CONSEQUENCES OF SANITATION PROBLEMS AS PERCEIVED BY THE RURAL FARM WOMEN

MST. TASMINA AKTER

DEPARTMENT OF AGRICULTURAL EXTENSION & INFORMATION SYSTEM

SHER-E-BANGLA AGRICULTURAL UNIVERSITY

DHAKA-1207

JUNE, 2021

CONSEQUENCES OF SANITATION PROBLEMS AS PERCEIVED BY THE RURAL FARM WOMEN

BY

Mst. Tasmina Akter

Reg. No. 19-10065

A thesis

Submitted to the Faculty of Agriculture

Sher-e-Bangla Agricultural University, Dhaka

In partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE (MS)

IN

AGRICULTURAL EXTENSION

SEMESTER: JANUARY-JUNE, 2021

APPROVED BY:

(Md. Wali Ahad Setu)	**(Dr. Md. Sekender Ali)**
Supervisor	Co-Supervisor
Associate Professor	Professor
Dept. of Agril. Ext. and Info. System	Dept. of Agril. Ext. and Info. System
Sher-e-Bangla Agricultural University	Sher-e-Bangla Agricultural University

Prof. Mohammad Zamshed Alam
Chairman
Examination Committee

Department of Agricultural Extension and Information System
Sher-e-Bangla Agricultural University
Sher-e-Bangla Nagar, Dhaka-1207

CERTIFICATE

This is to certify that the thesis entitled **"CONSEQUENCES OF SANITATION PROBLEMS AS PERCEIVED BY THE RURAL FARM WOMEN"** submitted to the department of Agricultural Extension and Information System, Faculty of Agriculture, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka in partial fulfillment of the requirements for the degree of Master of Science (M.S.) in Agricultural Extension, embodies the result of a piece of bona fide research work carried out by **Mst. Tasmina Akter, Registration No. 19-10065** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

Dated:
Dhaka, Bangladesh

Md. Wali Ahad Setu
Associate Professor
Supervisor
Department of Agricultural Extension
and Information System
Sher-e-Bangla Agricultural University

DEDICATED
TO
MY BELOVED
PARENTS

ACKNOWLEDGEMENT

At first the author expresses her gratefulness to Almighty Allah who has helped her to pursue her higher education in agriculture and for giving the potency of successful completion of this research work.

With deepest emotion the author wish to express her pious gratitude, indebtedness, felicitation, sincere appreciation to her research Supervisor ***Md. Wali Ahad Setu****, Associate Professor, Department of Agricultural Extension and Information System, Sher-E-Bangla Agricultural University, Dhaka, Bangladesh for his discursive guidance, intense supervision and continuous encouragement during the entire period of research work.*

The author also highly grateful and obliged to her research Co-Supervisor ***Dr. Md. Sekender Ali****, Professor, Department of Agricultural Extension and Information System, Sher-E-Bangla Agricultural University, Dhaka, Bangladesh for his continuous encouragement, innovative suggestions, and affectionate inspiration throughout the study period.*

The author expresses sincere respect ***Prof. Dr. Mohammad Zamshed Alam, Chairman****, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka for providing valuable advice and sympathetic consideration regarding to the research.*

The author is also grateful to all the teachers of Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh for their continuous encouragement and innovative suggestions.

Sincere thanks are additionally communicated to the Upazila Agriculture Official and SAAO of Sundarganj upazila in the study territory for their altruistic assistance and collaboration in information assortment period. The scientist is particularly appreciative to all the respondents in the study zone for their participation and help in achieving the targets of this exploration work.

The special communicates genuine thanks and true thanks to all other departmental and out of departmental teachers of Sher-e-Bangla Agricultural University for their assistance and support. Last but not the least, the author expresses her immense indebtedness, most profound feelings of appreciation to her cherished guardians, sibling and relinquished all their bliss during the entire examination time frame particularly during her MS study.

At last, the desires, genuine thanks and appreciation to reach out to every one of her family members, well-wishers particularly companions for their motivation, participation and support in all periods of scholastic interest from the earliest starting point to end.

The Author

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABBREVIATIONS

BBS	Bangladesh Bureau of Statistics
DPHE	Department of Public Health Engineering
GDP	Gross Domestic Product
CRI	Centre for Research and Information
JMP	Joint Monitoring Programme
ODF	Open Defecation Free
MDG	Millennium Development Goals
DAE	Department of Agricultural Extension
WHO	World Health Organization
FAO	Food and Agriculture Organization
MoYS	Ministry of Youth and Sports
IPM	Integrated Pest Management
SAAO	Sub Assistant Agriculture Officer
SAU	Sher-e-Bangla Agricultural University
SPSS	Statistical Package for Social Sciences
GoB	Government of Bangladesh
UNICEF	United Nations International Children's Emergency Fund
SDG	Sustainable Development Goals
FSM	Free School Meals
DLHS	District Level Household Survey
WSH	Water, Sanitation and Hygiene
CSPFI	Consequences of Sanitation Problem Faced Index

CONSEQUENCES OF SANITATION PROBLEMS AS PERCEIVED BY THE RURAL FARM WOMEN

MST. TASMINA AKTER

ABSTRACT

The main purpose of the study were to determine the extent of consequences of sanitation problems of the rural women; to determine and describe some selected socio-economic characteristics of the rural women; to explore the relationship between each of the selected characteristics of the rural women and their consequence of sanitation problem; and to identify the causes of sanitation problems of the rural women. The study was undertaken purposively in SundArganj upazila under Gaibandha district. Validated and well-structured interview schedule was used to collect data from 105 women during March 1st to April 30th 2021. Descriptive statistics Pearson's Product-Moment Correlation Co-efficient were used for analysis. Majority (60.95%) faced high consequences of sanitation problems while 12.38 percent faced low consequences of sanitation problems and (26.67%) faced medium consequences of sanitation problems. Among six selected characteristics of the women, education and contact with relevant organizations had positive significant relationship with their consequences of sanitation problems but annual family income and condition of toilet had negative significant relationship with their consequences of sanitation problems. As per Consequences of Sanitation Problem Faced Index (CSPFI), 'transmission of harmful viruses and bacteria' ranked 1st and 'feeling unwell in doing family work' ranked last position.

CHAPTER I
INTRODUCTION

1.1 General Background

Proper sanitation promotes health, improves the quality of the environment and thus, the quality of life in a community. Sanitation refers to the safe collection, transportation, treatment and disposal of human wastes. In developing countries, improvements in practices of disposing of human excreta are crucial to raising levels of public health. An increasing amount of literature suggests that health problems result from the lack of sanitation facilities, especially among the urban poor living in overcrowded informal settlements. Invariably, it is the poor who suffer the most from the absence of safe water and sanitation because they lack not only the means to provide such facilities but also the information on how to minimize the ill-effects of the unsanitary conditions in which they live (John and Kalbermatten, 1980). As a result, the negative effects of unsanitary living conditions lower the productive potential of the people who can least afford it.

Bangladesh has been working towards eliminating open defecation since before its independence in 1971. The Department of Public Health Engineering (DPHE) began some of its first sanitation and latrine projects in the mid1960s, a time when latrine coverage was estimated to be less than 1% (Al-Muyeed, 2015). Since then, Bangladesh has made substantial progress in improving sanitation coverage across the country. According to the WHO/UNICEF Joint Monitoring Programme (JMP), in 2000, approximately 18% of the population was practicing open defecation (JMP, 2017). As of 2018, the country had nearly ended open defecation. The significant accomplishments of improving sanitation are largely attributed to the leadership of the GoB and initiatives such as Community-Led Total Sanitation2 , which was developed and launched in Bangladesh in the early 2000s (CRI, 2017).

The Perspective Plan of Bangladesh (2010-2021): Making Vision 2021 a Reality (GoB, 2012a) is a cross-cutting national development plan for achieving Vision 2021. Vision 2021 sets development targets aimed at eradicating poverty and inequalities, improving standards of living, and achieving middle-income status by the 50th anniversary of Bangladesh in 2021. In regard to sanitation, the Perspective Plan lays out the following sanitationrelated target under the umbrella of ‘Promoting Human Development’:

"Contagious diseases will be eliminated and primary health care and sanitation will be ensured for all," (GoB, 2012a). The Perspective Plan does not define sanitation, nor does it specify what 'ensured' sanitation for all entails. These details are addressed specifically in the Sector Development Plan (See 4.5. Plans and strategies) The Perspective Plan also addresses sanitation in institutions. To promote and sustain health in Bangladesh, the plan states that adopting policies that support sanitation in HCF could improve public health in the long-term (GoB, 2012a). However, the developments of such policies are presented as a supportive activity and are not an explicit goal or target in the Perspective Plan. For schools, the plan states the following outcome: "All students enrolled in primary, secondary, and tertiary levels will have access to gender responsive health, nutrition, water and sanitation, socio-cultural development, greater participation in sports and ensuring a fruitful learning and living environment," (GoB, 2012a).

The disposal of untreated human waste into water or tidal mudflats, practiced in most coastal and waterfront communities, is satisfactory from the public health point of view, if the water is saline enough to prevent its use for drinking, if the feces are always deposited into the waters and not on land, and if there is sufficient current for dilution (Michael and McGarry, 1977).

Studies on the health aspects of sanitation show that water and human wastes are major factors in the transmission of more serious types of diseases in the developing world (John and Kalbermatten, 1980). There are 20 to 30 different communicable water-related diseases. These diseases are classified according to the mode of spread: first, water-borne diseases which are infections spread through water-supplies; 2) water-washed diseases which are due to the lack of water for personal hygiene; 3) water-based diseases which are infections through aquatic invertebrate animals; 4) water-related insect vectors (David and Bradley, 1977). Excreta, both feces and urine, contain an array of pathogenic viruses, bacteria, protozoa and helminths and are principal vehicle for the transmission and spread of a wide range of communicable diseases (Richard and Feacham, 1980). Sanitary disposal of human waste is necessary for the following reasons: to eliminate the causative agents of those water and excreta-related diseases; to convert waste into readily re-usable resources and so conserve both water and nutrients; and to prevent the pollution of any body of water (ground water or surface

water) to which the effluent escapes after re-use or into which it is discharged without re-use (Duncan and Mara, 1977). The organic pollution of water is especially undesirable as it interferes with the use of water for drinking and other domestic, industrial or agricultural purposes; it interferes with aquatic life and it may drastically disrupt the ecology of the surrounding area.

There is growing studies on the benefits perceived by members of a household with access to improved sanitation. There is strong evidence from observational, quasi-experimental, and small-scale intervention studies that the individual benefit to having improved sanitation is potentially very large. Evidence from experimental evidence (Patil *et al.,* 2014) and reduced form estimations (Headey, 2013; Duflo *et al.,* 2015; Geruso & Spears, 2015) indicates positive difference. But how much of this benefit is actually driven through a community benefit, or externality to private sanitation, is less well understood. Hence, there is a need to empirically quantify the benefits and the sources of the benefits in particular, of sanitation infrastructure, as well as the sources of these benefits to develop more efficient and greater policies and with higher impact. We estimate a model for the individual production function of health for children in farm Bangladesh assuming a linear-inparameters approximation.

