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Environmental Issues and Natural Resources Management in Bangladesh: Policy Options

By

FARHANA AFROZA AFRIN

Registration No# 179/2009-2010

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FARHANA AFROZA AFRIN

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BY

FARHANA AFROZA AFRIN

REGISTRATION NO# 179/2009-2010

SUPERVISED BY

DR. FERDOUS JAHAN

PROFESSOR

DEPARTMENT OF PUBLIC ADMINISTRATION

UNIVERSITY OF DHAKA

THESIS PRESENTED IN PARTIAL FULFILLMENT OF THE DEGREE OF MASTER OF PHILOSOPHY IN PUBLIC ADMINISTRATION

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DECLARATION

The thesis titled Environmental Issues and Natural Resources Management in Bangladesh: Policy Options in partial fulfillment of the requirement for M. Phil degree in Public Administration. The research work has been carried out under my supervision. To the best of my knowledge no part of the work has been submitted for another degree or qualification in any other institute.

Dr. Ferdous Jahan
Professor
Department of Public Administration
University of Dhaka

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ABSTRACT

Environmental pollution by the poor people of slum settlements in urban areas is an important development challenge in Bangladesh. Rapid expansion of mega-cities by the uncontrolled growth rate of urbanization creates adverse impact on urban environment. Urbanization is the result of rural urban migration. Migrated people are mostly poor or extreme poor who put a significant pressure on the urban infrastructure and urban environment and ecological system. Poor people lead a substandard life in the slum and squatter settlements with inadequate essential services like land, housing, health, education, water, sanitation, sewerage, drainage, gas, electricity and so forth. Many slum settlements were established beside or over the natural water bodies such as rivers, canals, lakes, drains and standing water. These open water sources are very often badly polluted by the industrial and residential waste, as majority of the slums does not have proper waste management and sanitation system (Shiree Working Paper 11, 2013). This thesis argues that the problem of environment pollution in general and water pollution in particular in slums is caused by the absence of proper government policies on housing and the negligence of government authorities to the housing issues of the poor people of urban slums. However, decades of mismanagement is responsible for the long term damage in the natural water bodies. Moreover, there is lack of coordination between government and private sector developer.

This research attempts to explore how the pro-poor people of the urban slum pollutes the natural water body and how environmental and housing issues are addressed in relevant policies of government and the role of different government authorities in implementing such policies. The research then applies the concepts drawn from review of secondary literature, empirical study at the field level and the context of policy formulation and implementation of the government of Bangladesh.

The research shows that the urban poor housing and environmental pollution are interlinked. Findings from empirical research also shows that living conditions and livelihood of the poor people of the urban slums cause a serious negative impact on the surrounding environment especially on the open water resources. The study also revealed that, though the poor people of

urban slum receive some basic social services like housing, health, education, water, sanitation, gas, electricity, but the services are mostly inadequate in nature and when provided require an extremely high cost for the poor. However, these poor people do not know their actions are highly responsible for depletion of adjacent natural water resources. Its due to lack of their knowledge and awareness about environmental pollution.

For environmental preservation the study proposed several solutions including the preservation of the natural water body in the study area by initiating legislative measures and innovative implementation of policies and cooperative effort of the local urban authorities.

Keywords: Pro-poor housing, slum settlement, environment, water pollution, public policy.

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ACRONYMS

ADB Asian Development Bank

BBS Bangladesh Bureau of Statistics

BSTI Bangladesh Standard and Testing Institute

BCAS Bangladesh Centre for Urban Studies

BOI Board of Investment

BRAC Bangladesh Rural Advancement Committee

BUF Bangladesh Urban Forum

BWDB Bangladesh Water Development Board

BWPI Brooks World Poverty Institute

CBO Community Based Organization

CUS Centre for Urban Studies

DAP Detailed Area Plan

DCC Dhaka City Corporation

DESA Dhaka Electric Supply Authority

DMA Dhaka Metropolitan Area

DOE Department of Environment

DSK Dushtha Shasthya Kendra

DWASA Dhaka Water Supply and Sewerage Authority

EPRG Extreme Poverty Research Group

FGD Focus Group Discussion

HBFC House Building Finance Corporation

IDI In-depth Interview

IPCC Intergovernmental Panel on Climate Change

KII Key Informant Interview

LGD Local Government Division

LGED Local Government Engineering Division

MoEF Ministry of Environment and Forests

MoHPW Ministry of Housing and Public Works

NGO Non-Government Organization

NHA National Housing Authority

NIPORT National Institute of Population Research and Training

OECD Organization for Economic Co-operation and Development

PPSIP Pro-Poor Slum Integration Project

RAJUK Rajdhani Unnayan Kartripakkha

REHAB Real Estate and Housing Association of Bangladesh

SIP Slum Improvement Project

UDA Urban Development Agency

UDD Department of Urban Development

UNCHS United Nations Centre for Human Settlements

UNDP United Nations Development Programme

UN-HABITAT United Nations agency for Human Settlements Programme

UNFCC United Nations Framework Convention on Climate Change

UNICEF United Nations Children's Fund

WB World Bank

WHO World Health Organization

UK United Kingdom

USD US Dollar

GLOSSARY

Baor	Wetlands
Fitkiri	One kind of chemical to purify water
Katcha	Houses made with mud or soil
Katcha Bazar	Vegetable Market
Khal	Canal
Khaler gora	Beginning of canal
Khas Land	State owned land
Jheel	Water Tank
Jupri	Houses made of low cost materials
Haor	Wetlands
Nagorik	Citizen
Parishad	Council
Pourashava	Municipality
Pucca	Houses made with brick, sand, cement, concrete
Rajdhani Unnayan Kartipakkha	Capital development authority
Samity	Cooperative Association
Semi-pucca	Houses made with both mud and concrete materials

PART ONE
INTRODUCTION

1.1 Introduction:

Environmental degradation and ecological imbalance due to different kinds of pollution of natural resources is the top most concern of the present societies as well as the state authority. As a densely populated country with inadequate natural resource base the situation of environment in Bangladesh is very serious. Pollution has become the vigorous opponent of the human civilization to which the human being has to be fought against. The global society is now more scared about depletion of natural resources rather than any civilization destroying instrument like nuclear blast (Alam, 2009). Environmental concerns may cause serious and long term damage to the environment which simultaneously impede to the growth and development of the society. Therefore, to explore the potential of the environment protection is more essential for sustained management of natural resources.

