.70
Type: 2, The pit is broken or pipe connection is damaged.	22.00
Type:3, The toilet platform is broken	10.20
Type:4, The toilet is partially or completely damaged.	4.30
Type:5, The toilet is unusable.	4.90

7.2.3. Alternative to the Damaged Toilets

During the flood, only half of the surveyed households could use their own toilet. The remaining households had to resort to other sanitation facilities. Households, on average, could not use their damaged toilet for 27 days (median=10 days). The fact that the waterlogging in Noakhali continued for about two months explains the difference between the average and the median numbers. As a result, people could not use their submerged toilets for a considerable amount of time. On the other hand, in Feni and Lakshmipur, the flood lasted for almost two weeks, allowing the residents to return to using their own restrooms much more quickly.

Among the respondents who could not use their own toilet, a large portion shared their relative's or neighbour's toilet. 8.5% of the respondents used toilets available in the flood shelter, and another 6.2% constructed a temporary toilet. 3.5% of the sample population used a madrasa or mosque's toilet. However, 9.2% of the respondents resorted to open defecation, which is a worrying statistic.

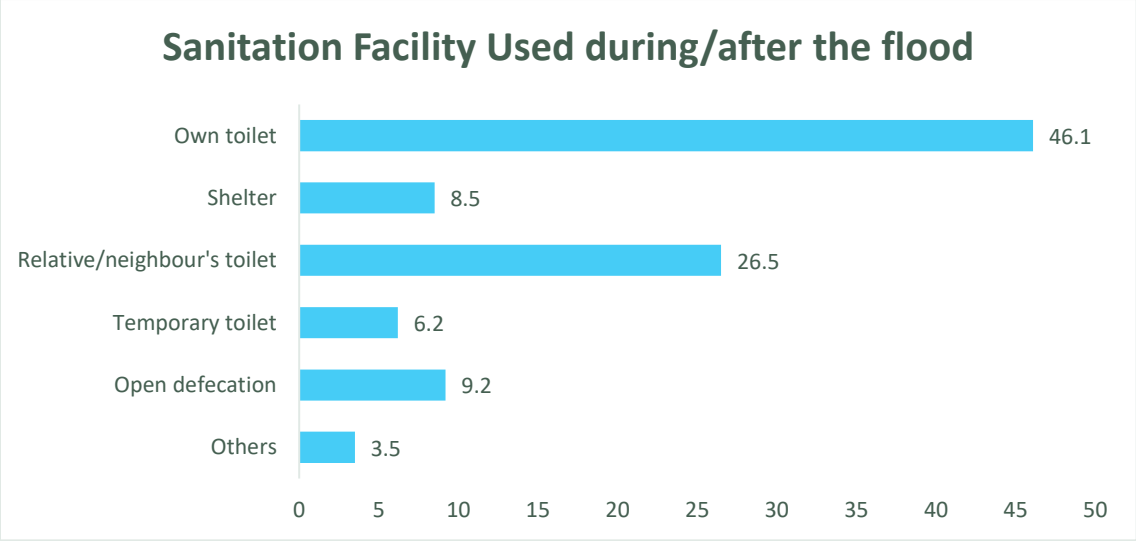


Figure-7.5: Sanitation Facility Used During/After The Flood.

Of all the respondents who used shared toilets or toilets available in shelters, mosques and madrasas, three quarters reported that they faced no problem. Around 10.7% reported unavailability of facilities like soap, sandals etc. and 6.7% said that they did have access to adequate water supply. One of the respondents reported facing physical or mental harassment while using the shared toilet.

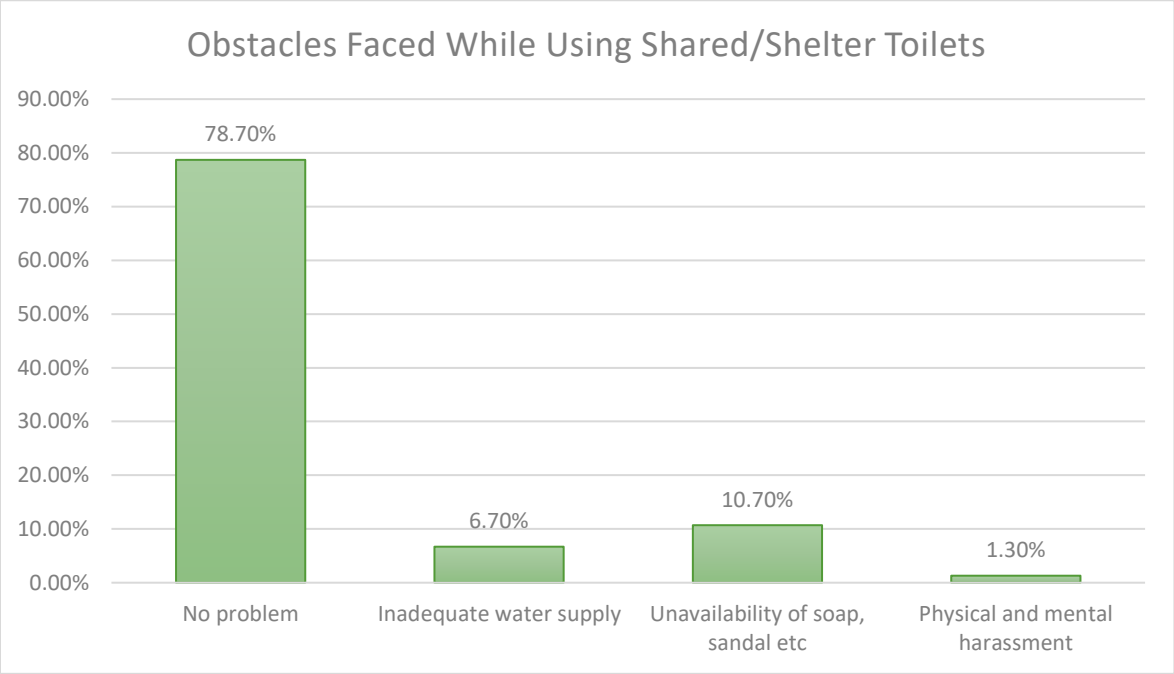


Figure-7.6: Distribution of Respondents according to the Obstacles faced Using Shared/Shelter Toilets.

7.2.4. Special Age Group

In this study, we tried to inspect if the respondents have any special age group who faces any kind of health problem during or after the flood occur. In this stiudy, we define the "special age" group as the people of ages under 5 years of age, adolescent aged and 65+ years aged people. We found that 35% of the respondents have no special age group people in their family. However, almost 57% of the respondents have either one or two members of the defined age group. Therefore, it is quite clear that these people surely need special attention or facing complexities during flood.

Table-7.3: Percentage Distribution of Special Age Group People in Households.

Special Age group (Under 5 & 65+)	Percentage
None	35.1
Up to two members	56.9
Three or more members	8.1
Total	100

Among the households with special age group members, 41.7% used their relative's or neighbour's toilet. Another 28.7% used their own toilet, and 10.4% used the toilet available in shelters. However, an alarming 19.1% of these members resorted to defecating in the open during the flood.

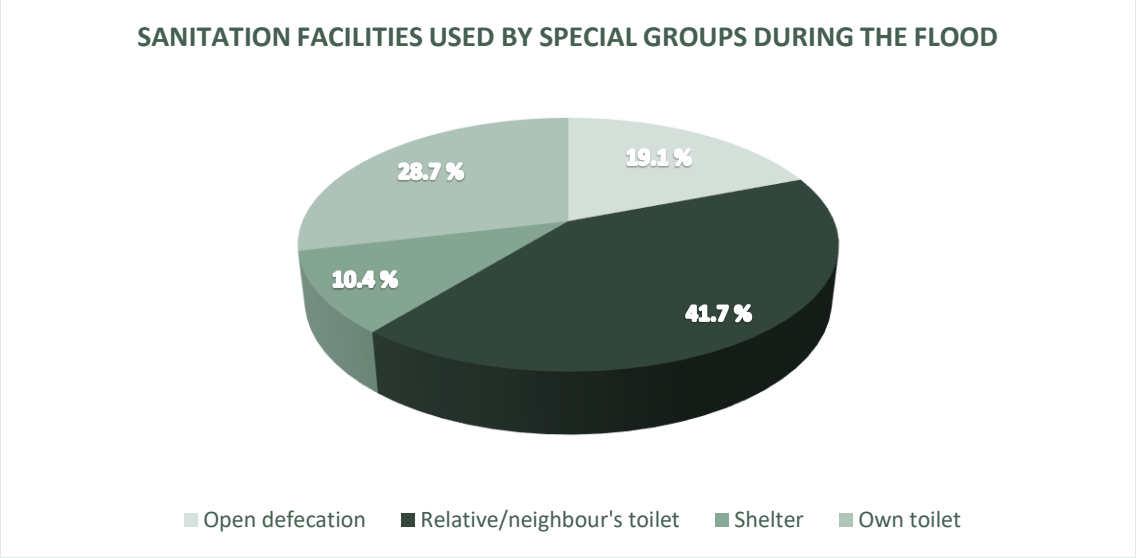


Figure-7.7: Sanitation facilities used by special groups during/after the flood.

7.2.5. Quantity and Cost of Repair

According to the survey, more than one-third of the respondents had to repair or rebuild their toilets after the flood. The median cost is around BDT 2000 to rebuild or repair their damaged toilet.

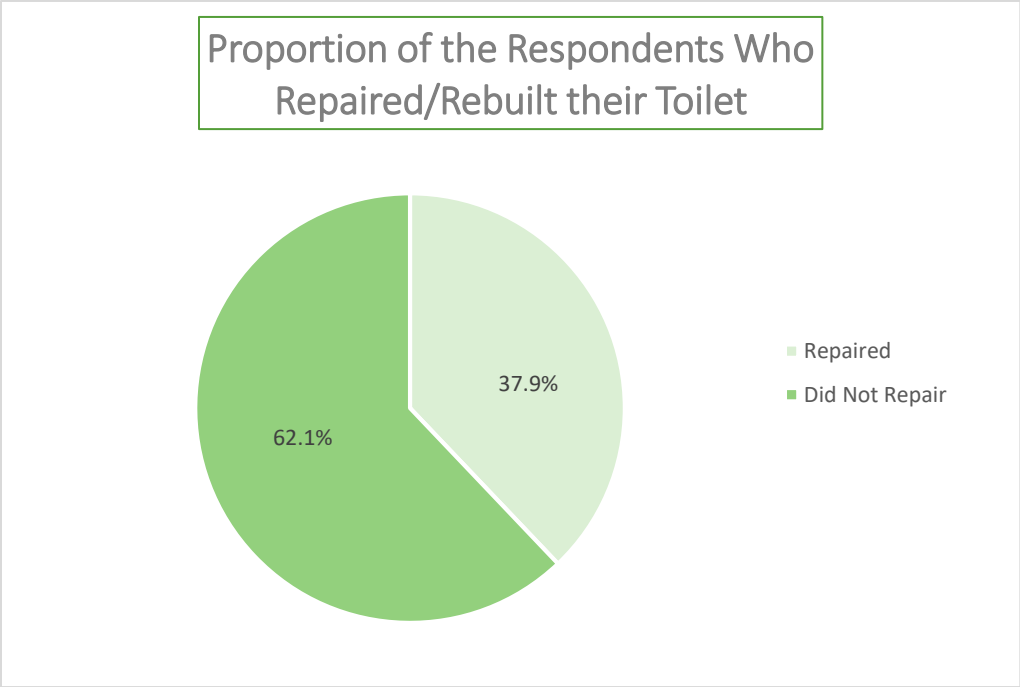


Figure-7.8: Proportion of Respondents Who Repaired/Rebuilt Their Toilets.