This paper contributes to the studies on the health impact of sanitation access in two ways. First, it adds to the existing evidence on the positive relationship between better sanitation infrastructure and early childhood health outcomes (Bose, 2009; Gunther & Fink, 2010; Kumar & Vollmer, 2012; Patil *et al.,* 2014; Duflo *et al.,* 2015; Geruso & Spears, 2015). The second, and most important, adds evidence to the idea on the existence of that positive externalities derive from access to sanitation infrastructure.

1.2 Statement of the Problem

In regards of importance of consequences of sanitation problems of farm women the investigator of this survey was highly interested to explore the consequences of sanitation problems of farm women.

This study attempted to find out the answer of the following research questions:

- What were the consequences of sanitation problems of farm women?
- What were the salient features of the selected characteristics of farm

women?

- Is there any relationship between each of the selected characteristics of the farm women and their consequences of sanitation problems?
- What were the causes of sanitation problems of the farm women and what were the suggestions to minimize the problems?

For getting a view of above questions, the researcher undertook a study entitled "consequences of sanitation problems of the farm women".

1.3 Objectives of the Study

The focal point of the research work was to explore the consequences of sanitation problems of farm women. This is why the following objectives were structured out in order to provide an appropriate track.

i) To determine the extent of consequences of sanitation problems of the farm women

ii) To determine and describe some selected socio-economic characteristics of the farm women

iii) To explore the relationship between each of the selected characteristics of the farm women and their consequence of sanitation problem

iv) To identify the causes of sanitation problems of the farm women and to make some suggestions to minimize the problems.

1.4 Justification of the Work

Bangladesh has one of the highest population densities in the world, with around 160 million people and 63.37% percent of the population, living in farm areas (BBS, 2020). Almost half of this population is women. Bangladesh has made remarkable progress in eliminating the practice of open defecation. But climbing the 'sanitation ladder' still represents a challenge. In Bangladesh, there is a high proportion of shared toilets particularly in farm area (UNICEF, 2013). Still, the quality of sanitation coverage is an emerging area of concern, with more than 40 percent of all latrines classified as "unimproved". However, the current rate of improved sanitation is growing at only 1.1 percent annually (World Bank, 2015). This growing rate is not enough to coverage all the farm women in Bangladesh. More over most of the farm women are not concerned about post defecation hygiene. Socio-economic factors are also associated with

methods practiced. In general, the effectiveness of hand washing practices is poor. Faecal coliform bacteriological counts were reported to be high for both left and right hands. About 85% of women studied who lived in slums and 41% of farm women washed their hands using only water. However, most women rubbed their hands on the ground, or used soil, and rinsed them with water during post-defecation hand washing (Hoque, 2004). Which is responsible for deadly disease like diarrhea, cholera, typhoid etc? That's why the researcher deemed it a timely necessity to undertake the present study "causes and consequences of sanitation problem of farm women".

1.5 Assumptions of the Study

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

i. The respondents included in the sample had capacity of furnishing proper responses to the questions contained in the interview schedule.

ii. The responses furnished by the respondents were valid and reliable.

iii. Information furnished by the respondents included in the sample was representative of the whole population of the study area.

iv. The researcher who acted as interviewer was well adjusted to the environment of the study area.

v. The data collected from the respondents were free from bias.

vi. Both the variables of this study were normally and independently distributed with their respective means and standard deviation.

vii. The findings of the study are expected to be useful for planning and execution of various programmes in connection with development of the country.

1.6 Limitations of the Study

It is necessary to impose definite limitations to make the research manageable and meaningful.

1. The research was confined to the one union of Sundarganj upazilla under Gaibandha district.
2. Data were collected from a small group of respondents taken as the sample of the study because of time and resource constrains.
3. The researcher had to face many obstacles during data collection. All the data were recall data. So, the researcher had to depend on the data as given by the respondents.
4. Only six socio-economic characteristics of the women were selected as independent variables.
5. Time allocation and budget was also limited in this study.
6. The researcher had to face many difficulties in conducting the research as ascertainment of effect is very complex especially in case of measuring consequences of sanitation problems of farm women as it has slow changing nature.

1.7 Scope of the Study

The present study was designed to have understanding consequences of sanitation problems of farm women and to explore its contribution with their selected characteristics.

i. The findings of the study will, in particular, be applicable to the study area at Sundarganj upazilla under Gaibandha district. The findings may also be applicable to other locale of Bangladesh where socio-cultural, economic circumstance do not differ much than those of the study areas.

ii. The findings of the study may also be subsidiary to the field worker of extension service to enhance their action strategies on consequences of sanitation problems of farm women.

iii. The findings of the study will be conducive to accelerate the improvement in agriculture, information needs and the way of dissemination especially tuned to key role players in the society as well as consequences of sanitation problems of farm women. The outcomes might also be helpful to the planners

and policy makers, extension workers and beneficiaries of the agriculture.

iv. To the academicians, it may help in the further conceptualization of the systems model for analysing the consequences of sanitation problems of farm women. The findings of this study may have other empirical evidence to all aspects of consequences of sanitation problems of farm women strategies which may be used to build theory of consequences of sanitation problems of farm women.

1.8 Definitions of some frequently used terms

The researcher used some uncommon terms and references in this study. They should be clarified and explained them properly by the researcher for easy understanding for all concerned. Therefore, the terms used in this piece of research work are defined and interpreted as follows:

Age: Age of the respondents referred to the period of time from birth to the time of interview.

Education: It is the act or process of imparting or acquiring general knowledge, developing the powers of reasoning and judgment, and generally of preparing oneself or others intellectually for mature life.

Family size: Family size of a respondent referred to the total number of members in her family including him/her, children and other dependents.

Annual family income: The term annual family income referred to the annual gross income of respondents and members of her family from different sources.

Contact: It defines as one's extent of exposure to different communication media.

Problem: According to sociologist's problem is a perceived gap between the existing state and a desired state, or a deviation from a norm, standard, or status quo. Although many problems turn out to have several solutions (the means to close the gap or correct the deviation), difficulties arise where such means are either not obvious or are not

immediately available. In this study problem was defined as the phenomenon of constraints or hinders into sanitation practices by the respondents.

Condition of toilet: Result in an unhealthy environment contaminated by human waste. Without proper sanitation facilities, waste from infected individuals can contaminate a community's land and water, increasing the risk of infection for other individuals.

Sanitation: Sanitation refers to public health conditions related to clean drinking water and treatment and disposal of human excreta and sewage. Preventing human contact with feces is part of sanitation, as is hand washing with soap.

Consequence: The effect, result, or outcome of something occurring earlier: a result or effect of an action or condition.

CHAPTER II
REVIEW OF LITERATURE

The present study is concerned with the involvement of farm women in consequences of sanitation problems as perceived by the farm women. This review of literature chapter deals with the review of past studies and findings related to study. The researcher came across with some expert opinions and has tried his best to collect needful information through searching relevant studies, journals, periodicals, bulletins, leaflets, internet etc. These enhanced the researcher's knowledge for better and clear understanding of the present study. This chapter has been presented in three sections as follows:

Section 1: Review of Literatures Related to Sanitation issues
Section 2: Research Gap of the Study
Section 3: Conceptual Framework of the Study

2.1 Review of Literatures Related to Sanitation issues

Howard (2021) water and sanitation services are critical for public health. The importance of these services is reflected in SDG 6 and the associated targets 6.1, 6.2 and 6.3. Much progress remains to be made to achieve these targets, but it is already becoming clear that greater ambition is needed. This paper looks at three global challenges: the need to increase the level of service to protect public health including infectious respiratory diseases; the role of sanitation in combatting anti-microbial resistance (AMR); and the urgent need to build more climate-resilient services. We need to upgrade the SDG targets to focus on universal access to piped water on premises, to incorporate action on AMR in definitions of safe sanitation and to embed actions to improve resilience, which take into account the greater ambition called for in the SDG 6 targets. This requires a shift in thinking in the sector, away from relying on households and communities to manage their services to properly funded, professional services staffed by trained technical, managerial and finance staff. This will require more public finance and better use of financial instruments that have proved effective in other sectors. Increasing our ambition will mean the world can achieve the aim of universal access to safe, sustainable, and resilient services and protect public health.

Mansour *et al.* (2017) according to the Joint Monitoring Programme (JMP), 58% of urban residents benefited from improved sanitation facilities in 2015. Open defecation has reportedly been eradicated in urban areas. However, 12% use unimproved facilities and 30% rely on facilities which are shared by different households, or on public (fee-paying) facilities. Most urban residents rely on onsite sanitation facilities: Dhaka is the only city in Bangladesh with a sewer system, to which only 20% of its population is connected. The legal framework for sanitation is fragmented, but recent progress has been made in developing a draft regulatory framework for FSM. The legal framework for sanitation services is distributed across several acts of law. The main acts pertaining to sanitation are the City Corporation and Pourashava Acts (2009) that assign to local governments the responsibility for sanitation services. At the same time, the Water Supply and Sewerage Authority (WASA) Act established the creation of WASAs (public utilities) in City Corporations, the prime responsibility of which is to provide water and sanitation services. Other environmental and health-related acts provide norms for environmental quality standards. In recent months, the Local Government Division of the Ministry of Local Government, Farm Development and Cooperatives (MoLGRD&C) drafted an institutional and regulatory framework for FSM, with support from key donors involved in the sanitation sector. The draft framework clarifies the roles and responsibilities for FSM, re-affirming City Corporations and municipalities' roles for ensuring services, and the need for potential partnerships with WASAs where relevant. The framework also proposes guidelines for the design of household facilities and faecal sludge treatment facilities; specifies the potential of private sector participation; and identifies the need for the MoLGRD&C to set up a dedicated unit in the City Corporations or municipalities for FSM. As of February 2017, the draft framework was ready for approval by Parliament.

Christine *et al* (2006) the year 2005 marks the beginning of the "International Decade for Action: Water for Life" and renewed effort to achieve the Millennium Development Goals (MDGs) to reduce by half the proportion of the world's population without sustainable access to safe drinking water and sanitation by 2015. Currently, UNICEF and WHO estimate that 1.1 billion people lack access to improved water supplies and 2.6 billion people lack adequate sanitation. Providing safe water and basic sanitation to meet the MDGs will require substantial economic resources, sustainable technological solutions and courageous political will. We review five major challenges to providing

safe water and sanitation on a global basis: (1) contamination of water in distribution systems, (2) growing water scarcity and the potential for water reuse and conservation, (3) implementing innovative low-cost sanitation systems, (4) providing sustainable water supplies and sanitation for megacities, and (5) reducing global and regional disparities in access to water and sanitation and developing financially sustainable water and sanitation services.

It is estimated that the risk of fecal-oral diseases resulting from poor water, sanitation and hygiene (WSH) contributes to 5.7% of the global disease burden (Prüss *et al.,* 2002). Diarrhea is the most common fecal-oral disease associated with poor WSH, accounting for nearly 0.8 million child (under five years) deaths each year worldwide (Liu *et al.,* 2012), and 11% of all deaths of children under five in 2010 (UNICEF, 2012). Open defecation, practiced by an estimated 626 million people in India (JMP, 2012) and around 560 million by 2015, is indicated as a major contributing factor to diarrheal disease.