There is a mounting concern about the critical issues of environment like depletion of natural resources specially the damage to the quality of open water bodies. A lot of studies have been conducted upon water pollution especially on arsenic contamination of water and safe drinking water or water logging in some areas of the country and even on pro-poor urban housing. But none reflects the issue of pollution of natural water bodies by the activities of the pro-poor urban slums.

The present research has been conducted to address the pollution of natural water bodies in Dhaka city basically in lakes, khal, beel, rivers, water tank etc. by urban slum settlements and to manage the degradation in natural water sources by reviewing the government policies related with housing, water and environment. This study has attempted to answer some research questions that were not addressed fully in the previous works. The main focus of this research is pro-poor urban housing that means urban slum settlements and its consequence on natural resources of environment specifically on open water bodies. The study also views housing and environmental issues from Public Administration perspective and policy perspective of such issues.

Dhaka is one of the fast growing mega cities of the world. Rapid expansion of Dhaka city due to uncontrolled growth of urbanization which is the resultant fact of rural urban migration causes development of slum and squatter settlements in urban areas as well as urban poverty. (Zaman et al, 2010; Ahsan et al, 2009; Biplob et al, 2011) The current urban growth rate is above 6 (six) percent per annum which is above the national population growth rate of 3.5 percent annually. (CUS et al, 2006, Banks, 2012) This uncontrolled migration and urbanization have become a threat for the development of Bangladesh as well as for the urban governance. This increasing slum population put a significant pressure on the existing urban structure. (Sinthia, 2013) The people migrated from rural to urban areas in search of jobs and for better economic condition and in most cases live in a very unhealthy environment with poor housing, inadequate sanitation and drainage facilities. Moreover, some of the slums are located beside or over the open water bodies like rivers, canals, lakes standing water etc. (Shiree Working Paper, 2013). This unhealthy condition of housing of the urban slums causes loss of natural resources, environmental pollution, imbalance in the ecosystem and biodiversity and degradation of standard of living. (Ahsan et al, 2009) Sanitation and waste management system of these poor slums pollute the environment of the city. Moreover human waste and solid waste go directly to the water sources and pollute the natural water bodies of the city. (Biplob et al, 2011). Water pollution is degrading the environment because a large portion of environment is occupied by water resource. (Islam, 2008). If such pollution in water resources continues to be happen in the present rate the natural water bodies will extinct immediately which will lead to climate change and natural disaster which will finally question to the survival of the human being. Furthermore, extinction of natural water bodies also effect on the urban aquatic ecosystems and biodiversity.

This condition of environmental pollution by poor housing of urban slum clearly shows the image of prolonged negative perceptions of government officials towards the urban poverty and the lack of commitment for improving the living condition of urban poor. Urban poor are the mostly neglected part of urban life. Inadequate attention of the government officials is responsible for the less involvement of the pro-poor people in the policy, planning and management of urban governance. (Banks, 2012; Alamgir et al, 2009).

Therefore, this research finds close linkages between poor housing conditions of urban slum and environmental pollution. This study attempts to focus on the poor housing condition and tries to draw the attention of the government officials to ensure sustainable urban environmental management. The study also suggests appropriate and effective policy measures for the improvement of the local environment of the study area by protecting the natural water bodies, canals, rivers.

1.2 Background of the study:

Rapid urbanization in Dhaka city reflects high population growth rate which is a challenge for urban management in terms of providing basic public services, local public goods and social amenities to the urban poor. Over the past decades, the population growth rate of Dhaka remained consistently high which is over 6 percent per annum. Rural to urban migration is the most dominant factor for this population explosion. Undoubtedly, this unplanned growth will magnify the socio-economic and environmental problems of the urban poor. (Shafi, 2011)

Ample evidence shows that rural people migrate to urban areas for better economic opportunities. But when they come to Dhaka they face a tremendous problem in leading their daily life even in getting the basic social services like housing, health, sanitation etc. Limited resource base and lack of proper attention and commitment of the city governance towards the urban poor is responsible for this poor condition of housing of these urban slums. Still, the country has a lacking in comprehensive policy to control urbanization or reducing urban poverty. (UNICEF, 2010) However, a review of policy, research and action to deal with the issue of pro-poor housing of urban slum reveals a general neglect of urban poverty. (Roy et al, 2011). This reflects a lack of awareness and political will among the policy makers about the urban poor of the country. It also reflects the lack of understanding of how these issues can be solved.

In the absence of proper monitoring by both government and private authorities the poor people continues to live in an unhealthy, unhygienic environment. As a consequence, they are polluting the nearby water resources and subsequently they are suffering from different health hazards caused for the polluted water.

Moreover, water resources of Dhaka city now is in a great menace of extinction. In order to meet the growing demand of housing for slums and squatters, unplanned houses are constructed by filling the water bodies, wetlands and lowlands. This increasing build-up and construction of buildings for numerous purposes like residential, commercial, industrial set up resulted in loss of natural water bodies, wetlands. Thus, the water of Dhaka city is polluted particularly by the domestic waste water and untreated industrial effluent which adversely affects the biodiversity and the ecosystem. (Ahsan et al, 2009)

1.3 Review of the Literature:

A number of empirical studies conducted on the housing condition of poor people of urban slum and squatter settlements cover a wide range of issues. Globally, the intensity of slum problem has been highlighted by UN-HABITAT (2003) which reported that 1/3rd of the world population is living in slum settlements and if adequate measures are not immediately adopted the figure will reach 50% by 2030. The same report provides that the number of people living in urban slums in Asia and Pacific is as high as 498 million, about half of the total urban population. Another study by UN-HABITAT (2009) explains that the population of Dhaka city in 2007 was over 13 million and projected that this figure will reach on over 22 million by 2025.