Almost all the toilets (98.6%) of the toilets fulfilled the project requirement of having adequate space (5 ft*5 ft) inside the toilet.

Out of the households that fixed their own toilet, more than one-third of them used their household income to finance the expenditure, whereas another one-third borrowed money. The remaining households financed their spending through savings, donations from family members, or by selling assets like livestock. In case of borrowing, a household borrowed about BDT 2700 on average.

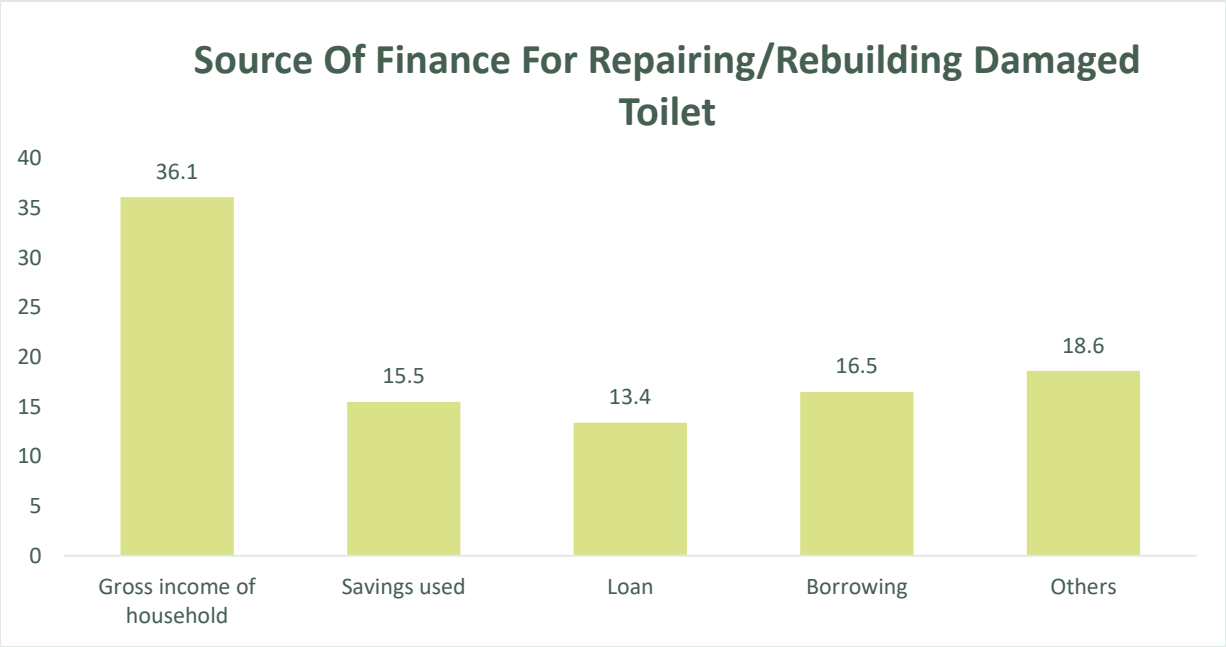


Figure-7.9: Source Of Finance For Repairing/Rebuilding Damaged Toilet.

Of the 211 toilets surveyed, local entrepreneurs trained under the "BD Rural WASH for HCD programme" made up 85.8%. About 10% of the respondents built the toilet by themselves, and the remaining 4.2% used other local workers to build their toilets.

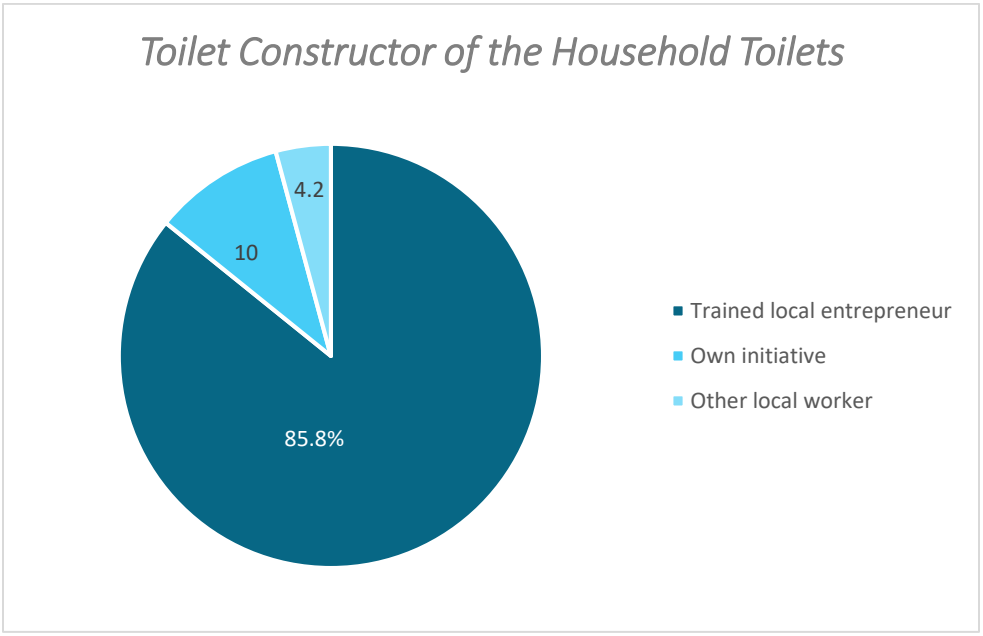


Figure-7.10: Percentage Distribution according to the Constructor Type of Household Toilets in Noakhali Region.

7.2.6. Mental Satisfaction

In addition, 98.6% of the households reported to being satisfied with the twin pit toilet constructed under the PKSF programme.

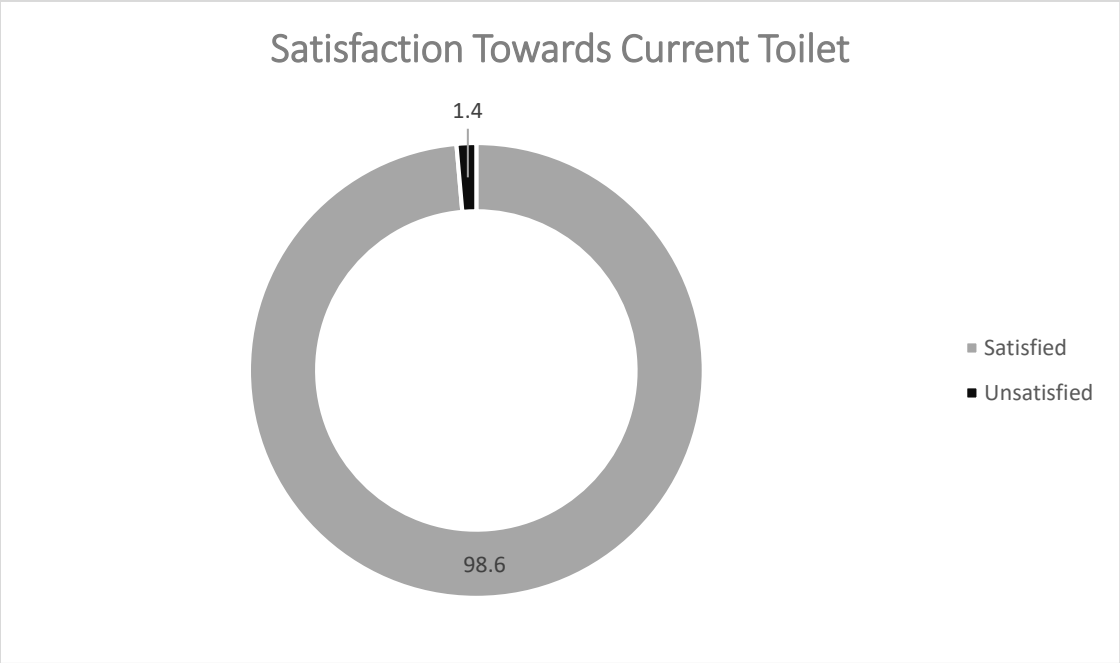


Figure-7.11: Mental Satisfaction of the Respondents towards the Current Toilet.

When the respondents were asked about the role their toilet plays in their social standard, most of them responded positively, saying that their current toilet improves their social standard. Some built the toilets because their children were taught in school about the importance of sanitation and waste management, and they wanted better toilets for their households. Meanwhile, others built the toilets because their previous toilet emitted bad odours, leading to complaints from neighbours. This motivated them to build a toilet that eliminated the unpleasant feature. Some of the respondents built their toilet attached to the main house to increase their safety, while others built it because it provided better access to children, women, and the physically disabled.

Even though some of the respondents attributed the twin pits as the reason for them to build the toilet, saying that the dual pit takes longer to fill, and the waste is safely managed. Most of the respondents are unaware of these benefits. They built the toilet because they were financed by a loan.

7.3. HEALTH & HYGIENE

In this study, the pattern of disease and the change in hygiene behavior are of interest. The outbreak of waterborne disease in post-flood is the significant finding in the primary survey.

7.3.1. Source of Water for Daily Use

According to the primary data collection, we found that a large number of people in Noakhali region used to have tube wells for drinking purposes (95.8%) but more than half (56.8%) of households' main source is pond water for cooking purposes. As most of the areas are submerged due to heavy flooding, the people have to face serious trouble in maintaining hygiene practice during & after the flood occurs.

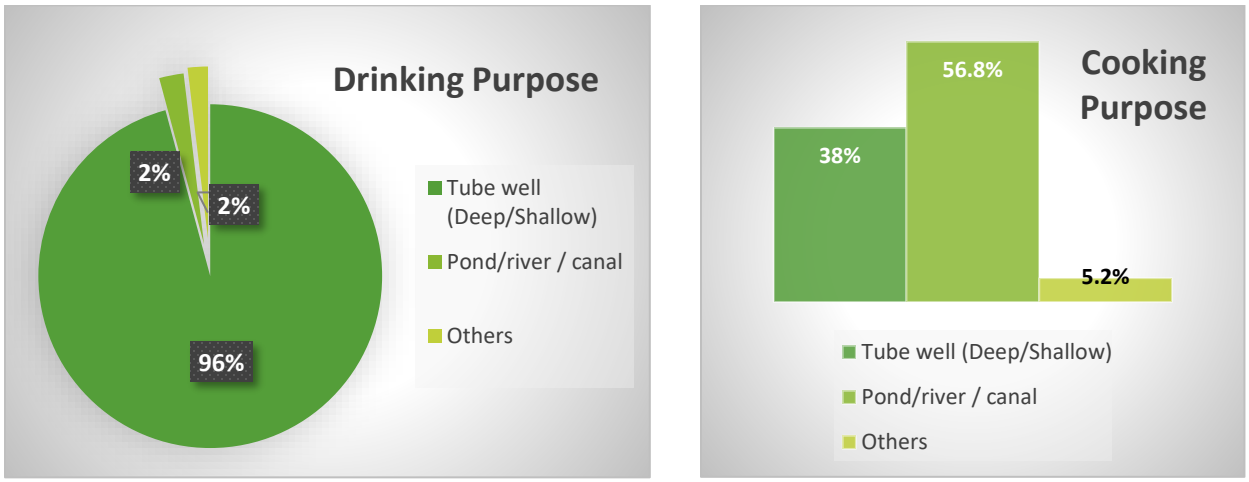


Figure 7.12: Water Resources Used for Drinking and Cooking Purposes During the Flood.