Many studies have attempted to quantify the effect of this transition from widespread open defecation to improved sanitation on health outcomes. However, to date, few rigorous studies have been conducted and most have taken place alongside complementary water and hygiene interventions, making it difficult to isolate the effect of safe feces containment (Andres *et al.,* 2013). Indeed, some have suggested there is too little evidence on the complementary effects of WSH interventions and that too much attention has been focused on understanding the epidemiology of single transmission pathways (Eisenberg *et al.,* 2007, 2012). A widely cited meta-analysis estimates the impact of sanitation on diarrheal disease to be 32% (Fewtrell *et al.,* 2005), but this estimate is based on just two studies.

More recently, communities which were randomly assigned to receive a community-led total sanitation and sanitation marketing intervention reported reductions in 2-day prevalence of diarrhea in children under five of 45% (Cameron & Shah, 2013). It is critically recognized that the consequences of poor sanitation extend beyond the burden of diarrhea. Exposure to fecal contamination in the environment and chronic diarrhea decreases the ability to absorb essential nutrients, leading to malnutrition (Checkley *et al.,* 2008). This effect also goes the other way, with poor nutritional status associated

with increased risk of diarrhea (see for example, Chen *et al.,* 1981). Poor sanitation is increasingly recognized as a distal cause of underweight and stunting in children (Humphrey, 2009). Malnourishment during childhood is associated with severe long-term consequences. These long-term consequences include poor cognitive development, lower school attendance, reduced human capital attainment, and potentially, a higher risk of chronic disease in adulthood (Victora *et al.,* 2008).

There is strong evidence that the individual benefit to having improved sanitation is potentially very large, but to what extreme is this benefit actually driven through a community benefit, or externality to private sanitation, is less well understood. It has been suggested that even a few remaining open defecators in a community risk bringing fecal matter back into the environment resulting in continued contamination of soil and water, and potentially infecting others in the community who practice safe sanitation. In other words, even if my household has chosen to practice safe sanitation, if others in my community continue to defecate in the open, what are the consequences for the welfare of my household?

Experimental and quasi-experimental studies have looked at the impact of improved sanitation on child health outcomes including diarrhea, infant mortality, and stunting. However, most of these studies have focused on the effects at the household level, and while they acknowledge the possibility that an important part of the effect has been driven by externalities, previous work has not estimated these effects (Spears, 2013; Spears *et al.,* 2013). Recent research such as that of Patil *et al.* (2014) and Clasen *et al.* (2014) may have even underestimated the beneficial effects of improved sanitation by restricting the analysis to effects over the average at village level, which mixes the effects from externalities and private returns to sanitation. Headey, (2013) investigates the drivers of rapid declines in child under nutrition in Bangladesh, and finds evidence of a positive and non-linear relationship between levels of open defecation in a community and nutrition outcomes.

One of the most relevant analyses for the current study is a recent paper that used propensity score matching to estimate the effect of access to improved sanitation in India on diarrhea in children under five using the DLHS-3 (Kumar & Vollmer, 2012). The authors found that access to improved sanitation reduces diarrhea by 2.2 pp

corresponding to a 17% drop in prevalence. Another study (Bose, 2009), using similar methods from Nepal, looks at access to sanitation using a 2006 Demographic and Health Survey (DHS), finding reductions of 5% from mean prevalence of 8%, a substantially larger relative reduction. Similar results were found in Duflo *et al.* (2015), when using experimental data to evaluate a water and sanitation program in India, reductions between 30% and 50% in diarrhea prevalence were found.

In other studies, Spears, (2013) estimates the effect of open defecation in anthropometric measures between and within countries, and finds positive benefits from externalities and direct effects of eliminating open defecation; also, Spears ,(2013) looked at the relation between infant mortality and sanitation and found that an important driver of the effects was coming through externalities. Finally, Gunther & Fink, (2010) analyzed data from 172 DHS surveys and found that households having flush toilets have 13% lower odds of diarrhea than households without – in line with the estimates from Kumar & Vollmer, (2012), but much less than estimates from meta-analyses. Moreover, this study finds the benefits at the cluster level (a cluster in the DHS is typically a village for farm areas and district for urban areas) are twice as large as those at the household level, suggesting there may be positive externalities to improved sanitation. In contrast to the positive results found in these studies, a study in India that employed multiple matching techniques failed to find a consistent effect of access to improved toilets on diarrhea. The authors hypothesize that behavior, rather than infrastructure, could be driving these null results.

Flood deteriorates the normal functions of life, affecting homesteads, agricultural land, daily activities, water supply and sanitation condition and economic structure. Along with the numerous vulnerabilities, problems related to water supply, sanitation and health become acute during a flood. During a flood especially water supply and sanitation system are severely affected that boost the spreading of waterborne diseases causing stern health problems. Besides this, like other poor communities due to reduced incomes owing to losses of assets, rural poor experience increased difficulty in food that create relentless health and nutrition problems (Gaillard *et al.*, 2008).

Half of the global population will menstruate for a significant portion of their lives, yet around the world this normal and natural process is surrounded by stigma, shame and

silence. Despite being a critical part of women's and girls' reproductive health, menstruation remains significantly under-researched and addressed (Bobel, 2020).

The last decade, has, however, seen menstruation gain increasing recognition within research, programming, and policy. The United Nation's (UN) Special Rapporteur on the Human Rights to Water and Sanitation first began to consider menstruation under the remit of water, sanitation and hygiene (WASH) following a visit to Bangladesh in 2009. She explains: "my visit to Bangladesh informed the rest of my mandate in terms of the needs of menstruating girls and women, not just in schools but across all aspects of their lives, at home, in the workplace and beyond. Menstrual hygiene and health became an additional consideration to be included within the requirements of the human right to sanitation" (Roaf and de Albuquerque, 2020).

There has been an emphasis on the use of sanitary pads from all actors (NGO, government and private), with some programmes supporting the manufacture and distribution of these, and/or promoting their use. Advertisements for disposable sanitary pads have typically promoted these by contrasting them with the use of re-useable cloths (sometimes referred to as 'rags') as inherently unhygienic. Some academic articles on MH in Bangladesh take a similar position in asserting that the use of cloths is unhygienic (Mondal *et al.*, 2017; Zakaria *et al*., 2020; Sultana *et al*., 2020; Asha *et al.,* 2019).

In developing countries transmission of cholera/diarrhoea is believed to be associated with poor quality of water for drinking, bathing, washing utensils, etc. with faecal pollution of water sources and the quality of home environment are identified as the key source of pathogens causing diarrhoea (Spira, Sayeed, Khan and Sattar 1980).

It was also found that more than half of the women do not wash their hand before feeding their child (Hossain *et al.,* 2019).

A contrast result published in Lancet reports that overall, 54% of world's population maintains good personal hygiene, which is higher among women (59.5%) than men (44.5%) (Lubys, 2005).

Diarrheal disease has been considered as a serious global problem (WHO, 2018) and leading cause of child mortality around the world (Boschi-Pinto *et al.,* 2018).

According to World Health Organization, 1.8 million people die every year from diarrhoeal diseases including cholera; 90% are children under 5 years of ages, mostly

in developing countries. Of diarrhoeal diseases, 88% is attributed to unsafe water supply, inadequate sanitation and hygiene (Brace *et al*., 2005).

Akter & Ali in 2014 identified that factors such as poverty, lack of consciousness, lack of willingness, water sources and availability are barrier to proper hygiene behavior. They stressed that adoption of hygiene practice influences by income and access to available safe of water.

2.2 Research Gap of the Study

According to the review of literature of the present study the researcher has found the following research gaps:

- Very few researches on consequences of sanitation problems as perceived by the farm women have so far been conducted and no research has so far been conducted to measure the consequences of sanitation problems as perceived by the farm women. Hence the researcher carried out the present study to determine consequences of sanitation problems as perceived by the farm women.
- No research work has so far been conducted to measure consequences of sanitation problems as perceived by the farm women and extent of selected problem i.e. indifference about hygiene, using rags in menstruation, drinking water from open sources, single toilet for many persons, lack of knowledge on excrement management, inability of buying soap/hand wash, unavailability of money for making toilet, habit of not using soap/hand wash after using toilet, defecation in open place, unavailability of land for making toilet and using unhealthy kutcha toilet. The researcher carried out the study to explore the extent of practices of those strategies and level of problem faced by the women in practicing those strategies to minimize sanitation problem.
- No research work has so far been carried out to explore the relationship between each of the selected characteristics of the women with their consequences of sanitation problems as perceived by the farm women. The researcher carried out the study to explore the relationship between each of the selected characteristics of the farmers with their consequences of sanitation problems as perceived by the farm women.

2.3 Conceptual Framework of the Study

In scientific research, selection and measurement of variables constitute an important task. Consequences of sanitation problems as perceived by the farm women may be influenced and affected through interacting forces of many independent factors. It is not possible to deal with all the factors in a single study. Therefore, it was necessary to limit the factors, which included age, education, family size, annual family income, contact with relevant organizations and condition of toilet. Thus, consequences of sanitation problems as perceived by the farm women were the predicted variable of the study and 6 selected characteristics of the women were considered as the explanatory variables those might have relationship with their consequences of sanitation problems. Considering the above-mentioned situation and discussion, a conceptual framework has been developed for this study, which is diagrammatically presented in the following Figure 2.1.

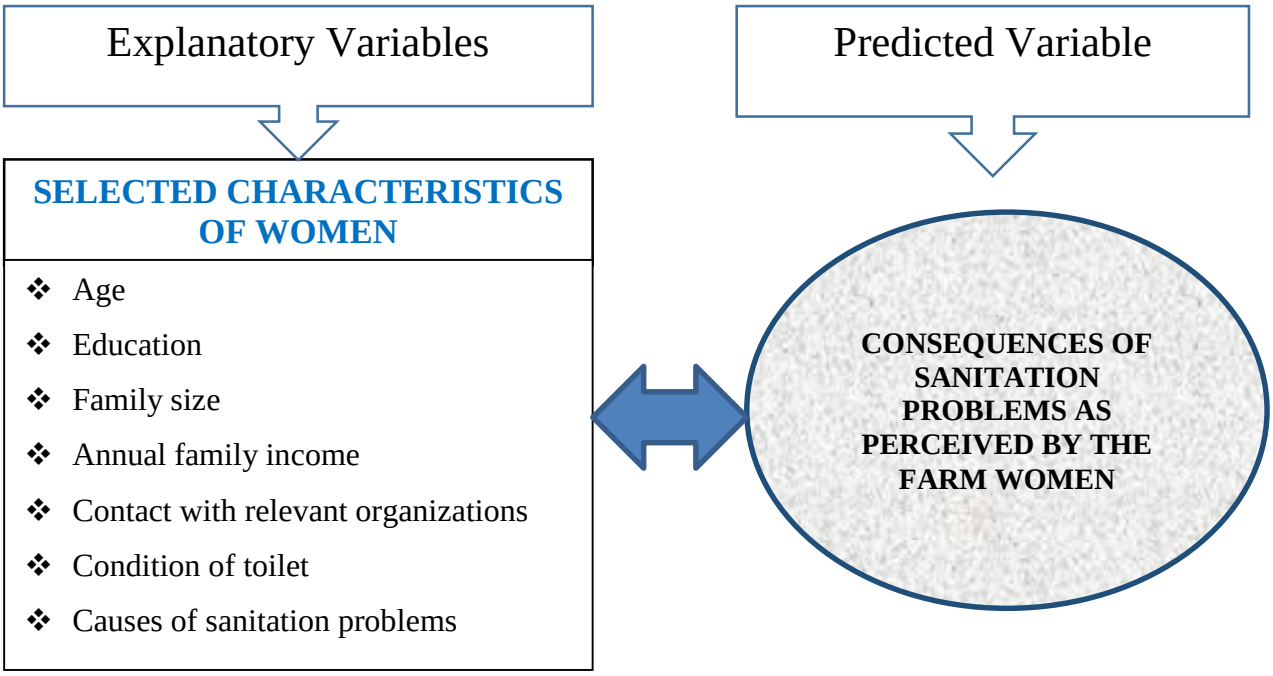

Figure 2.1 Conceptual framework of the study

CHAPTER 3
METHODOLOGY

The methods and procedures used in conducting research need very careful consideration. Methodology should be such that it enables the research to collect the valid information and to analyze the same property to arrive at correct decisions. The methods and procedures followed in conducting this study have been described in this Chapter.