CUS (2006) presents the results from a census and mapping of slums in six cities of Bangladesh in 2005. The report has generated a wealth of information about the location and basic characteristics such as population, households, as well as basic demographic, socio economic and environmental descriptions of the urban slums. The Centre for Urban Studies (CUS) found that 1.6 million people are slum dwellers out of the total population of 5 million of the city. The same study reflected the picture that in 2005 Dhaka has 3.4 million people living in some 5000 slums and projected that in 2010 this number will reach at 17.6 million. Slums and squatters in Dhaka are characterized by poor housing structure, lack of safe water and proper sanitation system.

Bangladesh Urban Forum in a study showed that the rate of urbanization (3.7%) in Bangladesh is higher than that of the national growth of 1.54%. The same study projected that by 2015 this urban population will reach to a total number of at least 50 million. (Shafi, 2011, p-3).

Ahsan et al (2009) in an article showed the environmental impact of rapid urban growth in Dhaka city by a case study conducted in Bhatara Union. From his empirical research he showed that rapid urban growth and its allied process have made considerable impact on land, water, solid waste and pollution on the surrounding environment of the study area. He also found that large scale residential settlements are constructed through development projects by filling up the water bodies, wetland and low lands of Dhaka city. Ahsan emphasized particularly on the issue of water pollution that happens for the unplanned construction of slum settlements which does not have sufficient sanitation and sewerage system results pollution of the open water resources and at the same time key source of waterborne diseases in the slum.

UNICEF (2011) in a study on urban water challenges in Bangladesh showed that sanitation coverage in urban slums is very low. The study found that only 8.5% households have access to improved sanitation facilities, compared with a national coverage of around 54%. Most slum people have no option but to dispose the waste in open drains, open fields and adjacent natural water bodies. The study also observed that the use of hanging toilets (10%) which are basically connected with the natural water bodies is frequently seen in the urban slums which means that urban water sources are more likely to be contaminated with raw sewerage.

Nahiduzzaman in his M. Phil thesis emphasized on the politics, planning and business of the urban poor housing by a case study at the Duaripara slum. He discovered that private developers, private consulting firms and politicians as well as political elites have strong influence on the officials of different public agencies. This business relation between political elites and bureaucratic elites hinders the way of quick policy revision and necessary steps to improve the quality of life of the urban poor.

From the preceding review, it appears that there is a large amount of literature which has investigated different aspects of slum settlement problems in Dhaka City in a fragmented manner. Now these studies need to be integrated to put forward for the necessity of providing a better living condition to the poor people of urban slum and manage the environmental pollution subsequently by developing the policy regime and implementing strategy.

1.4 Research Objectives:

The urban poor are the integrated part of urban life as they play a significant role in the urban economy though they lead a substandard life in the slum and squatter settlements. A notable portion of working force live in these slum settlements and help to run actively the economy of urban life. However, the issues of urban slum dwellers are generally neglected in times of formulating and implementing any national policy, plans or strategy papers. The present study has tried to find out the gaps between the documented policy and the implementation of those policies at the real field level. This research also attempted to identify the role and responsibilities of government actors in different sphere of decision making and implementation process. Based on the above assumption, this research aims to identify the factors responsible for the poor housing condition of the urban slum for which the environmental pollution is happening.

This research aims to highlight the condition of housing of the urban slum of Dhaka and investigates the slum and squatter settlements' impact on environment of the surrounding area basically on the natural water body. As the housing issue is not properly addressed by the government authorities this study will suggest alternative policy measures and way out to improve the local environment of the study area and the livelihood of the slum dwellers. Hence the study aims specifically:

1. To draw the housing condition of poor people in the urban slum areas.
2. To find out how natural resources (especially water) are being polluted by the activities of the poor people in the research areas.
3. To review the existing housing, water and environment policies addressing the issue of poor people of urban slum.
4. To analyze the role of different actors responsible for the implementation of policies and reservation of natural resources.
5. To find out the reasons of why most of the policy legislation remains non-effective.
6. To explore the way out to solve the housing problems of poor people related with water pollution.

1.5 Research Questions:

Considering the objectives, this research answers some questions, which are related with the broader conceptual and analytical framework of the research. This study focused mainly on three things, which are: housing condition of the poor people of the urban slums that are polluting natural water bodies of Dhaka city, existing government policies on housing, water and environment of the country addressing the issue of urban slum people and the role of different actors and organizations for housing the urban poor. Considering the above mentioned three points the research aims to explore and answer the following research questions:

1. What is the present condition of housing of the poor people of the urban slums?
2. How water pollution is caused by the people of urban slums?
3. How is the issue of poor people addressing in the existing housing, water and environment policy?
4. How environmental issues are addressed in different policies?
5. What are the roles of different actors under different organizational arrangement to take care the housing as well as environmental issues of urban slums?
6. Why most of the policies are being unimplemented?

1.6 Research Methods:

To gain the objective of the thesis, a mixed method research approach was used which includes qualitative investigation and quantitative survey methods. Both primary and secondary data was used for this purpose. There are a number of reasons behind this mixed-method approach. The term mixed-methods refer to an emergent methodology of research that advances the systemic integration or mixing of quantitative and qualitative data within a single investigation or sustained program of inquiry. The basic premise of this methodology is that such integration permits a more complete and synergistic utilization of data than do separate quantitative and qualitative data collection and analysis. The quantitative data shows facts and figures in a research work and the qualitative analysis of data depicts in depth meaning of any research programs. This creates the needs of using mixed method in a single research exertion.

Mixed method answers a broader and more complete range of research questions because it removes the limit of using a single method or approach. Apart from this mixed method of research methodology provides stronger evidence for a conclusion through convergence and justification of findings of this research task.

The primary data was collected through an empirical research with an in-depth study at the field level. Two slums (one in Mohammadpur named Lautola slum and another in Mirpur named Balur Math slum) of Dhaka City were selected to conduct the field study and survey. Household survey was conducted over 100 houses (50 HH in each slum) to have the overall scenario of housing, water pollution, sanitation, wastes management and other important issues. Thus quantitative methods were used to collect primary information by using structured questionnaire at the HH level.