7.3.2. Waterborne Disease Outbreak

We have found 183 cases of waterborne disease among the 211 total samples collected, which shows a vulnerable outbreak of those diseases between 30 days after the flood occurs. To get the data, the respondents were asked whether any of his/her family members had been affected by any waterborne disease within 30 days immediately after the floodwater stepped down. It is one of the most crucial findings of the study. In this period, people were suffering from some specific diseases like diarrhea, fever, itching, dysentery, typhoid, etc. However, itching and diarrhea affect the rural people terribly. The study team found 67.2% cases of itching and 55.2% cases of diarrhea, respectively, among the total waterborne disease affected people. One-fourth of the respondents suffered from both diseases.

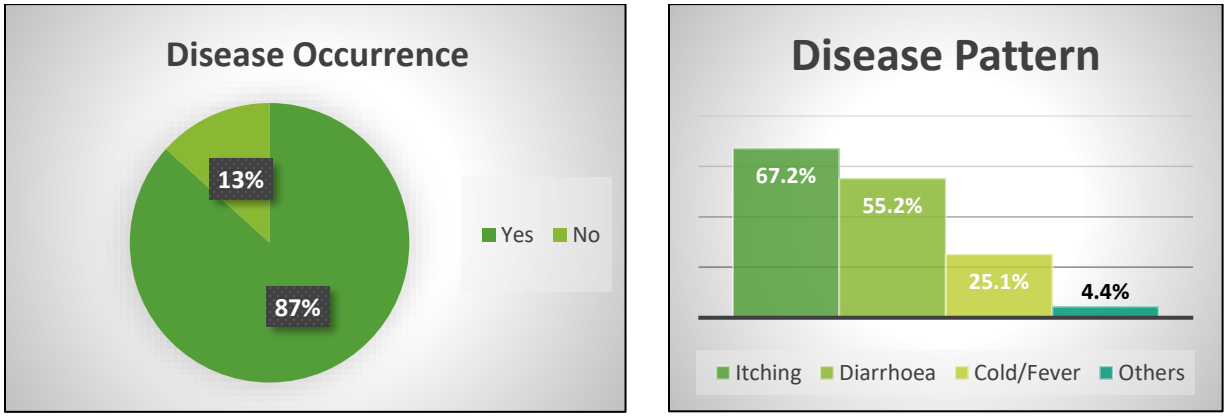


Figure-7.13: Disease Patterns and Occurances in Different Age Groups During/After the Flood.

7.3.3. Access to Healthcare

Almost 97% of disease-affected people had to seek healthcare to get rid of the waterborne disease between 30 days after the flood. The rural people have a greater tendency to seek healthcare from untrained village quacks or simply buy medicine from local dispensaries. Therefore, they are often ignorant of seeking better healthcare for themselves. In some cases, the household gets some relief medicines for use.

Table-7.5: Proportion of Disease-Affected People Seeking Healthcare.

Response	Number	Percentage
District Hospital	14	6
Upazila Health Complex	7	3
Union Health Care Centre	12	5.2
Community Clinic	7	3
Private Clinic / Service Centre	34	14.6
General Pharmacy	107	45.9
At home	19	8.2
Others	33	14.2

7.3.4. Treatment Cost

The median of the total treatment cost has been estimated as BDT 5000. In most cases, the household had to borrow the money from the neighbors, use the savings, or other donations, etc. A household is more likely to borrow BDT 9000 on average to maintain the extreme treatment costs. On the other hand, most of the earning members were unable to work due to the extreme flooding. They have to stay at home for 20 days at least. The economic loss of inability to work will be nearly BDT 15000 for a random household.

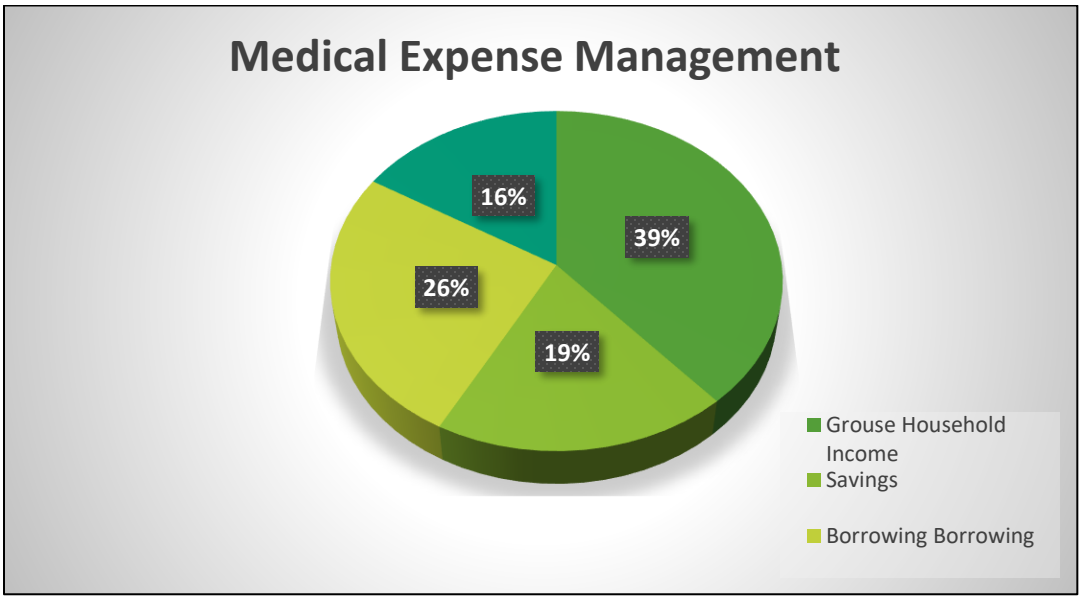


Figure-7.14: Medical Expense Management by Households During/After the Flood.

7.4. SUMMARY OF KEY FINDINGS FROM FGDs & KIIs

7.4.1. Findings from the FGD on MHM

Approximately 70% of the houses were under 1-2 feet of floodwater in most of the unions of the Noakhali and Lakshmipur regions. As a result, around 40% of locals from those inundated areas were forced to take refuge in nearby schools, colleges, and madrasas. Those who stayed back at home in the contaminated water suffered severely during those days. The shelters fell short of sanitation amenities as they became overcrowded over time, while the water level increased higher. The FGD sessions found that, with up to 20 people sharing a single latrine in the shelters and in other areas where the government aid could not even reach, the real-life scenarios displayed a major lack of proper sanitation facilities during the crisis period.

The floodwater remained stagnant for up to 15 days in some areas, which exacerbated all the living conditions and increased public health risks. The most common waterborne diseases, like diarrhea, dysentery, and typhoid, alongside skin infections such as rashes, fungal infections, and extreme itching. Some other seasonal illnesses, like fever, colds, and coughs, prevailed at an increasing rate as well. Most of the tube wells were submerged, and pond waters were contaminated, which were the prime reasons for the waterborne diseases. In many cases, access to healthcare was very limited due to waterlogging for a long period. The residents had to rely on the nearest local pharmacies or home remedies.

In special cases like pregnancy, pregnant women faced extreme difficulties in accessing gynecological treatments and clinical care during the flood. As a result, they missed many of their routine checkups and struggled to find necessary medications. Some women also experienced gynecological health complexities like excessive vaginal discharge and infections because of using polluted floodwater.

In one case, a woman shared—

"I had to give birth at home with the assistance of a midwife or 'Daai Maa' due to lack of access to the nearest clinics or hospitals for delivery. All my routine checkups were missed as we all were locked up at home due to waterlogging. I had to struggle staying all alone in the darkness due to a short circuit of electricity, while others were out seeking food, medicines, and aid. There have been days when I needed to visit the doctor urgently but failed, due to a lack of income and a barely available transportation system. Prices surpassed the expected minimum range."

Some critically ill patients required treatment at private clinics, which incurred expenses as high as BDT 35000. Only in some specific areas, affected people received relief efforts, medical and awareness camping facilities provided by government agencies, NGOs, and volunteers. Health workers provided necessary medicines like ORS, saline, and Metryl for diarrheal diseases, antiseptic solutions for wounds, antibiotics to combat extreme skin infections, water purification tablets (Fitkiri) for contaminated water, and syrups for children to mitigate the outbreak of disease.

During the menstrual period, 80% of women used sanitary napkins received as government aid or by borrowing from others, but still, affordability became an issue due to increased product prices. The most famous local sanitary napkin brands were the most purchased; they cost BDT 30-120 per packet, resulting in BDT 90-360 usage per head during the flood. A few may have used tissue paper, but it was not a regular practice. Some purchased skin ointments, Dettol, or antiseptic solutions for both internal and external usage, which cost them BDT 150-3000 monthly. Due to financial and availability constraints, some women were forced to revert to traditional cloth methods (using soft old clothes instead of sanitary pads), which increased the risk of gynecological infections. Limited access to proper waste disposal facilities and a poor sanitation system, such as throwing menstrual waste or napkins in canals, ponds, or into floodwaters, further worsened the health conditions. One of the women respondents shared—

"Generally, we used to dump our menstrual waste or put them into polythene packets, and throw them directly behind our houses or bury them under the soil. Some of us used to burn those as well. During the disaster days, it was tough for us to maintain menstrual hygiene, particularly. We received adequate sanitary napkin products as government aid, but we were unfortunate enough that we could barely throw, burn, or bury them anywhere. There was water everywhere!! Thus, we were bound to throw them openly into floodwater. "

Another respondent added—

"Due to month-long waterlog, using the contaminated floodwater in sanitation purpose, we faced many unusual gynae infections like vaginal itching and white discharges. We were unable to share it with anyone due to privacy concerns and suffered in silence. For temporary relief, we sought medicines from local pharmacies or tried to use hot water with Dettol in it."

Respondents from Lakshmipur shared that they barely received any government support or volunteer aid during the flood, and so, many of them continued using unsafe water for drinking, cooking, and sanitation purposes. Additionally, no government healthcare sessions were conducted there, leaving many unaware of proper treatment methods. As a result, contaminated water sources led to widespread infections and gastrointestinal diseases.

7.4.2. Key Informant Information

The purpose of Key Informant Interviews was to collect information from individuals who have first-hand knowledge about the community. Interviews were conducted with two Civil Surgeons of Noakhali and Lakshmipur Sadar, a Community Healthcare Provider (CHCP), a Health Worker, and the Executive Director of Sagarika.

Conducting one-to-one sessions with Civil Surgeons of Noakhali region, CHCP, and Health Educator from Lakshmipur Sadar Hospital, we figured out that five upazilas in Noakhali district were severely affected due to month-long waterlogging, which increased the ratio of diarrheal disease and skin infection prevalence. As a result, public and private hospitals and clinics needed to expand their healthcare service delivery capacities. About 50 courtyard sessions (later increased to 2000 with UNICEF support) were conducted for hygiene awareness. We supplied medical aids like ORS Saline, necessary diarrheal medicines, paracetamols, water purifying tablets, etc. 102 shelters and union-based teams were on standby to provide adequate aids, who also coordinated with volunteers. Unfortunately, the Health Educator of Lakshmipur could not confirm any awareness-building efforts.

The female health worker shared that she provided primary healthcare, such as measuring blood pressure, checking breathing issues, etc. She tried to sell emergency medications like ORS Saline and Metryl for diarrheal disease cases, sanitary pads for menstrual issues, and skin ointments for extreme skin itching and infections at a lower price than the usual market price. She tried to promote the usage of sanitary napkins among young girls and women as well.

The executive director of Sagarika Samaj Unnayan Sangstha shared his contribution towards flood-affected residents. He shared that Noakhali had never experienced such prolonged flooding with heavy downpours. NGOs, individuals, and government authorities sent dry food, essential medicines, and clothing, which were distributed in overcrowded shelter homes and other inundated households. They organized over 80 health camps, mainly addressing diarrheal and skin disease prevalence. The organization is now ready to support government efforts in any future disaster response.