3.1 Locale of the Study

The study was conducted at Sundarganj upazilla under Gaibandha district of Bangladesh. Sundarganj upazila area 426.52 sq km, located in between 25°24' and 25°39' north latitudes and in between 89°24' and 89°43' east longitudes. It is bounded by Pirgacha ulipur and Chilmari upazilas on the north, Gaibandha and Sadullapur upazilas on the south, Chilmari and Char Rajibpur upazilas on the east, Pirgachha, Mithapukur and Sadullapur upazilas on the west. Fifteen unions of Sundarganj upazilla among of them two unions namely Dahabanda and Sarbananda were selected randomly for study. Four villages were selected from the selected two unions by taking two of each union. Four villages were finally select through random sampling technique from the selected unions. . A map of Gaibandha district showing Sundarganj upazila and a map of Sundarganj upazila showing the study area have been shown in Fig 3.1 and 3.2, respectively.

3.2 Population and Sampling

Two unions were randomly selected for this study. One thousand and fifty two family heads of the 4 villages was constituted as the population of this study. Ten percent of the population from each of the four villages were selected proportionately and randomly by using a Table of Random Numbers (Kerlinger, 1973). Thus, 105 women were selected to constitute the sample for this study.

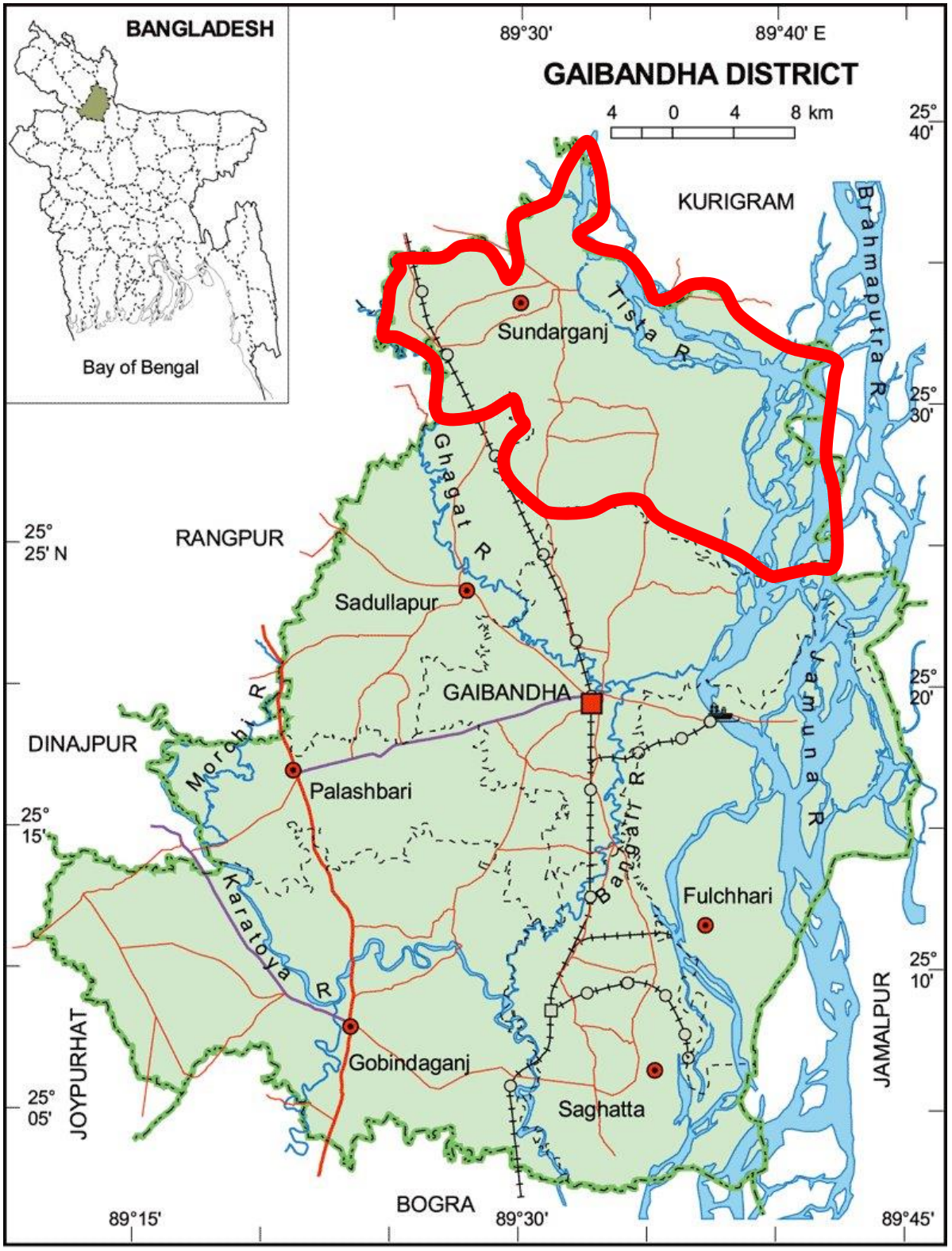

Figure 3.1: Map of Gaibandha district showing Sundarganj upazila.

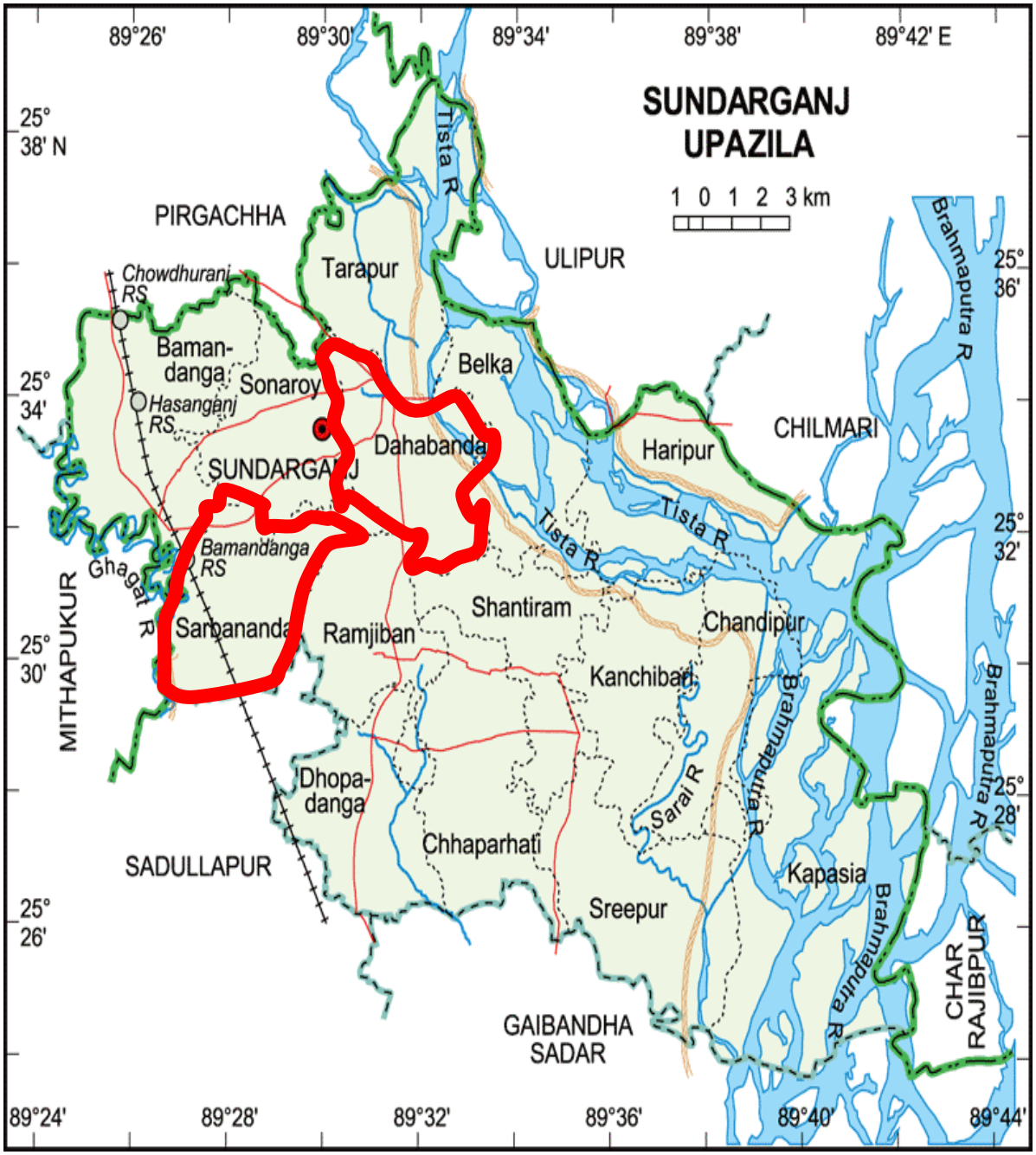

Figure 3.2: Map of Sundarganj upazila showing the study area.

Reserve lists of 10 women were also prepared so that the women of this list could be used if any respondent of the sample was not available during the interview. Distribution of the women constituting the population, sample and those included in the reserve list has been shown in Table 3.1 for clarity of understanding.

Table 3.1 Distribution of the women constituting the population, sample and reserve list in selected unions

Unions	Villages	Number of women		Reserve list
		Population	Sample	
Dahabanda	Dokkhin Gopalcharon	242	24	2
	Pochim Gopalcharon	277	28	3
Sarbananda	Purba Bachahati	293	29	3
	Pochim Bachahati	240	24	2
Total		1052	105	10

3.3 Variables of the Study and Their Measurement

Variables of the study and their measurement are below:

3.3.1 Measurement of consequences of sanitation problems

Consequences of sanitation problems were the main focus variable of the study. It was measured on the basis of the consequences of sanitation problems scores. A scale was used for measuring consequences of sanitation problems. The scale contained 10 observed consequences, which the women might face in respect of sanitation. Each woman was asked to indicate the extent of difficulty faced by each of the consequences by checking any one of the four alternative responses as "high problem", "medium problem", "low problem" and "no problem". Weights were assigned to these responses as 3, 2, 1 and 0, respectively. Weights for responses against all the 10 consequences-items of women were added together to obtain her consequences of sanitation problems score. Therefore, the consequences of sanitation problem score of the women could range from 0 to 30, where '0' indicated no problem and '30' indicated highest consequences of sanitation problems.