Under the qualitative method, a number of steps were followed to capture the empirical experiences of the slum dwellers. A total number of 4 (four) Focus Group Discussions (FGD) were conducted where both male and female dwellers participated. Two cases were taken (one from each research area) to get the real experience of health hazards from water pollution in the study area. In addition to the case studies, 6 (six) in-depth interviews were conducted with the influential persons of the slum who are mostly related with the slum management process. Information was also collected through non-participatory observation and photographic observation. Key actors/ officials of the government organization (City Corporation Officials, Personnel of NHA those who are mainly involved with the implementation of housing policy) were also interviewed during the study. The field survey was conducted during the period from August to November, 2014.

To know the quality of water, 4 (four) types of sample (two sample from each slum; one is sample of drinking water another sample is from natural water body) were collected and tested in the laboratory of the department of Zoology of the University of Dhaka.

At the same time a brief review of existing literature was done throughout the whole study period. Secondary sources of data include the literature review of available books, policy papers, strategy papers, research papers, different thesis papers, NGO reports and documents, articles on housing, newspapers, and magazines.

The research methods followed in this study can be shown by the following tables –

Table 1: Methodology of the Research

Methods	Stakeholders/activities	Purposes
Survey	• A questionnaire survey was done with 100 slum dwellers.	• To have the gross scenario of slums in the city focusing housing, water, sanitation, waste management and other important issues.
Literature review	• Available articles, books, policies and newspaper articles are reviewed as secondary data sources.	• To have detailed picture of research issues like pro-poor housing situation, water pollution and environmental degradation and of different policies, plans and strategies.
Focus Group Discussion	• FGD took place in both the slums mentioned before. With both male and female participants FGDs were done.	• To identify issues and context related to the housing and water of slums. • To know about the process and factors which have influence over the entire scenario. • To explore community perception and responses as a group about mentioned issues.

In-depth interviews	• In depth interview was done with the inhabitants of the community and also with persons related to management of the slums.	• To explore HH level scenario concerned to housing and water issues of the community. • To draw the picture of issues related to pollution of natural resources (specifically open water bodies) of studied spots. • To identify polluting activities and probable solution of such cases.
Case study	• Two participants were selected from two research areas to set the case study.	• To identify experiences and perceptions from personal and empirical angle on contextual issues. • To identify such problems and possible solutions from inhabitants.
Observation	• Observation took places (specifically water bodies) in two places of two research areas.	• To identify the activities responsible for the pollution of water bodies as natural resources of Dhaka city.
Interview to the Key Informants (Actors of Government)	• City Corporation Officials and Personnel of NHA were interviewed.	• To know about the implementation of housing policy.
Water quality test	• Total 4 samples (2 samples from each slum) were collected and tested in the laboratory.	• To know the quality of water what they are drinking and the water of natural site what they are polluting.

Qualitative Sampling: Sampling for qualitative research is as following –

Table 2: Steps of Qualitative Sampling

Sl	Tools	Sample/Quantity	Tasks
01	**Focus Group Discussion**	Total 4 (four) FGDs	• Total 4 (four) FGDs took place. Specifically, 2 (Male-1 & Female-1) FGDs in each area were conducted in mentioned areas.
02	**In depth Interview**	Total 6 (six) IDIs	• IDIs were done with the slum dwellers and also with the persons influential in the slum or related to the slum management.
03	**Case study**	Total 2 (two) cases	• Two cases were taken from two research areas which are from the empirical experiences of slum dwellers.
04	**Observation**	Total 2(two) points	• Observation took place in two selected places of two research areas for three consecutive days.
05	**Key Informant Interview**	Total 4 (four) persons were interviewed	• DCC and NHA personnel were interviewed
06	**Water quality test**	4 (four) types of water sample were collected and tested	• Two types of sample of water from each slum were collected

Quantitative Sampling:

Research areas and slum selection criteria and sampling for the research are as follows-