7.4.3. Case Studies

Md. Rubel, a 36-year-old agricultural businessperson, is the sole earner for his family of seven, including a physically disabled son. To improve sanitation, he built a "Shoukhin" toilet with designated washrooms for his children and elderly parents. During a flood, his house and farms were submerged, causing a business loss of approximately BDT 3 lakh. His family suffered from waterborne diseases, and medical expenses amounted to BDT 14,800. He took a loan of BDT 38,500 but was relieved that his advanced toilet remained mostly undamaged, ensuring better hygiene and mental satisfaction.

Fancy Akter, a 55-year-old artisan from Noakhali, faced similar challenges. Her family of seven, reliant on handcrafted work and her husband's guard job, struggled financially. The flood caused waterborne diseases, and her pregnant daughter required hospitalization, costing BDT 30,000. Medical expenses totaled BDT 50,000, and their three-month income loss was about BDT 45,000. Their toilet was submerged, forcing them to use neighbors' facilities. However, once the flood receded, their "Bilash" toilet was reusable, ensuring better privacy and security.

Both families experienced severe economic and health crises but benefited from their improved sanitation facilities, which played a crucial role in maintaining hygiene and overall well-being.

8. DISCUSSION

BD Rural WASH for HCD is a pioneer project conducted by PKSF to improve sanitation facilities, better hygiene practices, and bring a positive change in hygiene behaviour for the rural people. This project was running at a good pace before the devastating flood occurred in many rural areas of Bangladesh, especially in the Noakhali region. The study aims to assess the economic cost of the damage to safely managed WASH facilities and the health hazards increased due to floods. The primary fieldwork gives a clearer view of the objective of the study. As the people of this area have not faced flood situations in the last two or three decades, there are no precautionary measures available to cope with it easily. This is one of the reasons why studying is important. Therefore, we can discuss our key findings from several aspects.

8.1. DEMOGRAPHIC DYNAMICS

- **Education and Income level**

The data analysis shows that a notable percentage of people are farmers, small businesspersons, drivers, or migrant workers. The average household income is more or less 20000 BDT per month. Besides, the level of education is up to primary for most respondents. Again, the maximum (61%) household has at least 5 or more family members. The education level of an individual can play a vital role in practising healthy behavior, like safely managed sanitation. An educated and sensible household can understand the necessity of sanitation in daily life. Almost 78% of the respondents who have at least a primary level of education are aware of hygiene. Besides, income is also a significant factor in the hygiene practice improvement of a household. The reason is that improved sanitation has not been the top priority for the rural people generally. Sanitation practice varies from personal choice and the income level they earn. Therefore, education and income have a positive relationship with improved WASH facilities.

8.2. SANITATION ASPECTS

The sanitation aspects of the study are discussed below:

- **Extent of Toilet Damage Due to Flooding**

The study highlighted the impact of flooding in the Noakhali region on sanitation facilities. Approx. 98.6% of the respondent households reported damage to their toilets. One of the inclusion criteria of this study was to survey only the households that suffered damage to their toilets, which explains the high proportion. According to the survey initially completed by the POs implementing the program, the number of damaged toilets was approximately BDT 11500. However, experience from the recent survey suggests that the true extent of the damage is far less.

- **Flood Resilience of Twin Pit Toilets**

The severity of the damage varies from district to district. In Noakhali, prolonged waterlogging caused toilets to be submerged under water for about two months. The situation in Lakshmipur was better, as floodwater persisted for only about two weeks. However, strong flood currents caused more damage in Feni compared to the other two districts. Among the households that suffered from damage to their toilets, the most common form of damage was pit submersion (58.7%), followed by damage to pits or pipe connections (22%). About 4.3% of the toilets were partially or completely damaged, and 4.9% of the toilets became completely unusable due to damage caused by the flood. This is further testament to the sustainability and flood resiliency of the twin pit toilets that were built under the program, as only 9.2% of the toilets surveyed suffered from significant damage, and another 32.2% suffered from minor damage that could have been fixed relatively easily. Thus, it can be said that the toilets, though not fully flood-proof, are sustainable and flood resilient.

- **Financial Burden on Affected Households**

Besides, only 37.9% of households had repaired or rebuilt their toilet after the flood, and the cost of repair was BDT 2000. However, even though the median expenditure seems low to the naked eye, we must take into consideration that these toilets are built on loans taken by poor people,

mostly. The untimely and previously unforeseen flood in the region cost the livelihood of many. In Noakhali, waterlogging persisted for around 2 months, meaning many people could not return to work for that many days. Furthermore, the flood caused immense damage to crops and livestock, adding to the losses.

About 16.5% of the households used borrowed funds to repair their toilets. On the other side, 13.4% of respondents obtained loans, and 15.5% used their savings. Another 18.6% of the households financed their spending through donations from family members or by selling assets like livestock. Households borrowed or took out loans totalling around BDT 2700 to fix their toilets. This shows that even the relatively low expenditure required to fix toilets has led to a debt burden for the people in a time when they are already distressed by a multitude of other factors. This will add to the mental strain that already exists for these people.

- **Impact of Toilet Damage and Prevalence of Open Defecation**

About 53.1% of respondents who could not use their own toilet, on average, for about 27 days (median=10 days). During this period, 26.5% shared their relative's or neighbour's toilet. Again, 8.5% of the respondents used the toilets available in the flood shelter. When the respondents used shared toilets or toilets available in shelters, mosques, and madrasas, a large majority of 78.7% reported that they faced no problem. The high satisfaction rate shows that emergency sanitation facilities were satisfactory. Nevertheless, some of the respondents (17.4%) complained about the lack of adequate water supply or sanitation facilities like soap, sandals, etc.

The highlighting finding, however, is that 9.2% of the respondents resorted to open defecation when their own toilet was unusable. The rate of open defecation alarmingly increases to 19.1% for special members of the family, applicable to families consisting them. According to the report on sample vital statistics by the Bangladesh Bureau of Statistics (BBS), the national rate of open defecation in Bangladesh was 0.94 in 2023. Meanwhile, the rural open defecation rate was 1.9% in 2019 and the overall open defecation rate for Chattogram division was 1.4% according to the Bangladesh MICS survey, 2019. In comparison to the overall, rural and divisional rate, the finding of this study is distressing. A rate of 9.2% or even worse 19.1% is concerningly higher than the standard values. This is because open defecation poses serious health risks to families themselves, as well as those living nearby, as it can potentially lead to a multitude of waterborne illnesses.

8.3. HEALTH IMPACT

- **Health and Hygiene**

Among the respondents, almost 95% collect their drinking water from tube wells.. Again, the maximum people (58%) main source is the water from a pond or canal for cooking or other necessities. In the post-flood period, Noakhali faced prolonged waterlogging. Therefore, there was a tendency to stay in the house as there was less water flow, but logging. In that case, a notable population of Lakshmipur and Noakhali used the flood-affected wells and ponds for daily needs. Again, the water level was quite high in the Feni district. Therefore, they had to go to a shelter when the flood occurred. Consequently, it was quite tough to maintain good hygiene practices in that period. Additionally, those households having the special age group faced some serious drawbacks in maintaining healthy practices, as those groups are the most vulnerable portion to any kind of natural disaster like flooding.

- **Disease Pattern**

During the devastating flood, there was a serious outbreak of waterborne diseases like fever, diarrhea, typhoid, dysentery, and so on. Around 55% of Diarrhea cases are found according to the data collected among the respondents. On the other hand, more than half of the respondents addressed skin diseases like itching in the immediate 30 days after the flood. This is one of the crucial findings of this study. Almost 67% of itching cases are found in this study, which is a comparatively large number of disease outbreaks. So, we try to find the reason behind the skin disease outbreak as well. The civil surgeon of Lakshmipur and Noakhali confirmed that the reason behind the extreme outbreak of disease, mainly diarrhea and itching, was the dusty or contaminated flood water immediately after the disaster. The people who use polluted water regularly or have been in contact with it for a long time are more likely to suffer from those diseases. It establishes a quite strong relationship between disease outbreaks and the use of floodwater.

- **Menstrual Health Hygiene**

From the FGD sessions conducted among women of various age lines (age: 12- 45), it was found that the awareness about menstrual and reproductive health has advanced throughout the years among the young girls and women of the Noakhali region. Being educated by the basic menstrual health education through school curricula, from a few healthcare awareness sessions conducted at school, learning from others, and watching elaborate content on social media, 90% of the school-going girls and women now prefer sanitary napkin products to conventional methods. Napkin companies also play a significant role in spreading awareness by promoting menstrual hygiene through educational campaigns.

Among all the participants, a significant number of females belong to the younger generations. Approximately 60% of the female community, approximately two-thirds of the participants from the FGD sessions, now have a clear concept about keeping their menstrual hygiene checked. Nevertheless, due to social perspectives, 90% of them are still conservative enough not to open up about the gynecological health hazards to their mother or daughters, let alone to other women. Some of them are even indifferent about going for checkups and talking about their gynecological illnesses.

During the flood, due to water contamination, lack of sanitation facilities, and limited access to essential menstrual products, many women and young girls faced significant challenges in maintaining least menstrual hygiene. Despite these difficulties, they sought the availability of sanitary products from government aid or the nearest pharmacies. When not available, about 20% among them reverted to using old clothes (tena) instead of pads, in crisis moments. Some boiled water to clean the cloth before reuse, while others threw it in floodwater openly, being unable to dispose of the waste, risking the overall health and hygiene of the area population.

They highlighted that—

"We never faced such calamities in our whole lives. During the crisis moment, we felt the necessity for subsidized sanitary products and increased medical support from local healthcare providers, clinics, or healthcare centers, or even from the government."

Moreover, the findings illustrate the urgent need for affordable sanitary products, proper disposal systems, and accessible healthcare services to support women's menstrual health during and after such disasters.

8.4. ECONOMIC IMPACT

Economic Cost of Flood

A flood may cause much damage in the affected areas. Those costs were both direct monetary and economic. We have found both direct costs and economic losses in this study due to the extreme flooding. The costs are-

- **Direct Medical Cost**

The direct medical cost is the cost of seeking healthcare for an individual for the disease outbreak in the post or between immediate 30 days after the water steps down. The primary data suggested that most of the respondents who were affected by various waterborne diseases or skin diseases sought health care at that time. Therefore, there were direct medical expenses, including medicine, doctor visits, a healthy diet, and so on. We were able to assess the monetary value of direct medical costs or the cost of treatment. The median of the direct medical cost is BDT 5000 in the post-30-day period of flood, which denotes that each household spent more or less BDT 5000 specifically to get rid of the waterborne or skin disease during or after the flood outbreak.

- **Loss of Income**

We assess the loss of income due to unexpected floods by the Human Capital Approach (HCA), which is a traditional method for estimating productivity losses. The assumption is that individuals have the potential to produce a stream of outputs over their working life. The human capital approach measures lost productivity as the amount of time by which working life is reduced due to illness or other extreme situations.

In this study, we found that the respondents were confined at home due to the extreme flooding. Therefore, it caused a productivity loss, as they had no option to return to work or jobs. A notable population could not go to work due to post-flood illness.

We assessed the loss of income as the monetary value of productivity loss. The data suggested that the loss of working days due to illness is 29 days on average. Therefore, the income loss due to sickness has been calculated using the existing data of the study.

Method of Calculation

Firstly, we have to find out the total number of workday losses due to the devastating flood in the Noakhali region. The average loss of workdays due to illness is 29 days, according to the analysis. As we have found more than one member in a household in approximately one-third of the cases, the total loss of workdays must be higher.