To compare the severity among the problems, Consequences of Sanitation Problem Faced Index (CSPFI) was computed for each item using the following formulae:

$$CSPFI = P_h x3 + P_m x2 + P_l x1 + P_n x0$$

Where,

CSPFI = Consequences of Sanitation Problem Faced Index

P_h = Number of women faced "high problem"

P_m = Number of women faced "medium problem"

P_l= Number of women faced "low problem"

P_n = Number of women faced "no problem"

Thus, the CSPFI of the problems could range from 0-315, where 0 indicated no problem and 315 indicated highest consequences of sanitation problems. Rank order also made with the descending order of the CSPI of the items.

3.3.2 Measurement of selected characteristics of the farm women

As mentioned earlier, nine selected characteristics of the women constituted the independent variables of this study. Procedures followed for measuring these variables are described below.

3.3.2.1 Age

Age of a woman was measured in complete years as reported by the respondent in response to question item no. 1 of the interview schedule (Appendix A). Example, a woman of 35 years old got score of 35.

3.3.2.2 Education

The education of a woman was measured on the basis of her years of schooling (completed in educational institute), which was determined by her response to item no. 2 of the interview schedule (Appendix A). A score of one was given for each year of schooling. For example, if a woman passed class V or equivalent, her education score was taken as 5. If a woman passed the final examination of class IX, her score was taken as 9. A score of 0.5 was given to that woman who could sign her name only. A score of zero (0) was assigned to the illiterate women.

3.3.2.3 Family size

The family size was measured by the total number of members in the family of a respondent including herself, husband, children and other dependents. The information

was obtained by a respondent's response to item no. 3 of the interview schedule (Appendix A). The total number of family members was considered as the family size of a respondent.

3.3.2.4 Annual family income

It referred to the total earnings in thousand taka by all the family members of a respondent from agriculture, others crop, poultry, livestock, fisheries, business, service, daily labour, others during a year as contained in question no. 4 of the interview schedule (Appendix A).

3.3.2.5 Contact with relevant organizations

Contact with relevant organizations was measured as one's extent of contact to different information sources. Each respondent was asked to indicate her nature of contact for each of 8 selected media with 05 alternative responses as regularly, often, occasionally, rarely and not at all contacts and scores were assigned for those alternative responses as 4, 3, 2, 1 and 0 respectively. Logical frequencies were assigned for each of the alternative responses as mentioned in question no. 5 of interview schedule. Thus, extension media contact score of the farmers could range from 0 to 32, where 0 indicated no contact and 32 indicated highest contact.

3.3.2.6 Condition of toilet

Condition	Shared by own family members	Shared by other family members
a. concreted	6	5
b. Semi-concreted	4	3
c. Normal shade	2	1
d. don’t have any	0	0

3.4 Identifying causes consequences of sanitation problems

To identify the causes of Sanitation Problems, 13 items were selected after thorough consultation of relevant experts. After pretesting with these 13 items, 11 were selected in the interview schedule for final data collection. Respondents were asked to mention the causes of Sanitation Problems and again they were asked to rank the causes they mentioned based on importance. A lowest score of 1 was assigned for lowest

importance cause. Similarly, scores of 2, 3, 4, …….. were assigned to 2nd, 3rd, 4th, …….. lowest important causes, respectively. Accordingly, highest score was assigned to highest important cause. Then scores of all the 105 respondents were added together against each of the causes to get the index of the causes.

3.5 Data Gathering instrument

In order to collect relevant data from the respondents an interview schedule was prepared. The interview schedule was pre-tested before final data collection for necessary correction, modification and adjustment. The interview schedule contained both open and closed form of questions. Simple and direct questions, and some scales were included in the schedule to obtain information for both explanatory and focus variables. The questions were arranged systematically and presented clearly. The interview schedule in English rendering are attached in Appendix-A.

3.6 Collection of Data

The researcher herself collected data for this study personally through interviewing the women by using the interview schedule prepared earlier. Appropriate rapport was established with the respondents before collecting relevant information. However, if any respondent failed to understand any question, the researcher took necessary care to explain the matter. Data collection was started on 1 March, 2021 and completed on 30 April, 2021.

3.7 Data Processing and Analysis

The collected data were compiled, tabulated, and analyzed in accordance with the objectives of the study. The SPSS computer software was used to perform the date analysis. Descriptive statistics such as number, percent, mean, standard deviation, range and rank order were used to describe data. Pearson's Product Moment Correlation Co- efficient was used in order to explore the relationships between the concerned variables. Five percent (0.05) level of probability was used as the basis for rejection of any null hypothesis.

3.8 Hypothesis

'The following null hypothesis was formulated to explore the relationships of each of the selected characteristics of the women with their consequences of sanitation problems. "There is no significant relationship between each of the six selected characteristics of the women with their consequences of sanitation problem.

CHAPTER IV
RESULTS AND DISCUSSION

In this chapter the findings of this study have been discussed in relation to the present findings and also to those found in other studies. The study investigated the consequences of sanitation problems as perceived by the farm women. In accordance with the objectives of the study, presentation of the findings has been made in four sections. The first section deals with the extent of consequences of sanitation problems as perceived by the farm women, the second sections deals with selected characteristics of the farm women and the third section deals with relationship between selected characteristics of the women and their consequences of sanitation problems. Forth section deals with causes of sanitation problems.

4.1 Consequences of Sanitation Problems

Consequences of sanitation problems of the women were measured by four point scale against as described in methodology chapter through 10 items. The problems score ranged from 7 to 27 against the possible range of 0-30. The average was 20.02 and standard deviation was 5.79 respectively. On the basis of their problem, the women were classified into the following three categories: "low" (up to 10), "medium" (11-20) and "high" (above 20). Table 4.1 contains the distribution of the women according to their problem.

Table 4.1 Distribution of the respondent women according to their perceived consequences

Categories (Scores)	Women		Mean	SD
	Number	Percent		
Low (upto 10)	13	12.38	20.02	5.79
Medium (11-20)	28	26.67		
High (>20)	64	60.95		
Total	**105**	**100**		

Information presented in Table 4.1 show that the majority (60.95%) of the women had high problem while 12.38 percent of the respondent women had low problem. Comparatively few women (26.67%) had medium problem. The findings again revealed that an overwhelming proportion (87.62 %) of the women had medium to high consequences of sanitation problems.

4.1.1 Item wise Consequences of Sanitation Problems

Cconsequences of sanitation problems faced by the farm women were ranked according to the descending order of (CSPFI) as shown in Table 4.2. As per Consequences of Sanitation Problem Faced Index (CSPFI), transmission of harmful viruses and bacteria ranked 1st followed by environmental pollution, financial losses, acute diarrhea, long term dysentery, pollution of drinking water, pollution of open water sources, neo natal deaths and other disease infestation and feeling unwell in doing family work in last position.

Table 4.2 Rank order of the Consequences of Sanitation Problem Faced Index (CSPFI)

Nature of problems	Extent of Consequences due to sanitation problem				CSPFI score	Rank
	High	Medium	Low	No		
Transmission of harmful viruses and bacteria	81	10	6	8	269	1st
Environmental pollution	75	12	10	8	259	2nd
Financial losses	62	26	13	4	251	3rd
Acute diarrhoea	58	21	16	10	232	4th
Chronic dysentery	51	24	20	10	221	5th
Pollution of drinking water	47	27	12	19	207	6th
Pollution of open water sources	41	24	18	22	189	7th
Neo natal deaths	39	21	15	30	174	8th
Other disease infestation	33	25	17	30	166	9th
Feeling unwell in doing family work	29	10	27	39	134	10th

The results show that the highest consequence of sanitation problem was transmission of harmful viruses and bacteria. As per consequences of sanitation problem faced index (CSPFI), 'Transmission of harmful viruses and bacteria' ranked 1st followed by 'environmental pollution,' 'financial losses,' 'acute diarrhoea,' 'chronic dysentery,' 'pollution of drinking water,' 'pollution of open water sources,' 'neo natal deaths,' and other disease infestation and feeling unwell in doing family work in last position. This was caused because the women were more involved in agricultural activity found in the study area. The lowest consequences of sanitation problem at the study area were feeling uncomfortable in doing family work. This happened because the women usually in rural area are busy with their duty, so they did not manage their time properly for sanitation in the study area.

4.2 Selected Characteristics of the respondent women

Six characteristics of the women were selected for this research. The characteristics include: age, education, family size, annual family income, contact with relevant organizations and condition of toilet. Some descriptive statistics of these features are given in Table 4.3 information contained in the Table 4.3 reveal the salient features of the characteristics of the women in order to have an overall picture of these characteristics at a glance. However, for ready reference, separate Tables are provided while presenting categorizations, discussing and /or interpreting results concerning each of the characteristics in this Chapter.

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

Categories	Measuring Unit	Range		Mean	S D
		Possible	Observed		
Age	Years	-	20-78	37.27	11.32
Education	Year of schooling	-	00-17	5.02	5.29
Family size	Person	-	3-16	6.44	2.69
Annual family income	(‘000’ tk)	-	30-200	73.31	25.36
Contact with relevant organizations	Score	0-28	9-26	17.20	4.85
Condition of toilet	Score	0-6	1-6	3.90	1.78

4.2.1 Age

Age of the respondent women ranged from 20 to 78 years, the average being 37.27 years and the standard deviation, 11.32. All the variables were categorized on the basis of their possible scores except age was categorized based on the classification provided by the Ministry of Youth and Sports, Government of the People’s Republic of Bangladesh. The distribution of the women according to their age is shown in Table 4.4.

Table 4.4 Distribution of the respondent according to their age

Categories	Women		Mean	SD
	Number	Percent		
Young aged (up to 35)	59	56.19	37.27	11.32
Middle-aged(36-50)	33	31.43		
Old(>50)	13	12.38		
Total	**105**	**100.0**		

Table 4.4 showed that the highest proportion 56.19 percent of the respondent women were "young aged" category, while 31.43 percent of them were "middle aged" category and 12.38 percent of the women were "old aged" category. The findings indicate that a large proportion (87.62 %) of the farmers were young to middle aged.

4.2.2 Education

The education scores of the respondent women ranged from 0 to 17. The average was 5.02 and the standard deviation was 5.29. On the basis of their educational scores, the women were classified into four categories, namely "illiterate (0-0.5), primary (1-5), secondary (6-10) and above secondary (above 10). The distribution of the women according to their education is shown in Table 4.5.

Table 4.5 Distribution of the respondent women according to their education

Categories	Women		Mean	SD
	Number	Percent		
Illiterate(0-0.5)	52	49.52	5.02	5.29
Primary level(1-5)	8	7.62		
Secondary level(6-10)	29	27.62		
Above secondary level(>10)	16	15.24		
Total	**105**	**100**		

Result presented in table 4.5 indicated that the majority (49.52 %) of the respondent women were illiterate compared to 27.62 percent of them were secondary level of education. About 7.62 percent of the respondent women were primary level of education, while 15.24 percent were above secondary level of education. The findings thus, indicate that the current literacy rate in the study area is lower than that of the national average of 73.9 percent (BBS, 2021).