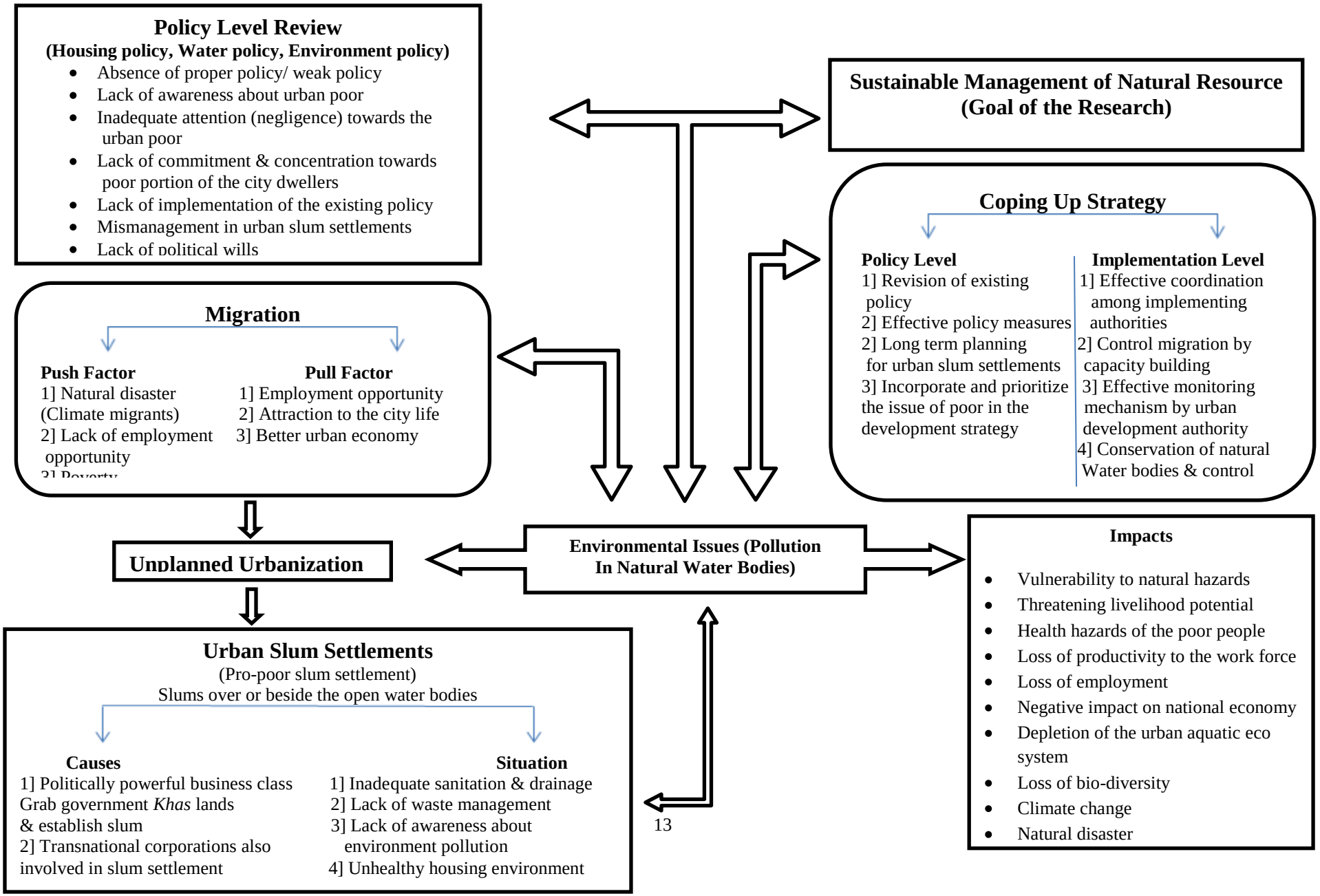
Table 3: Steps of Quantitative Sampling

Method	Research areas	Sample size for Interview	Slum Selection Criteria
Survey	1. Ekota Kacha Bazar, Lautola, Mohammadpur, Dhaka.	50 HH	The main criteria of selecting Slums was- location of community beside or over the natural water bodies. The selected slums were 1. Slum in Mohammadpur area is located on the bank of canal of Turag river. 2. Slum in Mirpur area is located beside the Balur math *Jheel (water tank)*
	2. Balur Math Slum, Kalshi, Mirpur, Dhaka.	50 HH	

1.7 Conceptual Framework:

Environment and maintaining its quality is the core concern of the global societies as well as the state authorities of all kinds underdeveloped, developing and developed. The question of sustaining the purity of environment is related with the existence of human civilization. So, environmental protection has become a priority. Therefore, conventional solutions shall have to be drawn to fight against pollution for ensuring sustainable management of natural resources. The conceptual framework developed after analyzing the existing literature and empirical field study. This study is based on different aspects of urbanization; urban poor housing, environmental pollution and policy strategy mechanism. Thus the study reflects the cause impact relationship between urban poor housing and pollution in natural water bodies where policy stands as the main engine to direct the poverty-pollution scenario to its present state. However, the study aims to demonstrate the context of pro-poor slum settlement and its consequence on environment. It is necessary to understand the interrelation among policies, pro-poor housing and pollution in open water bodies to find out the causes and factors of urban slum settlements, its impact on natural resources. With a view to draw the attention of the concerned government authority the study finally knocked the concerned institutional framework. Conceptual framework can be shown through the following flowchart.

Figure 1: Conceptual Framework of Interrelation of Policy, Poor housing and Environmental pollution



Source: Developed from the thesis by the researcher

1.8 Limitations of the study:

Some limitations have been found during the study period to complete the research work according to the selected objectives. These limitations are described below:

Poor housing condition in the urban slum is a common picture in Dhaka city. This condition is particularly due to uncontrolled migration and urbanization in the city area. Obviously this extended population adversely impacted upon the city's environment. But the respondents some times did not give the real picture as they do not understand that they are polluting the environment. As a result, there might have some deviation to depict the real picture. Shortage of literature on the environmental pollution particularly pollution of natural water bodies by urban slums has also been observed during the study. For the lack of fund and shortage of time the study only covers 2 slums, though there are almost 5,000 slums in Dhaka city. This might bring some variation of data like coverage of water, sanitation, sewerage etc. Though air pollution also covers a major part of environmental degradation, it has not been addressed here for time constraints.

1.9 Outline of the study:

The thesis is composed of five parts, references and appendix. **The first part** deals with the background of the research, its objectives and methodology. It also deals with the limitations to carry out the study.

The second part explicates the pro-poor urban housing and its consequence on Environment.

The third part describes existing relevant policies, its implications and the real implementing stage of those policies.

The fourth part depicts the findings and analysis from the empirical research.

The fifth part draws some possible policy options and appropriate measures to implement those policies as per the findings and analysis from the empirical research. This part also depicts the summary and conclusion of the research.