Table-8.1: Number of Total Workdays Lost

No of earning members	**Frequency**	**Number Of Workday Loss**
One Member	133	133
Two Members	50	100
Three Members	22	66
Four Members	6	24
	221	323

According to the report of the Household Income & Expenditure Survey (HIES) 2022, the income reduction due to a workday loss is BDT 872 in rural areas of Bangladesh.

More likely,

The total financial burden for flood outflow will be found by multiplying the average workday loss for an individual, total person-day or workday lost and the daily earnings.

= BDT (29 * 323 * 872)

= BDT 8168024

We can calculate the financial loss by dividing the amount by the number of respondents.

Thus, we get,

= BDT (8168024 / 211)

= BDT 38711 (approximate)

Therefore, the financial cost due to workday loss during the flood is BDT 38711 (approximate).

- **Cost of Toilet Restoration**

We tried to find the cost of toilet restoration after the destructive flood ended. However, only one-third of the respondents repaired their damaged toilets after the waterlogging subsided. Here, we try to calculate their cost of repair to assess the financial burden.

Table-8.2: The Cost Of Repair For Damaged Toilets Due To Recent Flood

Type of Damage to the Toilets.	**Frequency**	**Estimated value of Restoration in BDT**	**Total cost in BDT**
Type:1, The pit is submerged but not broken.	179	300-800	53,700-1,43,200
Type: 2, The pit is broken or pipe connection is damaged.	67	1,000-1,500	67,000-1,00,500
Type:3, The toilet platform is broken	31	500-3,000	15,500-93,000
Type:4, The toilet is partially or completely damaged.	13	2,000-7,000	26,000-91,000
Type:5, The toilet is unusable.	15	10,000-15,000	1,50,000-2,25000
Total	305		3,12,200-6,52,700

Here, the approximate total cost of repair for the damaged toilet is a minimum of BDT 3,12,200 and a maximum of BDT 6,52,700. As the cost of restoration varies with the intensity of the damage, the value is found as a range of numbers. To specify the monetary value of the repair cost, the study team decided to go with the average value of the estimated restoration. The value suggested is BDT 1582 for repairing the post-flood damages of a safely managed toilet for a household.

General Discussion of Cost Assessment

The study team tries to assess the economic costs from three different dimensions, like direct medical costs, loss of income & cost of toilet restoration. Some key observations are found about the total financial loss due to the unexpected flood by combining them all together.

Table-8.3 : Overview Of Cost Assessment Due To The Flood

Types of cost	Monetary value in BDT	Percentage %
Loss of income	38711	85.5
Direct medical cost	5000	11
Cost of toilet restoration	1582	3.5
Total	45293	100

From the above observation, the total financial burden of a household due to the flood outbreak is estimated at BDT 45,293. An interesting fact is, almost 84.7% of the financial burden is seen for the waterborne disease outbreak for which the respondents were unable to income. Only 10.9% of the cost is for the treatment purpose, where a minimal portion of the total financial burden is for restoration purposes. So, the loss of income due to the waterborne disease outbreak was the major financial burden for the respondents of Noakhali region in the post flood period. It gives a clear view that, if the waterborne disease could be controlled the respondent can cope with the overall loss due to the flood.

9. CHALLENGES

- **Sample Size, Representation & Site Selection**

The primary limitation of the study revolves around the restricted sample size, comprising data collected from only five upazilas from three flood-affected districts. The small sample size raises concerns about the generalisation and representation of the findings to a broader population. The limited number of cases covered from only five upazilas might not adequately capture the diversity of damaged toilets, economic costs, and public health complexities inherent in a larger population, thereby potentially skewing the outcome of the study.

- **Time Constraints**

An inherent limitation was the constrained time frame of three months allocated for data collection. This temporal limitation constrains the depth and breadth of the research endeavours, imposing restrictions on the comprehensive exploration of multifaceted aspects. The restricted timeline potentially curtailed the thoroughness of data collection and analysis, affecting the depth and granularity of the findings of the study.

- **Challenges in Data Integrity**

The study encountered challenges related to data integrity due to households tending to withhold critical information, possibly to mitigate the portrayal of their economic status. This challenge introduced discrepancies and uncertainties in the collected data, compromising the accuracy, reliability, and completeness of the study outcomes.

- **Unavailability of Adequate Secondary Data**

Since the disaster was uncommon, rare, and sudden, pre-existing secondary data or prior recorded occurrences from a Bangladeshi perspective were not sufficiently available on any websites, journals, papers, or articles, which made it quite difficult to analyze trends or predict the outcomes.

10. RECOMMENDATIONS

- The fact that a majority of the toilets only suffered from submerged pits demonstrates that the twin-pit toilets are flood resilient. This can be improved further by elevating the twin pit structures.

- However, before that, more effort must be put into improving awareness among the people regarding safely managed toilet structures. To make the general people understand the benefit of twin-pit toilets and improve their behaviour, the partner organisations tasked with implementing the programme must believe in the system wholeheartedly.

- Currently, the POs are more concerned about providing loans and collecting installments. The ones responsible for communicating the benefits must first understand the concept properly themselves for more effective communication. The POs need to buy into the entire idea because the work they are a part of is groundbreaking, and it can change the sanitation landscape in the rural areas of our country.

- We have also seen that the cost of repairing the damaged toilet, coupled with the health costs, creates severe financial stress on flood-affected people. At a time when many people lost their assets and livelihood, additional expenses can lead to more borrowing and debt servicing. As a result, financial assistance programmes can be taken under which only the toilets that suffered significant damage to their infrastructure, like those that became partially or completely damaged and because unusable. This will not only reduce the financial burden on the people but also encourage quicker restoration of damaged toilets.

- Some people who used toilets in emergency shelters during and after the flood complained about the lack of water and other sanitation facilities like soap and sandals. The relevant authorities must address this issue by ensuring better preparation for future natural disasters.

- Open defecation increased significantly due to the damaged sanitation infrastructure. This is highly concerning as it can lead to incidences of waterborne illnesses. Educational campaigns and awareness-building programmes must be taken to inform the people about these risks. In addition, safer alternatives like going to the emergency shelters or using relatives'/neighbours' toilets during the flood can be promoted to reduce the rate of open defecation.

- The findings also recommend an urgent call for improved calamity preparedness, particularly in menstrual health hygiene and sanitation. Many gaps remain in gynecological or emergency medical services, clean water accessibility, and sanitary products affordability. Thus, future interventions should focus on strengthening the healthcare infrastructure first. Secondly, conducting more reproductive health awareness programs and ensuring sustainable menstrual health hygiene management whenever any disasters like this occur needs to be assured. Increasing subsidized or free sanitary products, particularly during emergencies, could greatly improve the living standard of the vulnerable female population in flood-prone areas.

- The Government hospitals, clinics, healthcare centres, or union health complexes, alongside government programs and NGOs, need to be ready to build awareness efforts to face any kind of future disaster outcomes regarding health.

11. CONCLUSION

The impacts of the flood-induced damage to safely managed WASH facilities in Noakhali, Lakshmipur, and Feni were inspected in this study. Analyzing the significant impact on the economy and human health, the results demonstrate the severe monetary challenges that the affected households faced, which got worse due to extended waterlogging and limited access to available alternative sanitary facilities during the crisis. Although BD Rural WASH for HCD initiatives have improved sanitary infrastructure in rural regions, the flood revealed notable shortcomings, especially in underprivileged and marginalized populations.

The study analysed the hygiene behaviour, educational attainment, and income level in a strong correlation. Open defecation became more common as a result of households with lower incomes. They found it difficult to fix the damaged toilets, which incurred severe health hazards to the mass flood-affected population. Waterborne diseases like diarrheal diseases and skin infections were mostly prevailing, and the treatment cost brought additional strain on family finances. Due to limited access to clean water and healthcare services, vulnerable groups—such as pregnant women, children, and the elderly— faced unimaginable challenges.

Several households fall short of repairing the damaged toilets, despite their resilience. The study also highlighted that toilets constructed by trained local LE withstood floods more effectively than those built by unskilled laborers did. Lack of financial readiness and sanitation awareness, however, remain major obstacles.

Targeted actions such as flood-resilient sanitation systems, grants for toilet rehabilitation, and adequate public health awareness campaigns are required to reduce future risks. To lower the disease epidemics during the crisis, emergency shelter homes need to have sufficient water and sanitation facilities available. Ensuring sustainable sanitation policies will need strengthening legislative frameworks and boosting funding for climate-resilient WASH infrastructure. Furthermore, to protect public health and economic stability in flood-prone areas, the study underscores the necessity for an integrated approach that combines behavioral change strategies, infrastructural resilience, and financial support mechanisms.

12. APPENDICES

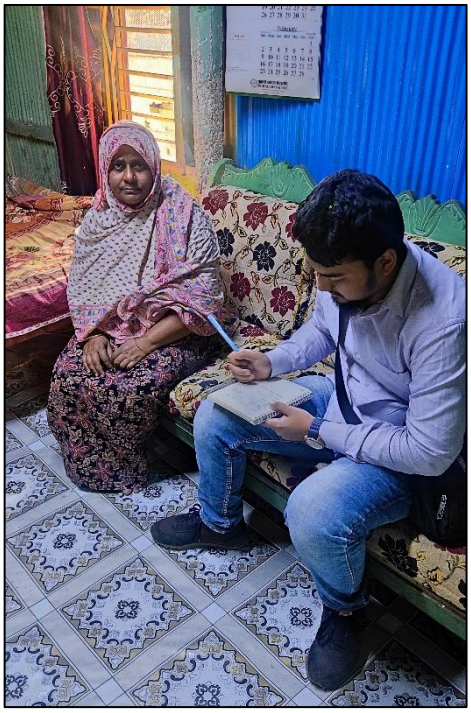
CASE STUDY – 1

36-year-old Md Rubel is an agricultural businessman. He is the sole earning member of a family of 4 adult members and 3 children. His eldest child has been physically disabled since birth. It used to be tougher for him to use the toilet daily all by himself. Therefore, Rubel decided to build a "Shoukhin" toilet around a year ago. He built two specific washrooms for his disabled son, young daughters, and old parents. He even managed to use an open space on the toilet roof for water reservoir tanks. The cleanliness and sanitation amenities, like adequate running water supply from the motor, soap, sandals, etc. One of his toilets is also used for storing rainwater in drums, for cooking and drinking purposes, for the whole year. They do not drink water from ponds or tubewells; they have a shallow motor system instead.

During the flood, their house and firms surged under floodwater, they had to take shelter in the nearest shelter home. One of my children is physically disabled; he cannot move around without others' assistance. Both of his parents are above the age of 65. Rubel had a hard time dealing with that crisis, managing family and parents. He shared, “I have a cow farm, a fish project, and other agricultural businesses. I used to earn a handful, around two lakhs, from a seasonal harvest. All of my businesses faced huge losses, my fish died and were swept away, and the cows faced severe illness. I could not work for 15 days, because the water was stagnant. All the cow foods were damaged. In monetary terms, the loss would be around 3 lakh taka.”

All members of his family suffered from various waterborne diseases like Diarrhea, High Fever, and Extreme skin itching. With the situation getting worse, he had to take his daughter to the nearest private hospital, which cost him around 14800 TK. At that time, he took a loan of 38500 tk. But fortunately, there was no necessity of repairing the toilets post-flood, as the damage to the toilets was very minimal. By using these advanced, built-in hygienic toilets, they were all highly satisfied, both physically and mentally. All of the family members were seen to be health-conscious.