4.2.3 Family size

The family size of the respondent women varied from 3 to 16. The average family size was 6.44 with a standard deviation of 2.69. According to family size, the women were classified into three categories (Mean±SD) as shown in Table 4.

Table 4.6 Distribution of the respondent women according to their family size

Categories	Women		Mean	SD
	Number	Percent		
Small family (up to 4)	28	26.67	6.44	2.69
Medium family (5-8)	57	54.28		
Large family (>8)	20	19.05		
Total	**105**	**100**		

Results contained in Table 4.6 indicate that (54.28%) of the respondent women had medium family while 19.05 percent of them had large family and 26.67 percent of them had medium family. Thus, about above two third (80.95%) of the farmers had small to medium family size.

4.2.4 Annual family income

Annual income score of the respondent women ranged from BDT. 30 to 200 (in thousands) with an average of 73.31 and standard deviation 25.36. On the basis of the observed scores, the women were classified into three categories (Mean ±0.5SD) as shown in Table 4.7.

Table 4.7 Distribution of the respondent women according to their annual income

Categories	**Women**		**Mean**	**SD**
	Number	**Percent**		
Low income (up to 48)	15	14.28	73.31	25.36
Medium income (49-108)	82	78.10		
High income (above 108)	8	7.62		
Total	**105**	**100.0**		

Information presented in Table 4.7 indicate that the highest proportion (78.10 %) of the women had medium annual family income, while (14.28 %) had low annual family income and (7.62 %) had high annual family income. As a result, the most (92.38 %) of the respondent women in the study area had low to medium annual family income.

4.1.5 Contact with relevant organizations

Contact scores of the women ranged from 9 to 26 with an average of 17.20 and standard deviation of 4.85. On the basis of their media contact, the women were classified into

three categories (Mean ±SD) namely, low contact, medium contact and high contact. The scale used for computing the media contact score of the women is given Table 4.8.

Table 4.8 Distribution of the respondent women according to their media contact

Categories (Scores)	Women		Mean	SD
	Number	Percent		
Low (<Mean-SD i.e. <12.35)	21	20.00	17.20	4.85
Medium (Mean+SD i.e. 12.35-22.05)	65	61.90		
High (>Mean+SD i.e. >22.05)	19	18.10		
Total	**105**	**100**		

Information contained in the Table 4.8 indicate that the highest proportion (61.90%) of the women had medium contact as compared to (20.00%) and (18.10%) having low and high contact respectively. Findings again revealed that overwhelming (81.90%) of the respondent women had low to medium contact.

4.1.6 Condition of toilet

Condition of toilet of the respondent women ranged from 1 to 6. The average was 3.90 with a standard deviation of 1.78. On the basis of their toilet condition, the women were classified into the following three categories (Mean ±SD): "low" (up to 2), "medium" (3-4) and "high" (above 4). Table 4.9 contains the distribution of the women according to their toilet condition.

Table 4.9 Distribution of respondent women according to their toilet condition

Categories	Women		Mean	SD
	Number	Percent		
Low (<Mean-SD i.e. <2.12)	42	40.00	3.90	1.78
Medium (Mean+SD i.e. 2.12-5.68)	25	23.81		
High (>Mean+SD i.e. >5.68)	38	36.19		
Total	**105**	**100**		

Table 4.9 showed that majority of the (40.00%) of the respondent women had low compared to (36.19%) of them having high. The proportion of medium had 20.95 percent. Findings again revealed that overwhelming (63.81 %) of the respondent women had low to medium condition of toilet.

4.3 Relationship between selected characteristics of the respondent women and their consequences of sanitation problems

To explore the relationships between the selected characteristics of respondent women with their consequences of sanitation problems, Pearson Product Moment correlation was run to find out the relation between the selected characteristics of the respondent women and their consequences of sanitation problems. From this correlation test, it was found that education and contact with relevant organizations had significant relationship with their consequences of sanitation problems but annual family income and condition of toilet had negative significant relationship with their consequences of sanitation problems. Beside these four characteristics, rest two characteristics of the respondent women (age and family size) had no significant relationship with their consequences of sanitation problems. Interco-relation among all the variables may be seen in Appendix-B.

The summery of the results of the co-efficient of correlation indicating the relationship between each of the selected characteristics of the women and their consequences of sanitation problems are shown in Table 4.10.

Table 4.10 Relationship between selected characteristics of the respondent women with their consequences of sanitation problems

Focus variable	Explanatory Variables	Coefficient OfCorrelation "r"	Tabulated value of "r"	
			at 0.05 level	at 0.01 level
Consequences of sanitation problems as perceived by the farm women	Age	0.102^{NS}	0.185	0.241
	Education	0.386**		
	Family size	0.114^{NS}		
	Annual family income	-0.279**		
	Contact with relevant organizations	.394**		
	Condition of toilet	-0.267**		

^{NS}Not significant

* Significant at 0.05 level of probability

** Significant at 0.01 level of probability

4.3.1 Age and consequences of sanitation problems

The computed value of "r" (0.102) was smaller than that of the tabulated value (r=0.185) with 103 degrees of freedom at 0.05 level of probability as shown in Table

4.10. Hence, the concerned null hypothesis was accepted and it was concluded that age of the women had no significant relationship with their consequences of sanitation problems.

4.3.2 Education and consequences of sanitation problems

Relationship between education and consequences of sanitation problems was determined by Pearson's product moment correlation coefficient.

The coefficient of correlation between education and consequences of sanitation problems was presented in Table 4.10. The coefficient of correlation between the concerned variables was found to be 0.386. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

- ✓ The relationship showed a positive trend between the concerned variables.
- ✓ The observed value of "r" (0.386) between the concerned variables was found to be greater than tabulated value (r = 0.241) with 103 degrees of freedom at 0.01 level of probability.
- ✓ The null hypothesis could not be accepted.
- ✓ The relationship between the concerned variables was statistically significant at 0.01 level of probability.

Based on the above findings, it was concluded that education of the women had significant positive relationship with their consequences of sanitation problems. It means that higher is the education, lower is the consequences of sanitation problems. So, reasonably education had significant relationship with consequences of sanitation problems.

4.3.3 Family size and consequences of sanitation problems

The computed value of "r" (0.114) was smaller than the tabulated value (r=0.185) with 103 degrees of freedom at 0.05 level of probability as shown in Table 4.10 and the relationship showed a positive trend. Hence, the concerned null hypothesis was rejected. The findings indicated that family size of the respondent women had no significant relationship with their consequences of sanitation problems.

4.3.4 Annual family income and consequences of sanitation problems

Relationship between annual family income and consequences of sanitation problems was determined by Pearson's product moment correlation coefficient.

The coefficient of correlation between annual family income and consequences of sanitation problems was presented in Table 4.10. The coefficient of correlation between the concerned variables was found to be 0.279. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

- The relationship showed a negative trend between the concerned variables.
- The observed value of "r" (-0.279) between the concerned variables was found to be greater than tabulated value (r = 0.241) with 103 degrees of freedom at 0.01 level of probability.
- The null hypothesis was accepted.
- The relationship between the concerned variables was statistically significant at 0.01 level of probability.

Based on the above findings, it was concluded that annual family income of the famers had negatively significant relationships with their consequences of sanitation problems.

4.3.5 Contact with relevant organizations and consequences of sanitation problems

Relationship between consequences of sanitation problems and their contact with relevant organizations was determined by Pearson's product moment correlation coefficient.

The coefficient of correlation between consequences of sanitation problems and their contact with relevant organizations was presented in Table 4.10. The coefficient of correlation between the concerned variables was found to be 0.394. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

- ✓ The relationship showed a positive trend between the concerned variables.

- ✓ The observed value of "r" (0.394) between the concerned variables was found to be greater than tabulated value (r = 0.241) with 103 degrees of freedom at 0.01 level of probability.
- ✓ The null hypothesis could not be accepted.
- ✓ The relationship between the concerned variables was statistically highly significant at 0.01 level of probability.

Based on the above findings, it was concluded that contact with relevant organizations had highly significant positive relationships with their consequences of sanitation problems. So, it could be said that higher is the contact with relevant organizations, lower is the consequences of sanitation problems. Contact with relevant organizations helps the women to take the right decision. It guides the women to take action for that which is best for them.

4.3.6 Condition of toilet and consequences of sanitation problems

Relationship between condition of toilet and consequences of sanitation problems was determined by Pearson's product moment correlation coefficient.

The coefficient of correlation between condition of toilet and consequences of sanitation problems was presented in Table 4.10. The coefficient of correlation between the concerned variables was found to be 0.267. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

- ✓ The relationship showed a negative trend between the concerned variables.
- ✓ The observed value of "r" (-0.267) between the concerned variables was found to be greater than tabulated value (r = 0.241) with 103 degrees of freedom at 0.01 level of probability.
- ✓ The null hypothesis could not be accepted.
- ✓ The relationship between the concerned variables was statistically significant at 0.01 level of probability.

Based on the above findings, it was concluded that condition of toilet of the women had significant negative relationships with their consequences of sanitation problems.

Therefore, it could be said that higher is the condition of toilet lower is the consequences of sanitation problems.

4.4 Causes of Sanitation Problems

Based on descending order of Index of Causes of Sanitation Problem, rank order was made shown in Table (Table 4.11).

Table 4.11. Summarized results of causes of sanitation problems

Sl. No.	Causes	Weights	Rank Order
1.	Indifference about hygiene	1100	1st
2.	Using rags in menstruation	950	2nd
3.	Drinking water from open sources	900	3rd
4.	Single toilet for many persons	792	4th
5.	Lack of knowledge on excrement management	693	5th
6.	Inability of buying soap/hand wash	570	6th
7.	Unavailability of money for making toilet	500	7th
8.	Habit of not using soap/hand wash after using toilet	408	8th
9.	Defecation in open place	309	9th
10.	Unavailability of land for making toilet	202	10th
11.	Using unhealthy kutcha toilet	105	11th
Total		6529	

Findings revealed that ‘indifference about hygiene ranked first cause of sanitation problem followed by ‘using rags in menstruation’, ‘drinking water from open sources, ‘single toilet for many persons’, ‘lack of knowledge on excrement management’, ‘inability of buying soap/hand wash’, ‘unavailability of money for making toilet’, ‘habit of not using soap/hand wash after using toilet’, ‘defecation in open place’, ‘unavailability of land for making toilet’ and ‘using unhealthy kutcha toilet’.

Respondent farm women were again asked to make some suggestions to minimize the sanitation problems. Based on the number of citation of responses of the farm women suggestions to minimize the sanitation problems were ranked as shown in Table 4.12.

Table 4.12 Suggestions to minimize the sanitation problems with citation number

Sl. No.	**Suggestions**	**Number citation**	Ranked order
1	Using Hand wash/soap after using toilet	96	1st
2	Washing hands properly	86	2nd
3	Awareness about Hygiene	77	3rd
4	Improve water quality	75	4th
5	Use sanitary product	52	5th
6	To improve sanitation facilities	49	6th
7	Proper education	32	7th

Using Hand wash/soap after using toilet ranked first suggestion to minimize sanitation problems followed by 'washing hands properly', 'awareness about hygiene', 'improve water quality', 'use sanitary product', 'to improve sanitation facilities' and 'proper education'.