PART TWO
POOR URBAN HOUSING AND ITS CONSEQUENCE ON ENVIRONMENT

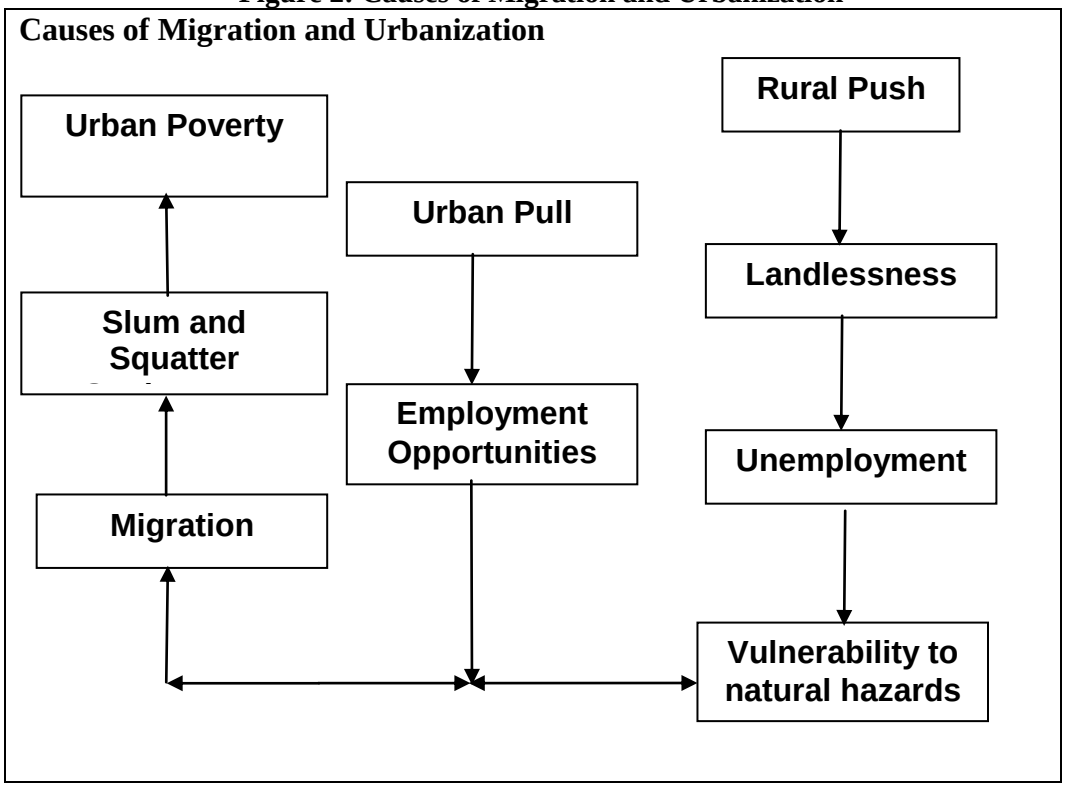
2.1 Urbanization, Urban Growth and Urban Poverty:

Bangladesh is now facing a crisis of unplanned urbanization which is a great challenge for the urban governance. Urbanization leads to urban poverty which is a multidimensional, dynamic and complex condition of city life. A lot of programs implemented and research conducted for the reduction of urban poverty, focused mostly on poor livelihood and health issues of slum people but the deterioration of urban environment due to this urban poor housing is being unaddressed. However, these urban poor are highly vulnerable to the environmental pollution caused by them. (Shafi, 2011).

At present the population of Bangladesh is 154.70 million with an annual population growth rate of 1.50%. (Urban Revitalization study, 2014). Mohit, 2012 in his studies on slum settlements of Dhaka city shows that '*Dhaka the capital city of Bangladesh with a population of 12 million receives 300,000 to 400,000 rural migrants annually*.' According to a study of UN-HABITAT, 2009 Dhaka is the 10^{th} largest megacities of the world. If the current growth rate continues it will be a metacity very soon. Rapid migration is causing Dhaka's population to grow at a fast rate. Consequently, the increasing urban poor seriously put pressure on the city's limited land, an already fragile environment and weak urban services. (Zaman et al, 2010). Environmental degradation and pollution is regarded as the implications of rapid urban growth. Unless the explosion of population managed effectively the challenge of the city governance will be multiplied.

In developing countries urbanization took place for a variety of reasons which directly impacted on the housing condition of poor people as well as on policy. Causes and consequences of migration and urbanization can be shown by the following figure and box:

Figure 2: Causes of Migration and Urbanization



Source: Adopted from Nahiduzzaman, 2006; Rahman, 2012

Box 1: Consequence and Challenges of Urbanization

Challenges of Urbanization

- Unplanned and unguided spontaneous urbanization continuously mounting the city's problems;
- Lack of advanced planning for utility services, shelter and infrastructure;
- Lack of advanced planning for road infrastructure and public transportation, installation of electric, gas, water, sewerage and telephone lines;
- Lack of comprehensive urbanization comprising all civic amenities like parks, lakes and other recreational facilities;
- Absence of regulatory framework of urban public land and waterways to prevent their misuse;
- Inadequate environmental concerns for protection of urban waterways, disposal of solid wastes and industrial effluents;
- Lack of concern for poor slum dwellers;
- Absence of regulatory support for citizen's protection against exploitation by home developers and other private utility providers;
- Absence of strong mechanism for coordination of infrastructure development

Source: Adopted from Zaman et al, 2010

2.2 Slum and Squatter Settlements:

Most of the urban poor people live in slum and squatter settlements in a substandard physical and social condition. Slum settlement depends on locational pattern and scope of employment. Such settlements in Dhaka city are basically seen in residential areas, commercial and industrial zones, besides hospitals, street and railways, over canals or rivers or embankment slopes. (Nahiduzzaman, 2006)

In 2007 Dhaka's population was 13.5 million with a growth rate of 6.9 percent where 50 percent population lived below the poverty line. (United Nations Revision, 2008). A census in 2005 by Centre for Urban Studies estimated that in Dhaka city 3.4 million people lived in some 5000 slums where the total urban population in that year was 5.4 million. (CUS, 2006).

Most of the slums in Dhaka city lack in the basic amenities like safe drinking water, sewerage system, latrines, waste disposal services, electricity, and gas. There is also lack of basic social services like health clinics and schools. (UNICEF, 2010)

According to a Census conducted in 2005 by the Centre for Urban Studies characteristics of urban Slums can be shown by the following way:

Box 2: Characteristics of Slum Settlement

Characteristics of Slum Settlement:

- Predominantly poor housing
- Very high population density and room crowding (more than 1,000 persons per acre)
- Very poor environmental services
- Very low socio-economic status for the majority of residents
- Lack of security of tenure (permanent threat of eviction)
- Poor governance

Source: Mapping & Census 2005 (CUS, 2006)

Slum settlements in Dhaka city can be seen in the following image.