CASE STUDY – 2



Fancy Akter, a 55-year-old woman, from Noakhali Sadar. She, alongside her daughters, earns by selling handcrafting works. Her husband works as a local guard. A family of seven members is run by their aggregate income, which seems to be very difficult to deal with in their everyday life. During the flood, almost all members faced various waterborne diseases like Diarrhea, fever, and skin diseases like extreme itching and skin irritation. One of her daughters was pregnant during the crisis. For her delivery, she was taken to the nearest private hospital, which cost around 30 thousand taka. The other members took random medications available from the nearest pharmacies, which cost them a together 20 thousand taka. They had to seek a huge loan, around 50 thousand taka, for treatment purposes.

Due to waterlogging for months, they could not work for 3 months, an income cost of which was roughly calculated as 45000 taka. Even though they could not use the toilet during the flood as it was inundated fully under water, they had to seek sanitation facilities from the neighbourhood toilets. After the flood, the water subsided, and the toilet was reusable.

All of the family members are highly satisfied using the newly built Bilash Toilet. The pregnant lady also felt less insecure, and her privacy concern was met.

FOCUS GROUP DISCUSSION (FGD) – 1

Union: Alinagar

Upazila: Noakhali Sadar

Zila: Noakhali

Respondent's Age: 21-46 (Female)

Number of Respondents: 25-26

Almost all of our houses were submerged under approximately 1–2 feet of water. As a result, we could not stay in our homes and had to take shelter in a nearby higher secondary school. There, we had access to only two toilets, which had to be shared among all of us. Despite the crowd, we managed without major difficulties.

During the flood, we suffered from various health issues. The most common ones included skin infections such as rashes, itching, and fungal infections, as well as waterborne diseases like diarrhea, fever, cold, and cough. Skin diseases spread like an epidemic among the community. We believe the main cause was the contamination of local water sources—floodwaters mixed with pond water and submerged tube wells, making clean water inaccessible for drinking, cooking, and daily use.

To tackle these health issues, we obtained medicines and ointments from both the district hospital and local pharmacies. At times, we relied on advice from acquaintances for treatment. The elderly and children were the most vulnerable, often requiring assistance to reach hospitals and shelters. For skin infections, we used various allergy medications and an antiseptic lotion called *Elimate Plus*, which cost around 180 BDT per bottle. However, the condition persisted, leading to additional medical expenses totaling around 1,000 BDT. Managing these expenses was challenging due to financial constraints, forcing us to take loans and rely on credit-based purchases.

One among all those women was pregnant during the flood and she faced immense hardships taking care of her gynecological health in the shelter homes. She barely found enough medications and couldnt go for regular visits to doctors.

We generally use tube well water for drinking, while water for cooking and other household chores is collected from a nearby pond. However, during the flood, the pond water became contaminated as it mixed with polluted floodwaters, making it unsafe for consumption. Despite the risks, we were often left with no choice but to use this water, which we believe contributed to the widespread outbreak of skin diseases.

In our household, around 20 people share a single latrine. We typically use sanitary napkins for menstrual hygiene, and in some cases, tissues. However, a few elderly women in our community still rely on old cloth, which they use once and then dispose of in the canal instead of reusing. Nowadays, the younger generation primarily prefers sanitary pads, with brands like *Senora Confidence* and *Joya* being the most commonly available and affordable options. A pack of 16 pads costs around 120 BDT, while smaller packs of three cost 40 BDT.

As for disposal, some of us discard used pads in the nearby canal or pond, while others wrap them in plastic before disposing of them in garbage pits. During the flood, they had no options to dump their napkin wastes in the garbage pits and thus they threw those wastes into flood water. Several government organizations provided sanitary napkins as part of their relief efforts, which helped us maintain hygiene without major difficulties.

However, before and during the flood, many of us experienced gynecological issues such as intense itching, infections, and excessive vaginal discharge. Some of us managed these conditions by purchasing ointments and medicines from local pharmacies, but we did not consult doctors.

School-going girls now receive some knowledge on menstrual and physical health through their female teachers or health awareness sessions conducted by healthcare workers. Additionally, many of us access information through social media, which allows us to educate others in our community as well.

FOCUS GROUP DISCUSSION (FGD) - 2

15 no Laharkandi Union Porishodh

Village: Chandkhali

Upazilla: Sadar

Zilla: Lakshmipur

Respondent's Age: 12- 40 (Female)

Number of Respondents: 18

People of Laharkandi, Lokkhipur Sadar faced unmentionable hardships and struggles in the recent devastating flood caused for the very first time in this area. The houses weren't submerged, but the yards in front of them were submerged under approximately 1-2 feet of water. People who had their houses submerged as well had to leave immediately and took shelter in the nearest Primary Schools, colleges, or madrasas. The yards and houses remained inundated under water for around 10-15 days, somewhere 25 days.

Various disease outbreaks were traced and recorded then. Some of the major ones were Diarrhea, Fever, cold, allergic reactions (skivvy, daud, bichi). The outbreak of extreme skin itching and irritation increased excessively in the post flood situation, as everyone forcefuy had to intake and use polluted toxic flood water for drinking, cooking and other living purposes.

Many used their own tube wells for drinking water purpose, but some had their tube wells sunk under water and thus they had to drink and cook with the available flood water directly. Whenever

one fell sick, they had to seek medications and treatments from the nearest pharmacies or healthcare workers. The government's help or aid didn't reach this region, thus they had to buy the medicines on their own, which put them under a huge financial burden.

To maintain menstrual health hygiene, the women of Laharkandi are now using sanitary napkin pads that are available everywhere around the union. Easy accessibility and affordability made it more attractive to the young girls and married women that they never went back to the previously attempted traditional, unhygienic techniques anymore.

Most of the women get their monthly periods 2-3 months delayed. Senora, Joya, etc are the most available and affordable sanitary napkin brands there. During and after the flood, the price value of all products increased at an excessive rate, which made it tougher for them to buy sanitary products like before. As a result, many had to switch back to their old traditional techniques of using old soft clothes for periods, reusing them by washing in boiled water. If not, then openly throwing the waste away in the flood water, as the water took days to drain.

The younger girls who go to the school are taught well about menstrual health hygiene in their physical education subject. In addition, the napkin pad companies sometimes come and advertise their products while preaching the necessity of using sanitary napkin pads to keep menstrual hygiene protected. Many married women from those households faced gynecologic diseases and infections due to using toxic, polluted floodwater. They sought treatments and medications for allergies and skin disease outbreaks from their nearest pharmacies. Some of them used hot water with antiseptic dettol in it to get relief from extreme vaginal itching or irritation or infection.

FOCUS GROUP DISCUSSION (FGD) - 3

Shomiti: Fulkoli Mohila Shomiti

Village: Nolua

Union: Dhanshiri

Upazila: Kabirhaat

Zilla: Noakhali

Respondent's Age: 17-35 (Female)

Number of Respondents: 22

People from Nolua never faced such a devastating disaster like the recent flood took place in Noakhali region in august 2024. The women from this union had to face greater hardships maintaining overall health safety, specifically menstrual health hygiene. They shared that when the water reached 1-2 feet higher it was nearly impossible to get out of their house and take shelter somewhere else as transportation wasn't available enough expect for boats. They had to stay inundated under water for 15-20days.

While receiving government supports and aids, they got enough sanitary napkin products to use in that emergency crisis. Being stuck at home during flood, many faced different types of waterborne diseases like Diarrhea, Dysentery and extreme Skin itching due to usage of toxic polluted flood water, as most of the tube wells sunk. They managed some emergency medications from nearest pharmacies in their village or from other villages. Some of them were- Histacin, Metryl, Napa, Hagyl etc. Those who went under extreme health hazards needed to seek medical treatments from Private clinics which cost them max 35000tk. One of the women were pregnant during this disaster situation, she couldn't visit to doctors regularly or get her child delivered in clinics. Rather she let her child born to a Midwife/Daai (trained/untrained) in her own home.

To ensure the menstrual health hygiene during flood, all were privileged enough to buy or receive sanitary napkin pads and products to use. Old conventional methods aren't preferred anymore by them. It has been 5-7 years since people have started using sanitary napkin products and got used to it thinking about self health hygiene first. Spreading awareness among them in the community or through conducting sessions in school or teaching them through physical education subject was observed. It left a huge impact in changing their health hygiene behaviour, drastically in last 2years. Still many women used to dispose their napkin wastes in ponds nearby, or by burning them or burying them in soil pits.

One suggested that vaginal infections and skin allergies/itching increased due to usage of unhygienic polluted flood water. Some managed to get medications but others are just suffering in silent ever since the flood was caused. It would be a greater help for them if any subsided initiatives are provided for pads or supports from local doctors are ensured. Usually they go for doctors' visits at Maizdi Sadar hospital or clinics. Senora, Joya are most used sanitary napkin products because of their affordability and availability in that area. They don't tend to use old clothes or tissues as substitution of pads anymore.

FOCUS GROUP DISCUSSION (FGD) - 4

Upazilla: Chandragonj

Zilla: Lakshmipur

Respondent's Age: 28- 40 (Female)

Number of Respondents: 8

People in Chandragonj, Lokkhipur, suffered greatly as a result of the recent terrible flood, which also brought disease epidemics like fever, cold, diarrhea, and allergic responses. Extreme skin irritation and itching resulted from the usage of the flood water for cooking, drinking, and other necessities. Many households were forced to utilize the floodwater directly for cooking and drinking because their tube wells were submerged under the flooding. Young girls and married women used sanitary napkin pads from companies like Senora and Joya to maintain menstrual health hygiene. Many faced gynecological diseases like vaginal discharge or extreme itching during the flood after being compelled to use unhygienic polluted flood water. Some of them followed the medications by purchasing ointments and creams for internal use from the nearest pharmacies. Others took preventive measures like using boiled water to get relief from extreme itching and infection. Nobody received any healthcare session or health worker's guidance to learn about the health risks regarding menstrual health hazards and hygiene.

FOCUS GROUP DISCUSSION (FGD) - 5

Branch: Dhanshiri

PO: Sagarika Shomaj Unnayan Shangstha

Upazila: Kabirhaat

Respondent's Age: 26-35 (Female)

Number of Respondents: 7

While visiting the branch "Dhanshiri" of Sagarika Shomaj Unnayan Shangstha, Kabirhaat, we interviewed 7 of their branch managers. We found from our conversation session that almost 60% of them faced major disaster interruption due to floodwater logging.

Nolua Union, Joddanandapur, was the most affected among all villages. The area was inundated with around 2-3 feet of floodwater for months. People went homeless, lost their jobs, agricultural assets were damaged severely. As a result, receiving installments by the branch managers was closed for 2 months. 60% of residents took shelter in primary schools, colleges, or madrasas in Nolua. Overall, (30-40)% of people from Kabirhaat had to move to shelter homes.

Primarily, emergency healthcare supports and aids were provided by the government or regional heads. Diarrhea, skin diseases appeared at their maximum level. To provide health protection and treatments, various necessary medicines were supposed to be immediately volunteers like ORS saline, Metryl for diarrhoeal diseases, water-purifying tablets (Fitkiri) for drinking safe water, paracetamols for fever, etc. These were distributed by doctors and experts from the established medical camps, volunteers of the government aid team, local pharmacies, or by sharing between each other, whoever received the aid at that time. For children, medicine syrups were provided as well. As doctors and health care workers in the medical camps reached those areas, they prescribed and distributed the medicines, there were a matter of financial cost, the amount or source of which wasn't found.