CHAPTER V
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

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

5.1 Summary of Findings

5.1.1 Characteristics of the women

Age: The highest proportion 56.19 percent of the women were "young aged" category, while 31.43 percent of them were "middle aged" category and 12.38 percent of the women were "old aged" category.

Education: The majority (49.52 %) of the women were illiterate compared to (27.62%) of them was secondary level of education. About (7.62%) of the women were primary level of education, while (15.24%) were above secondary level of education.

Family size: The highest (54.28%) of the women had medium family while 19.05 percent of them had large family and (26.67%) of them had medium family.

Annual family income: The highest proportion (78.10 %) of the respondent had medium annual family income, while (14.28 %) had low annual family income and (7.62 %) had high annual family income.

Contact with relevant organizations: The highest proportion (61.90%) of the women had medium contact as compared to (20.00%) and (18.10%) having low and high contact.

Condition of Toilet: The majority of the (40.00%) of the women had low compared to (36.19%) of them having high. The proportion of low had 23.81 percent.

5.1.2 Consequences of sanitation problems

Consequences of sanitation problems of the respondent women were measured through 10 items scale. The problems score ranged from 7 to 27 against the possible range of 0-30. The average was 20.02 and standard deviation was 5.79 respectively. The majority (60.95%) of the women had high problem while 12.38 percent of the women had low problem. and (26.67%) of the women had medium consequences of sanitation problems.

5.1.3 Item wise Consequences of Sanitation Problems

Cconsequences of sanitation problems faced by the farm women were ranked according to the descending order of (CSPFI) as shown in the Table 4.2. (CSPFI), 'Transmission of harmful viruses and bacteria', ranked 1st followed by 'environmental pollution', 'financial losses', 'acute diarrhoea', 'chronic dysentery', 'pollution of drinking water', 'pollution of open water sources', 'neo natal deaths' and 'other disease infestation' and 'feeling uncomfortable in doing family work' in last position.

5.1.4 Relationship between selected characteristics of the women and their consequences of sanitation problems

To explore the relationships between the selected characteristics of women with their consequences of sanitation problems, Pearson Product Moment correlation was run to find out the relation between the selected characteristics of the women and their consequences of sanitation problems. From this correlation test, it was found that education and contact with relevant organizations had significant relationship with their consequences of sanitation problems but annual family income and condition of toilet had negative significant relationship with their consequences of sanitation problems. Beside these four characteristics, rest two characteristics of the women (age and family size) had no significant relationship with their consequences of sanitation problems.

5.1.5 Causes of Sanitation Problems

Findings revealed that 'indifference about hygiene ranked first cause of sanitation problem followed by 'using rags in menstruation', 'drinking water from open sources, 'single toilet for many persons', 'lack of knowledge on excrement management', 'inability of buying soap/hand wash', 'unavailability of money for making toilet', 'habit

of not using soap/hand wash after using toilet', 'defecation in open place', 'unavailability of land for making toilet' and 'using unhealthy kutcha toilet'. Using Hand wash/soap after using toilet ranked first suggestion to minimize sanitation problems followed by 'washing hands properly', 'awareness about hygiene', 'improve water quality', 'use sanitary product', 'to improve sanitation facilities' and 'proper education'.

5.2 Conclusions

Following conclusions were drawn on the basis of findings, logical interpretation and other relevant facts of the study:

1. About half (49.52%) of the women were illiterate. There existed had a significant positive relationship between education of the respondent women with their consequence of sanitation problems. Therefore, it may be concluded that an appreciable proportion of the respondent women will not continue to face problems in sanitation, if suitable steps are taken to remove illiteracy from the women.
2. Almost (91.43%) of the respondent women had low to medium contact. Findings expressed that contact of the women had significant positive relationship between selected characteristics of the women with their consequence of sanitation problems. So, it may be concluded that if the women come in more contact of extension provider, electronics, and printed media and extends they will face less problems in sanitation.
3. Most of the respondent women (40.00%) had low toilet condition. Findings expressed that condition of toilet of the women had significant negative relationship between selected characteristics of the women with their consequence of sanitation problems. So, it may be concluded that the women having lower sanitation faced more problems in case of sanitation issues vice-versa.
4. On the basis of (CSPFI), the women faced serious problems in transmission of harmful viruses and bacteria, environmental pollution, financial losses, acute diarrhea and feeling unwell in doing family work. Therefore, it may be concluded that necessary steps should be taken by Government & Non-Government Organization to minimize these problems with priority.

5.3 Recommendations

Recommendations based on the findings and conclusions of the study have been presented below:

5.3.1 Recommendation for policy implication

1. The findings indicated that an overwhelming majority proportion (87.62%) of the women had medium to high consequences of sanitation problems. So, it may be recommended that necessary steps should be taken by Government & Non-Government to remove these problems so that they can improve their sanitation system by increasing knowledge with less construction cost.
2. The findings of the study indicated that education had a significant positive relationship between selected characteristics of the women with their consequence of sanitation problems. Therefore, it may be recommended that the concerned authorities should take the special mass education program for the illiterate and low lettered women for solving their problems.
3. The findings revealed that the contact with relevant organization had a significant positive relationship between selected characteristics of the women with their consequence of sanitation problems. So, it may be recommended that the extension workers of the concerned authority should increase the contact with women personally and motivate them to be connected with electronic and printed media that can help them to exchange related information which will reduce their problems.
4. The findings indicated that condition of toilet had a positive significant relationship between selected characteristics of the women with their consequence of sanitation problems. Therefore, it may be recommended that the extension provider of concerned authority should select those women with priority that has more attraction, eagerness and attention toward new technologies of sanitation so that they can overcome their problems.

5.3.2 Recommendations for further study

i. The study was conducted on the women of only one selected area of Sundarganj upazila under Gaibandha district. Finding of the study need verification by similar research in other areas of the country.

ii. Relationship between selected characteristics of women with their consequence of sanitation problems has been investigated in this study. Further research should be conducted to find out contribution of the other personal characteristics of the women with their others problems.

iii. In addition to problems in sanitation, the women also faced other problems such as social, economic, housing, nutrition and domestic etc. Therefore, it may be recommended that research should be conducted relation to other problems of the women.

iv. The research was conducted to find out the problems of sanitation of the women. Further research should be taken related to other issues like food security, food safety, other problems etc.

REFERENCES

Akter, T., A. M. Ali. 2014. Factors influencing knowledge and practice of hygiene in Water, Sanitation and Hygiene (WASH) programme areas of Bangladesh Rural Advancement Committee. Rural and remote health. 2014;14(3):31.

Al-Muyeed, A. 2015. Book of Abstracts Journey to Zero Conference. Sanitation Conference 3-4. Sanitation Secretariat. Department of Public Health Engineering. Local Government Division. Dhaka, Bangladesh.

Andres, L., A. Limi, A., Orfei, & H., Samad. 2013. Impact Evaluation for Infrastructure: General Guidance and Existing Evidence. The World Bank, Washington, DC.

Asha, A.C., N. B Karim, M. Bakhtiar, and K. S. Rahaman. 2019. Adolescent Athlete's Knowledge, Attitude and Practices about Menstrual Hygiene Management (MHM) in BKSP, Bangladesh. Asian Journal of Medical and Biological Research, Vol. 5 No. 2, pp. 126-137, doi: 10.3329/ajmbr. v5i2.42494.

BBS. 2020. Bangladesh Bureau of Statistics. Ministry of Planning. Government of People's Republic of Bangladesh. Yearbook of Agricultural Statistics, Agargoan, Dhaka-1207.

BBS. 2021. Statistical Year Book of Bangladesh. Bangladesh Bureau of Statistics. Statistics Division, Ministry of Planning, Government of the Peopled Republic of Bangladesh.

Bobel, C. 2020. Introduction: menstruation as lens – menstruation as opportunity. The Palgrave Handbook of Critical Menstruation Studies, Springer Singapore, Singapore, pp. 1-6, doi: 10.1007/978-981-15-0614-7_1.

Boschi-Pinto, C., L. Velebit, K. Shibuya. 2008. Estimating Child Mortality due to Diarrhea in Developing Countries. Bull World Health Organ. 2008;86:710–717.

Bose, R. 2009. The Impact of Water Supply and Sanitation Interventions on Child Health: Evidence from DHS Surveys. International Initiative for Impact Evaluation, New Delhi, India.

Brace, J., C. Boschi-Pinto, R. E. Black. 2005. WHO estimates of causes of death in children. Lancet. 2005;365:1147-52.

Cameron, L. & M., Shah. 2013. Impact Evaluation of Farm Sanitation in East Java, Indonesia. The World Bank, Water and Sanitation Program, Washington, DC.

Checkley, W., Buckley, G., Gilman, R. H., Assis, A. M. O., Guerrant, R. L., S. S., Morris, K., Mølbak, P., Valentiner-Branth, C. F., Lanata, and R. E., Black. (2008). Multi-country Analysis of the Effects of Diarrhoea on Childhood Stunting. *International Journal of Epidemiology*, 37 (4), 816–830.

Chen, L. C., E., Huq, & S. L., Huffman. 1981. A Prospective Study of the Risk of Diarrheal Diseases according to the Nutritional Status of Children. *American Journal of Epidemiology*, 114(2): 284–292.

Christine L. Moe and Richard D. Rheingans. 2006. Global challenges in water, sanitation and health. Journal of Water and Health. doi: 10.2166/wh.2005.039.

Clasen, T., S. Boisson., P. Routray., B. Torondel., M. Bell., O. Cumming., J. Ensink, M., Freeman, M., Jenkins, M., Odagiri, S., Ray, A., Sinha, M., Suar, & W.P., Schmidt. 2014. Effectiveness of a Farm Sanitation Programme on Diarrhoea, Soil-transmitted Helminth Infection, and Child Malnutrition in Odisha, India: a Cluster-Randomized Trial. *The Lancet Global Health,* 2(11): e645–e653.

CRI, (Centre for Research and Information). 2017. Water and Sanitation in Bangladesh: A Clean Future.

David, J. and Bradley. 1977. Health Aspects of Water Supplies in Tropical Countries in *Water, Waste and Health in Hot Climates*, eds. Richard Feacham, Michael McGarry and Duncan Mara, p.6-7.

Duflo, E., M., Greenstone, R., Guiteras, & T. Clasen. 2015. Toilets Can Work: Short and Medium Run Health Impacts of Addressing Complementaries and Externalities in Water and Sanitation. Tech. Rep. 9, National Bureau of Economic Research.

Duncan, D., and Mara. 1977. Wastewater Treatment in Hot Climates in *Water, Waste and Health in Hot Climates*, eds. Richard Feacham, Michael McGarry and Duncan Mara, p. 265.

Eisenberg, J. N. S., M. A., Desai, K., Levy, S. J., Bates, S., Liang, K., Naumoff, & J. C., Scott. 2007. Environmental Determinants of Infectious Disease: a Framework for Tracking Causal Links and Guiding Public Health Research. *Environmental Health Perspectives*, 115(8): 1216–1223.