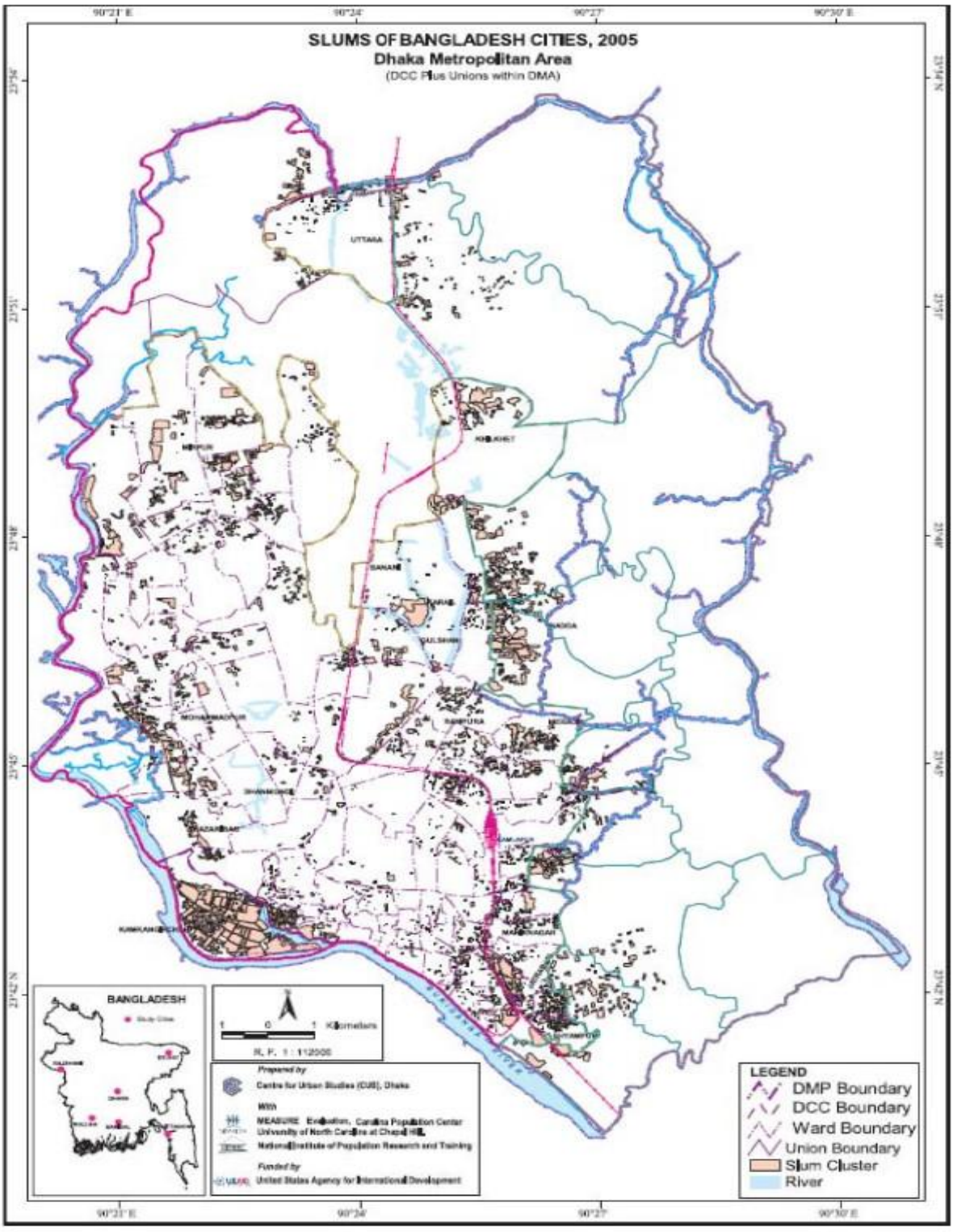


Image 1: Slums of Dhaka Metropolitan Area. Source: (CUS, 2006)

2.3 Housing Scenario in Urban Slum:

In Dhaka city, slums are established with densely constructed huts and open defecation, open drains and unhygienic environment are very common here. Maximum slum people live in self-made houses locally known as *jupri*. Majority of houses does not have their own kitchen or cooking facilities. Even most of the family with large member lives in a single room. The other facilities include the following.

Water Supply:

Supply of safe drinking water is still a challenge for the slum dwellers. The Water Supply and Sewerage Authority (WASA) in Dhaka has a policy to not provide water services to households without a legal land-holding permit, which effectively excludes informal settlements from access to a safe water supply. Slum dwellers therefore have to depend on the illegal water connections, which usually are very much polluted. Poor quality plastic pipes which are usually used to carry the drinking water from the nearby supply systems in most cases carry a lot of germs, may have connections with the sewerage lines. This is the main source of drinking water for slum people, which they usually drink without boiling due to the cost of firewood, the required pots, space and time. (Shiree Working Paper, 2013)

Sanitation Facilities:

Apart from poor housing conditions, sanitation and drainage facilities are the mostly neglected part of slums. Poor people in the urban slums mostly use unsanitary latrines and open defecation. However, in urban slums the commonly used sanitation systems include pit latrines, bucket latrines and water seal latrines. In many slums, 10 to 20 families share only one or two latrines. Although these latrines sometimes looked sanitary, usually are linked directly with the open drainage and sewerage line which runs into the nearby water bodies (such as river, lake or standing water). These so-called sanitary latrines in most cases are not water sealed. Moreover, there are a number of hanging latrines built over the lakes or rivers in many slums. Drainage is also poor in urban slums. Drains are not sufficient and usually open and blocked with garbage and even a little rain causes water logging with garbage and sewerage overflowing. (Biplob et al, 2011; Shiree Working Paper, 2013).

In a study conducted by Biplob Pramanik titled *Assessment of Water Supply and Sanitation Facilities for Korail Slum in Dhaka City* presented the data that there is produced 17 million metric tons of human feces and 57 million metric tons of urine each year in Bangladesh. The major portion of these excreta is deposited into natural water bodies and open places which is polluting water sources, groundwater, surface water and the general environment. Therefore, it results in health hazards for the poor people. Slum people mostly suffer from water borne and excreta borne diseases due to lack of safe drinking water, adequate sanitation and hygiene and waste management (Biplob et al, 2011). Contaminated water very often creates different water borne diseases like melanosis, kurtosis and conjunctivitis. Subsequently, respiratory problem, gangrene, skin disease, kidney disease, lung cancer may also happen for polluted water (Alam, 2009).