KEY INFORMANT INTERVIEW (KII) – CIVIL SURGEON, CHCP & HEALTH EDUCATOR

According to the interview, Dr. Masum Iftekhar, the Civil Surgeon (CS) of Noakhali, stated that altogether 5 Upazilas were affected by the flood, namely Begumganj, Sonaimuri, Senbagh, Kabirhat, and Noakhali Sadar Upazila. The main issue with the flood was waterlogging, with water levels persisting for about 3 months in certain areas. As commonly seen during these scenarios, the sanitation system broke down, and the incidence of diarrheal diseases increased significantly. The upazila health complexes (UHCs) and district hospitals had treated a large number of patients with diarrhea and similar diseases. The hospitals had to create additional space to provide care to these patients.

In order to increase awareness in the post-flood period, DPHE and volunteers conducted 50 courtyard sessions in villages. In such sessions, they taught people about cleaning tube wells so that safe drinking water becomes accessible. The number of these sessions increased to 200 with support from UNICEF. They also provided relief like saline, medicine, and water purifying tablets, etc. These sessions worked successfully in reducing the number of diarrhea patients.

The post-flood period also witnessed an increase in skin diseases among the affected population. In order to combat that, community clinics and UHCs conducted camps to provide treatment and improve awareness.

In preparation for any future calamities, there are 102 shelters, and union-based teams are kept on standby, ready to be called upon if needed. The civil surgeon also stated that they received enough support from the central government, development partners, and the United Nations to deal with the flood and its effects.

The comments of the civil surgeon were also echoed by Jharna Begum, a Community Health Care Provider (CHCP) from the Dakshin Nalua community clinic. Here, too, they had to treat more diarrhea patients than usual. The incidence was higher among children and the elderly. They received medicine and saline from the government and disbursed them to the patients in need. During the flood, drinking water for the community clinic was sourced from deep tube wells, which prevented further outbreaks of diarrheal diseases. The community clinic itself provided shelter to people during the flood.

Furthermore, the interview with Dr. Ahmed Kabir, who was the civil surgeon of Lakshmipur district during the flood and is now the administrator of Munshiganj district hospital, provided similar insights. He stated that the flood in the district lasted for a week. The situation in Lakshmipur was manageable as the flooding was not as fierce as it was in Feni, and unlike Noakhali, waterlogging did not persist for a sustained period. The primary concern was the outbreak of diarrheal diseases. To tackle that, the medical team under the health department coordinated with volunteers in the affected regions. They received adequate support from the central government and international agencies like UNICEF, ICDDR, B, and WHO, as emergency saline, medicine, IV fluids, and water purifying tablets were delivered sufficiently in time. The incidence of skin diseases also increased after the flood.

In case of similar natural disasters that might threaten the region shortly, preparation is being worked upon, with 64 area based medical teams, consisting of Sub-Assistant Community Medical Officers (SACMO) and community health workers, and control rooms in each of the five upazilas and in the civil surgeon’s office to deal with any event swiftly.

Similar to Noakhali, the incidence of skin diseases also increased after the flood. Medical teams consisting of doctors provided treatment in medical camps, and serious cases were taken to UHCs and the district hospital.

However, when the health educator appointed to Lakshmipur district hospital, Md. Mizanur Rahman was asked about the measures taken to improve awareness among the population regarding waterborne and skin diseases, he could not provide any definitive answers. This can lead to the conclusion that awareness building among the population about diseases that can affect them during and after floods have not been prioritized.

KEY INFORMANT INTERVIEW (KII) – FEMALE HEALTH WORKER

Rabeya Begum Happy

Health Worker, Age: 32

Ward-2, Union: Dhanshiri

Upazila: Kabirhaat

District: Noakhali

32 years old Rabeya Begum Happy is a former Health worker of Ward-2, Dhansiri union, Kabirhaat, Noakhali. She played a huge significant role in serving primary healthcares and immediate emergency services to her local ward people. She studied up until class 8. She provided primary health care services like- measuring blood pressure of the affected stressed people from

the surrounding, checking breathing difficulties with a breathing pump machine in those flood-affected days.

During those days, a huge outbreak of random diseases was observed. People were most likely affected by various skin diseases like allergies, extreme itching, skin irritation and infection, rashes, etc. Some notable waterborne diseases were diarrhea, stomach ache, dysentery, etc. Rabeya had different types of medicines stocked or reserved for sale, at a small medicine corner of her house veranda. She usually purchases these medicines from a local pharmacy named 'Jamuna Pharmacy'. Medicines she stored were Paracetamol (fever-cold-cough), Histamine (allergy), Metryl (diarrheal diseases), ORS saline packets (diarrheal diseases), Sanitary Napkin Pads, etc.

Usually, young girls or women, whoever is in need, used to use pieces of old clothes in their monthly menstrual periods. But now almost all of them have switched to sanitary napkin pads from various brands like Senora, Joya, etc. The teen girls and other young female students are also getting preached, taught, and instructed on the necessity of using sanitary pads instead of old clothes, which are a greater risk for menstrual health hygiene. Thus, the demand for the medicines eventually increased among the locals during the flood. Even the pregnant women were purchasing necessary medicine, or ‘Sufola’ medicine at that time, for around 3-4 months when the flood water stayed there in halt, from Rabeya. She prepared handmade hand sanitizers as well for all. She also helped out wounded people by treating them by putting head or hand bandages whenever needed.

As a result, the supply of her reserved medicines increased too drastically during those days. But for any severe cases or secondary healthcare treatments or major accidental incidents, people from her ward visited and sought better and professional medical care from Maijdi Sadar Hospital, travelling by boats or walking in the water.

KEY INFORMANT INTERVIEW (KII) – EXECUTIVE DIRECTOR (ED)

Md. Saiful Islam, Executive Director (ED)

PO: Sagarika Samaj Unnayan Sangstha

Upazila: Subarnachor, Noakhali

When asked about the flood situation in the Noakhali region, Mr. Saiful Islam, Executive Director of Sagarika Samaj Unnayan Sangstha, told us that during the flood, residents of the Noakhali region were also faced with heavy rains. This is a new situation for the residents of this region, as they have not faced flood situations before. The Noakhali region was flooded for almost two months. In such a situation, as the water level rises, the established educational institutions of every ward and city are declared as the shelter of the affiliated people in that area. He also said that during the distribution of relief materials, he saw that people, cattle, and poultry were staying together in unhygienic conditions in the shelters. Many people left their homes and moved to their relatives' houses elsewhere. He said that there is an extreme shortage of food items and safe drinking water during the flood. Various NGOs and individuals have come forward from different positions to help them. Meanwhile, dry food, medicine, and clothes have been provided for a month as various relief items. At this time, there was some difficulty in reaching the Noakhali Lakshmipur road relief materials to this region due to severe flooding and the damaged road. Various waterborne diseases are seen in the Noakhali region after the flood. Out of these people are most affected by diarrhea and skin diseases. Initially, several health camps were organized by Dhaka University and the government to solve the problem. He also said that more than eighty health camps have been conducted by the organization authorities. High yielding paddy seeds of various varieties have been distributed to farmers at field level by the organization to overcome the post-flood losses. No large-scale assistance has been provided so far for the reconstruction of various flood-damaged structures. However, he mentioned that if any other charitable organization is taken by the government to control the damage in such natural disasters in the future, Breaker Social Development Organization would give full cooperation.

QUESTIONNAIRE & CONSENT PAPER

অংশগ্রহণকারীর সম্মতিপত্র

বিষয়: "নোয়াখালী অঞ্চলে বন্যাক্রান্ত নিরাপদ পরিচালিত ওয়াশ (WASH) সুবিধাসমূহের অর্থনৈতিক ক্ষতি পরিমাপ: পিকেএসএফ-এর BD RURAL WASH FOR HCD প্রকল্পের একটি গবেষণা"

আমি, ----------, পিকেএসএফ-এর BD Rural WASH for HCD প্রকল্পের আওতায় ---------- সহযোগী সংস্থার পক্ষ হতে লক্ষ্মীপুর, ফেনী এবং নোয়াখালী অঞ্চলে বন্যাক্রান্ত নিরাপদ পরিচালিত ওয়াশ (WASH) স্যানিটেশন সুবিধাসমূহের অর্থনৈতিক ক্ষতি ও স্বাস্থ্যের ওপর প্রভাব মূল্যায়ন করার লক্ষ্যে একটি গবেষণা কার্যক্রম পরিচালনা করছি। এই গবেষণার মূল লক্ষ্য বন্যার কারণে নিরাপদ পরিচালিত ওয়াশ (WASH) সুবিধার ক্ষতিগ্রস্ত অবস্থার কারণে সৃষ্ট অর্থনৈতিক খরচ পরিমাপ করা। এছাড়াও গবেষণার তিনটি বিশেষ লক্ষ্য এবং সেগুলো মূল্যায়নের কিছু বিশেষ মাত্রা রয়েছে:

১. বন্যার কারণে স্যানিটেশন সুবিধার ক্ষতির ফলে সৃষ্ট রোগের ধরণ এবং স্বাস্থ্যসেবা গ্রহণের আচরণ পরীক্ষা করে মূল্যায়ন করা।

২. বন্যা-পরবর্তী সময়ে নিরাপদ পরিচালিত ওয়াশ সুবিধার ক্ষতির কারণে পরিবারের অর্থনৈতিক ব্যয়ের পরিমাণ নির্ধারণ করা।

৩. যথাযথ স্যানিটেশন এবং স্বাস্থ্যবিধির অভাবের ফলে সৃষ্ট আচরণগত পরিবর্তন বিশ্লেষণ করা।

এই প্রেক্ষিতে আমরা আমাদের গবেষণা পরিচালনার জন্য প্রয়োজনীয় তথ্য সংগ্রহের লক্ষ্যে আপনার/ আপনাদের স্বতঃস্ফূর্ত অংশগ্রহণ কামনা করছি সর্বোচ্চ ২০-৩০ মিনিটের জন্য। গবেষণায় আপনার/আপনাদের অংশগ্রহণ সম্পূর্ণ ঐচ্ছিক। আপনার অংশ নিতে অস্বীকার করার অধিকার রয়েছে এবং আপনার সিদ্ধান্ত আপনার/আপনাদের প্রাপ্ত কোনও বর্তমান/ ভবিষ্যতের সেবাগুলিকে প্রভাবিত করবেনা।

এই গবেষণার তথ্য সংগ্রহের জন্য আমরা কোবো অ্যাপ প্রযুক্তি (Kobo App Technology), কাগজে প্রশ্নপত্র এবং মোবাইল ডিভাইসে রেকর্ডিং-এর মাধ্যমে আপনার মতামত ও তথ্য সংগ্রহ করব। আপনার প্রদানকৃত সমস্ত তথ্য সম্পূর্ণ গোপন রাখা হবে এবং শুধুমাত্র গবেষণার উদ্দেশ্যে ব্যবহার করা হবে। আপনি এই গবেষণায় অংশগ্রহণ করতে সম্মত হলে, আমাদেরকে নিম্নলিখিত ফর্মটি পূরণ করতে দিন।

সম্মতি ফর্ম

আমি নিশ্চিত করছি যে, গবেষণার উদ্দেশ্য এবং পদ্ধতি সম্পর্কে আমি অবহিত হয়েছি এবং আমি স্বেচ্ছায় এই গবেষণায় অংশগ্রহণ করতে সম্মত।

নাম/স্বাক্ষর: ..... তারিখ: .....

আমি গবেষণার প্রকৃতি এবং উদ্দেশ্য অংশগ্রহণকারীকে সম্পূর্ণ ব্যাখ্যা করেছি। আমি তাদের যেকোনো প্রশ্নের উত্তর দিয়েছি। আমি সিদ্ধান্তে পৌঁছেছি যে অংশগ্রহণকারী স্বেচ্ছায় অবহিত সম্মতি দিয়েছেন।

তথ্য গ্রহণকারীর স্বাক্ষর: ..... তারিখ: .....