Eisenberg, J. N. S., Trostle, J., Sorensen, R. J. D. & K. F., Shields. 2012. Toward a Systems Approach to Enteric Pathogen Transmission: from Individual

Independence to Commun ity Interdependence. Annual Review of Public Health 33, 239–257.

Gaillard, J.-C., R. M. M. Pangilinan, R. J. Cadag, and M. Le Virginie. 2008. Living with increasing floods: insight from a rural Philippine community. Disaster Prevention and Management, Vol. 17 No. 3, pp. 383-95.

Geruso, M. & Spears, D. 2015. Neighborhood Sanitation and Infant Mortality. Technical report, National Bureau of Economic Research. http://www.nber.org/papers/w21184.

GoB,(Government of the People's Republic of Bangladesh). 2012. Perspective Plan of Bangladesh (2010-2021): Making Vision 2021 a Reality. General Economics Division. Planning Commission. Ministry of Planning.

Goode, W J. and P. K. Hatt. 1952. *Methods in Social Research*, New York: McGraw-Hill-Book Company, Inc.

Gunther, I. & G., Fink. 2010. Water, Sanitation and Children's Health: Evidence from 172 (DHS) Surveys. Policy Research Working Paper Series, No. 5275. World Bank.

Headey, D. D. 2013. Developmental Drivers of Nutritional Change: a Cross-country Analysis. World Development 42, 76–88.

Hoque, B. 2004. Handwashing Practices and Challenges in Bangladesh. *International Journal of Environmental Health Research*, 13:581-587.2003.

Hossain, M. B., A. Lutfa, A. M. A. A. Awwal. 2019. Domestic Hygiene Practices and Factors that Risks for Childhood Diarrhoea among under Five Children in IsolatedCharsofGaibandha,Bangladesh.AKMMCJ.2019;10(1).DOI:https://doi.org/10.3329/akmmcj.v10i1. 43652

Howard, G. 2021. The future of water and sanitation: global challenges and the need for greater ambition. Water Infrastructure, Ecosystems and Society press.

Humphrey, J. H. 2009. Child Undernutrition, Tropical Enteropathy, Toilets, and Handwashing, *Lancet*, 374(9694):1032–1035.

JMP. 2012. Progress on Drinking Water and Sanitation: 2012 Update. Technical report, WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation, New York, USA.

John, M. and Kalbermatten. 1980. Appropriate Technology for Water Supply and Sanitation: A Planner's Guide.

Kerlinger, F. N. 1973. Foundations of Behavioral Research, Educational and Psychological Inquiry. *Rinehart and Winston Inc.* Halt, New York, U.S.A.

Kumar, S. & S., Vollmer. 2012. Does Access to Improved Sanitation Reduce Childhood Diarrhea in Rural India? *Health Economics*, 22:410–427.

Liu, L., Johnson, H. L., Cousens, S., Perin, J., Scott, S., Lawn, J. E., Rudan, I., Campbell, H., Cibulskis, R., Li, M., Mathers, C. & R. E., Black. 2012. Global, Regional, and National Causes of Child Mortality: an updated Systematic Analysis for 2010 with time trends since 2000. *The Lancet*, 379(9832): 2151–2161.

Lubys, M., Agobatwalla, D. R. Feikin, J. Painter, W. Billhimmer, A. Atref, R. M. Hoekstar. 2005. Effect of hand washing in child health. Lancet. 2005;366:225-233.

Mansour, G., W., Islam & M. Akhtaruzzaman. 2017. Situation analysis of the urban sanitation sector in Bangladesh. WSUP Water & Sanitation for the Urban Poor.

Michael, G. and McGarry, 1977. "Waste Collection in Hot Climates: A Technical and Economic Appraisal" in *Water, Waste and Health in Hot Climates*, eds. Richard Feacham, Michael McGarry and Duncan Mara, p.247-248.

Mondal, B.K., M. K. Ali, T. Dewan, and T. Tasnim. 2017. Practices and effects of menstrual hygiene management in rural Bangladesh. Paper presented at the 40thWEDCConference,28July,Loughborough,UK,availableat:https://wedcknowledge.lboro.ac.uk/resources/conference/40/Mondal2578.

Prüss, A., D. Kay, L. Fewtrell, & J. Bartram. 2002. Estimating the Burden of Disease from Water, Sanitation, and Hygiene at a Global level. *Environmental Health Perspectives*, 110(5): 537– 542.

Richard, G., and Feachem. 1980. Health Aspects of Excreta and Sullage Management: A State-of-the-Art Review.

Roaf, V., and C. de Albuquerque. 2020. Practice note: why we started talking about menstruation – looking back (and looking forward) with the UN special rapporteur on the human rights to water and sanitation. The Palgrave Handbook

of Critical Menstruation Studies, Springer Singapore, Singapore, pp. 475-483, doi: 10.1007/978-981-15-0614-7_37.

Spears, D. 2013. How much International Variation in Child Height can Sanitation Explain? Policy Research Working Paper. no. WSP 6351.

Spears, D., A. Ghosh and O. Cumming. 2013. Open Defecation and Childhood Stunting in India: an Ecological Analysis of new data from 112 districts. PLoS One 8 (9), e73784.

Spira, W. M. Y. A., M. U. Sayeed., Khan and M. A. Sattar. 1980. "Microbiological Surveillance of Intra-Neighbourhood El Tor Cholera Transmission in Rural Bangladesh." Scientific Report 35. ICDDR'B, Dhaka, Bangladesh.

Sultana, R., E. R. Shom, F. Khatun. 2020. Menstrual hygiene practice between rural and urban high school adolescent girls in Bangladesh. International Journal of Reproduction, Contraception, Obstetrics and Gynecology, Vol. 9 No. 3, pp. 1039-1044, doi: 10.18203/2320-1770.ijrcog20200871.

UNICEF. 2012. Committing to Child Survival: A Promise Renewed. Progress Report 2012.

UNICEF. 2013. Safer Sanitation and Hygiene, Quality, Equitable Access and Sustainability.https://www.unicef.org/bangladesh/en/better-access-safe-drinking-water.

Victora, C. G., L. Adair, C. Fall, P. C. Hallal, R. Martorell, , L. Richter & H. S. Sachdev. 2008. Maternal and Child Undernutrition: Consequences for Adult Health and Human Capital. *Lancet*, 371(9609):340–357.

WHO. 2008. Health Statistics. Mortality and Burden of Diseases. Geneva, Switzerland.

WHO/UNICEF JMP. 2017. Progress on Drinking Water, Sanitation and Hygiene. Update and SDG baselines. WHO/UNICEF Joint Monitoring Program. Geneva: World Health Organization and UNICEF.

World Bank. 2015. Bangladesh: Improving Water Supply and Sanitation.

Zakaria, M., F. Karim, S. Mazumder, F. Cheng and J. Xu. 2020. Knowledge on, Attitude towards, and Practice of Sexual and Reproductive Health among Older Adolescent Girls in Bangladesh: an Institution Based Cross-sectional Study. International Journal of Environmental Research and Public Health, Vol. 17 No. 21, p. 7720, doi: 10.3390/ijerph17217720.

Appendix-A
Department of Agricultural Extension and Information System
Sher-e-Bangla Agricultural University
Dhaka-1207

An Interview schedule on

CONSEQUENCES OF SANITATION PROBLEMS AS PERCEIVED BY THE RURAL FARM WOMEN

Sl. No. ……. Date: ……..
Name of the respondent: …….....
Address:
Village: ……... Union: ……..
Upazila: …….. District: ……
Mobile No:……

Please answer the following questions. Your provided answer will be kept confidential and used only for research purposes

1. Age:
How old are you? ..... years

2. Education:
Please mention your educational status.

a. I don't know how to read and write. ( )
b. I can sign only. ( )
c. I have studied up to class……

3. Family Size:
How many members are there in your family? …….....

4. Annual Family Income:

Please mention your annual family income.

Sl. No.	Source of Income	Amount (Taka/year)
1	Agriculture	
2	Fisheries	
3	Livestock	
4	Forestry	
5	Business	
6	Service	
7	Others	
Total		

5. Contact with Relevant Organizations:

Please mention the extent of your contact with the following personnel/media for solving sanitation problems.

Sl. No.	Name of the Organization	Extent of contact				
		Regularly	**Often**	**Occasionally**	**Rarely**	**Never**
1	Government health assistants	2 or more times/month ()	1-2 times/2 month ( )	1-2 times/ 3 Month ( )	Once / 6 Month ( )	Not even once ( )
4	NGO workers	3 times or more / month ( )	1-2 times /2 month ( )	1-2 times /3 month ( )	Once / 6 month ()	Not even once ()
5	Mass media(Television program /Radio)	4 times or more /month ()	3 times /month ()	2 times / month( )	Once/ month( )	Not even once ( )
6	Publications	10 or more times/year ( )	6-9 times /year ()	3-5 times/ year( )	1-2 times/ year ( )	Not even once ( )
7	Mobile phone/Internet browsing/Call Centre etc.	1-2 times/ week( )	1-3 times /month ()	1-3 times/ season( )	1-3 times/ 6 month ( )	Not even once ( )
8	Other health workers /neighbors /relatives	3 times or more / month ( )	1-2 times /2 month ( )	1-2 times /3 month ( )	Once / 6 month ( )	Not even Once ()

6. Condition of Toilet:

Please mention the condition of your toilet.

Condition	Shared by own family members	Shared by other family members
a. concreted		
b. Semi-concreted		
c. Normal shade		
d. don't have any		

7. Consequences of Sanitation Problems:

Please put tick marks on the consequences produced on your life and family due to sanitation problems below.

Serial No.	Consequences	Extent of Consequences due to sanitation problem			
		High	**Medium**	**Low**	**No**
1	Pollution of drinking water				
2	Pollution of open water sources				
3	Long term dysentery				
4	Acute diarrhea				

5	Neo natal deaths				
6	Other disease infestation (Try to know)				
7	Feeling unwell in doing family work				
8	Environmental pollution				
9	Transmission of harmful viruses and bacteria				
10	Financial losses				

8. Causes of Sanitation Problems:

Which of the following items do you think, is responsible for the sanitation problems? Specify the order according to importance.

Serial No.	Causes of Sanitation Problems	✓	Order
1	Indifference about hygiene		
2	Habit of not using soap/hand wash after using toilet		
3	Inability of buying soap/hand wash		
4	Single toilet for many persons		
5	Using unhealthy kutcha toilet		
6	Defecation in open place		
7	Unavailability of land for making toilet		
8	Unavailability of money for making toilet		
9	Using rags in menstruation		
10	Drinking water from open sources		
11	Lack of knowledge on excrement management		

Thank you very much for your nice co-operation.

Signature of the Interviewer :…….

Date:…….

Appendix-B

Correlations matrix between dependent and independent variables

	X_1	X_2	X_3	X_4	X_5	X_6	X_7
X_1	1						
X_2	-.490**	1					
X_3	.467**	-.105	1				
X_4	-.076	.050	-.055	1			
X_5	-.481**	.823**	-.119	.086	1		
X_6	-.186	.228*	-.080	.505**	.180	1	
X_7	.102	.387**	.114	-.279**	.394**	-.267**	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

X_1= Age X_2= Education X_3= Family size X_4= Annual family income	X_5= Contact with relevant organizations X_6= Condition of toilet Y= Consequences of Sanitation Problems