।। আপনার সহযোগিতার জন্য ধন্যবাদ ।।

সেকশন ০১: আর্থ-সামাজিক অবস্থা সংক্রান্ত তথ্য

ক্রমিক নম্বর	প্রশ্ন	উত্তর	কোড	স্কিপ
১০১	উত্তরদাতার নাম			
১০২	বয়স			
১০৩	মোবাইল নম্বর			
১০৪	ধর্ম		১. ইসলাম ২. হিন্দু ৩. খ্রিস্টান ৪. বৌদ্ধ ৫. অন্যান্য (উল্লেখ করুন)	
১০৫	শিক্ষাগত তথ্য (কত বছর পড়াশোনা করেছেন উল্লেখ করুন)			
১০৬	পেশা		১.শ্রমিক/দিনমজুর ২. বেসরকারি চাকুরি (দেশে/বিদেশে) ৩. কৃষক/খামারী ৪. জেলে ৫. কাঠমিস্ত্রী ৬. রাজমিস্ত্রী ৭. ব্যবসায়ী ৮. ড্রাইভার ৯. ইমামমতি ১০.শিক্ষক ১১. গৃহিণী ১২. বেকার ১৩. অন্যান্য (নির্দিষ্ট করুন)	
১০৭	খানার মোট সদস্য সংখ্যা উল্লেখ করুন			

১০৮	আপনার খানায় বাড়তি স্বাস্থ্যসেবা প্রয়োজন এমন কোন সদস্য সংখ্যা উল্লেখ করুন (যেমন- বয়ঃসন্ধিকালীন কিশোরী/বয়স্ক ব্যক্তি /শারীরিক বিকলাঙ্গ/ বিশেষ চাহিদা সম্পন্ন/অন্তঃসত্ত্বা মা/ ৫ বছরের কম বয়সী শিশু ইত্যাদি)॥			
১০৯	খানার মোট কতজন সদস্য আয় করেন?			
১১০	খানার মোট মাসিক আয়ের পরিমাণ (টাকায়)			

সেকশন ০২: স্বাস্থ্যসেবা প্রাপ্তি বিষয়ক তথ্য

ক্রমিক নম্বর	প্রশ্ন	উত্তর	কোড	স্কিপ
২০১	আপনার খানার খাবার পানির উৎস কী?		১. নলকূপ (গভীর/অগভীর) ২. সুরক্ষিত কুয়া ৩. অরক্ষিত কুয়া ৪. পুকুর /নদী/খাল ৫. বৃষ্টির পানি ৬. রিজার্ভ পানির ট্যাংক ৭. অন্যান্য (উল্লেখ করুন)	
২০২	খানায় রান্না বাদে অন্যান্য দৈনন্দিন প্রয়োজনে আপনি যে পানি ব্যবহার করেন তার উৎস কোনটি?		1. নলকূপ (গভীর/অগভীর) 2. সুরক্ষিত কুয়া 3. অরক্ষিত কুয়া 4. পুকুর /নদী/খাল 5. বৃষ্টির পানি 6. রিজার্ভ পানির ট্যাংক 7. অন্যান্য (উল্লেখ করুন)	

২০৩	আপনি বা আপনার খানার কোন সদস্য কী সাম্প্রতিক বন্যা পরবর্তী সময়ে কোন পানিবাহিত রোগে আক্রান্ত হয়েছিলেন? (যেমন - ডায়রিয়া, কলেরা, জন্ডিস, উদরাময়, টাইফয়েড ইত্যাদি)		১. হ্যা (উল্লেখ করুন) ২. না	
২০৪	আক্রান্ত হয়ে থাকলে উক্ত রোগের জন্য চিকিৎসা সেবা নিয়েছিলেন কী?		১. হ্যা ২. না	
২০৫	কোথায় থেকে সেবা গ্রহণ করেছিলেন?		১. জেলা হাসপাতাল ২. উপজেলা স্বাস্থ্য কমপ্লেক্সে ৩. ইউনিয়ন স্বাস্থ্যসেবা কেন্দ্র ৪. কমিউনিটি ক্লিনিক ৫. বেসরকারি ক্লিনিক / সেবা কেন্দ্র ৬. সাধারণ ঔষধালয় ৭. নিজ বাড়িতে ৮. অন্যান্য (উল্লেখ করুন)	
২০৬	চিকিৎসা বাবদ মোট খরচ টাকায় উল্লেখ করুন। (ডাক্তারের খরচ, ঔষধের খরচ, পথ্যের খরচ, যাতায়াত খরচ ইত্যাদি সহ)			
২০৭	আপনি এই চিকিৎসা খরচ কীভাবে নির্বাহ করেছিলেন?		১. খানার মোট আয় হতে ২. জমানো অর্থ হতে ৩. ঋণ নেয়ার মাধ্যমে ৪. ধারকর্য করে ৫. অন্যান্য (উল্লেখ করুন)	
২০৮	ঋণ/ধার এর পরিমাণ উল্লেখ করুন।			
২০৯	অসুস্থ থাকাকালীন আপনি বা আপনার খানার সদস্যগণ মোট কতদিন কাজে যেতে পারেননি?			
২১০	কাজে যেতে না পারার কারণে আপনার খানার কী ধরণের আর্থিক ক্ষতি হয়েছে? (টাকায় প্রকাশ করুন)			

সেকশন ০৩: স্বাস্থ্যবিধি বিষয়ক তথ্য

ক্রমিক নম্বর	প্রশ্ন	উত্তর	কোড	স্কিপ
৩০১	আপনার খানার ব্যবহৃত টয়লেটটির ধরণ উল্লেখ করুন।		১. সুলভ টয়লেট ২. বিলাস টয়লেট ৩. শোভন টয়লেট ৪.সৌখিন টয়লেট	
৩০২	সাম্প্রতিক বন্যায় আপনার টয়লেটটি কী ক্ষতিগ্রস্ত হয়েছিল?		১. হ্যা ২. না	
৩০৩	ক্ষতির ধরণ উল্লেখ করুন।		১. পিট পানিতে ডুবে গেছে কিন্তু ভেঙে যায়নি ২. পিট ভেঙে গেছে বা পাইপ সংযোগ ক্ষতিগ্রস্থ হয়েছে। ৩. টয়লেটের প্লাটফর্ম ভেঙে গেছে ৪. টয়লেট ঘর আংশিক বা সম্পূর্ণরূপে ক্ষতিগ্রস্ত হয়েছে। ৫. টয়লেট ব্যবহারের অনুপযোগী হয়েছে।	
৩০৪	এ সময়ে আপনি কত দিন সেই টয়লেট ব্যবহার করতে পারেন নি?			
৩০৫	টয়লেট ক্ষতিগ্রস্ত হওয়ার পর প্রাথমিকভাবে আপনার খানার সদস্যগণ কী ব্যবস্থা গ্রহণ করেছিলেন?		১. খোলা জায়গায় মলমূত্র ত্যাগ করতেন। ২. অস্থায়ী টয়লেট নির্মাণ করেন।	

			৩. আত্মীয় /প্রতিবেশীর বাড়ির টয়লেট (শেয়ার) ব্যবহার করেন। ৪. অন্যান্য (উল্লেখ করুন)	
৩০৬	টয়লেট শেয়ার করার ক্ষেত্রে কোন ধরণের সমস্যার সম্মুখীন হতে হয়েছিলো কী না?		১. কোন সমস্যা হয়নি। ২. পর্যাপ্ত পানি সরবরাহ ছিল না। ৩. সাবান, স্যান্ডেল ইত্যাদি সুবিধা ছিল না। ৪. শারীরিক ও মানসিক হয়রানির স্বীকার হাতে হয়েছে। ৫. অন্যান্য (উল্লেখ করুন)	
৩০৭	বন্যা পরবর্তী বাড়তি স্বাস্থ্যসেবা প্রয়োজন এমন সদস্যদের স্যানিটেশনে কী পদক্ষেপ নেয়া হয়েছিল? (যেমন- বয়ঃসন্ধিকালীন কিশোরী/বয়স্ক ব্যক্তি /শারীরিক বিকলাঙ্গ/ বিশেষ চাহিদা সম্পন্ন/অন্তঃসত্ত্বা মা/ ৫ বছরের কম বয়সী শিশু ইত্যাদি)		১. খোলা জায়গায় মলমূত্র ত্যাগ ২. অস্থায়ী টয়লেট নির্মাণ ৩. আত্মীয় /প্রতিবেশীর বাড়ির টয়লেট (শেয়ার) ব্যবহার করেন। ৪. অন্যান্য (উল্লেখ করুন)	
৩০৮	বন্যা পরবর্তী সময়ে আপনি কী আপনার টয়লেটটি সংস্কার/ পুনঃনির্মাণ করেছেন?		১. হ্যা ২. না	উত্তর না হলে ০০০ দেখুন
৩০৯	আপনার ব্যবহৃত টয়লেটটি কে নির্মাণ করেছিল?		১. প্রশিক্ষণপ্রাপ্ত স্থানীয় কর্মী ২. নিজ উদ্যোগে	

			৩. অন্যান্য স্থানীয় কর্মী	
৩১০	উক্ত কাজের জন্য কত টাকা খরচ হয়েছিল?			
৩১১	আপনার বর্তমান টয়লেট নির্মাণকালে ভেতরের অংশে কী প্রকল্পে উল্লেখিত জায়গা রাখা হয়েছে? (৫*৫ ফিট জায়গা)		১. হ্যা ২. না	
৩১২	আপনি টয়লেট সংস্কারের খরচ কীভাবে নির্বাহ করেছিলেন?		১. খানার মোট আয় হতে ২. জমানো অর্থ হতে ৩. ঋণ নেয়ার মাধ্যমে ৪. ধার করে ৫. অন্যান্য (উল্লেখ করুন)	
৩১৩	ঋণ/ধার এর পরিমাণ উল্লেখ করুন।			
৩১৪	আপনার খানার সদস্যগণ বর্তমান টয়লেটটি ব্যবহার করে সন্তুষ্ট?		১. হ্যা ২. না	
৩১৫	বর্তমান টয়লেটটি আপনার খানার সদস্যদের সামাজিক মর্যাদার ক্ষেত্রে কীভাবে সহয়তা করছে বলে মনে করেন?			

❖ FGD QUESTIONS (WOMEN GROUPS):

1. During the flood, did water enter your homes? If so, to what extent? Were you able to stay at home, or did you take refuge in a nearby shelter? What difficulties did you face regarding toilet facilities there?
2. Did you or your family members suffer from any health issues, illnesses, or diseases during the flood? If so, what kinds of illnesses have you experienced? What do you think caused them? Who suffered the most? How did you manage medical expenses? What steps did you take to treat the illnesses, and what medications did you use?
3. Where do you usually collect water for drinking and cooking? What challenges did you face during the flood? How many people share a single latrine in your household?
4. How do you usually manage menstrual hygiene? How did you ensure menstrual hygiene during the flood? Where do you dispose of sanitary waste? Have you ever suffered from gynecological health issues? Where do you receive information about menstrual health? Do schools provide physical health education?

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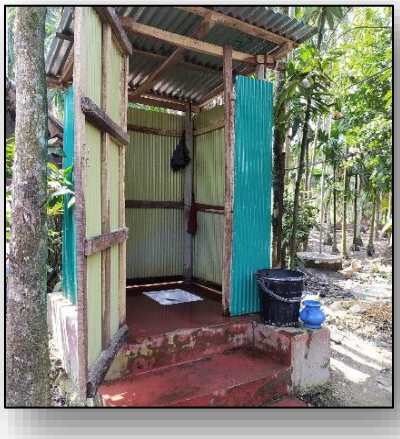
14. PHOTO GALLERY




সিভিল সার্জন