Waste Management:

Waste management is very poor in most of the slums of Dhaka city. Waste includes both solid and liquid particles. Municipality is responsible to collect waste from roads, public toilets, drains and from all settlements within the metropolitan area. They need to set up dustbin in different locations and alert the citizens for proper use of it. But due to lack of resources and accountability waste is not collected properly. As a result, uncollected wastes block the drains and sewerage and eventually create water logging which pollutes the air. On the other hand, in most cases, slum people dump the wastes into the nearby water bodies which result in water pollution of the natural water bodies and also degrade the quality of groundwater.

Unhealthy Living Environment:

Due to lack of proper shelter, safe drinking water, sewerage and sanitation facilities poor people of urban slum live in a very unhealthy environment. Some of the slums are located near the waste dumping sites or near railway lines. Moreover, many slum houses are built over water bodies like: lakes, rivers, canals, standing water or drains. Unfortunately, most open water sources in Dhaka are seriously polluted by the residential wastage and industrial effluents, due to poor garbage management system. Living in unhealthy and unhygienic environment, eating unhealthy food and drinking unsafe water, the poor people of the urban slum face a lot of health

hazards. Thus poverty and ill health have a strong linkage where poverty causes ill health reversely ill health may cause poverty. (Alamgir et al, 2009; Shiree Working Paper, 2013). Consequence of ill health may be shown by the following way.

Box 3: Consequence of Ill Health on Slum People

Consequence of Ill Health

- A number of income earners faced losses of working days, salary cuts and a few have to stop working or lost their jobs for acute illness.
- To manage the situation, some households had to use savings, borrow money from formal and informal sources, spend money from their working capital or sell other assets.
- In some cases young members of the family are forced to start work when the main earning member of the family become unable to work and earn which results stoppage of child education forever.
- Some people faced disability (full or partial) or lass their working capacity due to lack of timely proper treatment
- Disability of the household head brings disaster to the whole family.

Source: Adopted from Shiree Working Paper, 2013.

2.4 Poverty, Natural Resources and Pollution Conundrum:

Poverty and environment coexist in quite a complex set of relationship where poor people directly depend on the resources of environment like land, water, crops, fish, poultry, and livestock and by turn poor people's actions are responsible for the long term damage and depletion to the natural resources like open water bodies. Furthermore, any loss or degradation to the natural resources question to the livelihood potential of the poor class. Even the poor people are badly affected by the pollution of natural resources of the environment. Access to adequate sanitation is the prime health concern of the poor slum people. However, poverty is the main obstacle to ensure proper sanitation for the slum people as they lack both means and

access to improved sanitation facilities and also lack of knowledge about hygienic sanitation practice. Hence, poverty-environment must have a close linkage and therefore a deep impact in the policy discourse of Bangladesh. Even poverty reduction has got the recognition of the global society as the central issue of development strategy in the development discourse (Islam, 2008, Selina et al, 2006, Rahman et al, 2002, Ghosh et al, 2010). According to a USAID Publication of 2006 "Poor people and poor countries tend to be dependent to a large extent on natural resources for growth, poverty reduction and empowerment. Therefore, the relationship between natural resources management and poverty is complex and dynamic." Poverty pollution situation can be improved by concentrating on some levels like conservation of nature and natural resources for sustainable livelihood of the poor, controlling or combating pollution for the maintenance of biodiversity and protection of human health (Source: Internet, othesis4u.blogspot.com/2012/09/environment-and-natural-resource.html).

There is another phenomenon arises where the poor people have lost their access to and control over natural resources due to market domination mechanism. Simultaneously transnational financial institutions and transnational corporations usually try to exploit the precious natural resources and deprive the marginal people. Therefore, it is the mandate of the state authority to look the poor portion of the society through the lens of equity, justice, non-discrimination and human rights (Rubayat Ahsan, 2008).

'The term environment is closely linked to the concept of sustainable development. The concept received global recognition in 1987 through the adoption of the recommendations of Brundtland Commission (formed in 1982) at the UN General Assembly in New York. According to this concept the level of natural resources consumed at present should remain the same in future. For this purpose, the cost of technology should be decreased, alternative technologies should be invented and economic growth should happen in such a manner that the supply of resources could be maintained in the long run. Therefore, sustainable development entails conservation of natural environment and biological diversity alongside improving the living standards of the people' (Source: Internet, www.thedailystar.net/book-reviews/contemporary-environmental-challenges-bangladesh-196438). Therefore, social activities should be done in a manner where economic growth will maximize without compromising environmental protection and safety
(Source: Internet, othesis4u.blogspot.com/2012/09/environment-and-natural-resource.html).

2.5 Consequence on Environment:

Urban poor who are mostly migrant, in most of the cases suffer from extreme poverty. These poor people come from different disaster prone, river eroded, monga affected, coastal belts and many other pockets of extreme poverty of the country. They moved to Dhaka as climate refugees after experiencing a kind of environmental hardship. (Shiree Working Paper, 2013). But after moving to Dhaka, they reside in the poor slum settlements where basic services are mostly inadequate. They are bound to pollute the surrounding environment as the city governance failed to provide them the basic physical and social services. Consequently they suffer from environmental health hazards for air and water pollution which are caused by them. If this situation continues, once upon a time the environment of Dhaka will not be suitable habitat for anybody.

Pollution in Natural Water Bodies:

Water pollution involves any kind of contamination of water by any kind of chemical, particulate material or bacterial matter that degrades the quality and purity of water. Water pollution can occur in oceans, rivers, lakes and underground reservoirs (Source: Internet, http://www.ehow.com/how_2081630_prevent-water-pollution.html). The dumping of different urban wastes like municipal wastes, hospital wastes, toxic discharges from the industrial hubs lead to the contamination of both surface and ground water sources (Alam, 2009). Slum people resides beside or over the natural water bodies like canals, rivers, lakes, standing water directly pollute the adjacent natural water bodies. Thus polluted water creates severe health hazards for the poor people. Pollution in natural water body eventually degrades the whole environment as a large portion of environment is occupied by water (Islam, 2008).

PART THREE
POLICY APPROACH

3.1 Policy as a Concept:

The term 'Policy' refers to the set of principles which guides or sets decisions to have target outcome. There are numerous definition of Policy defined by scholars and institutions.

Policy generally describes the intention of the Government and provides the principles that govern the actions towards given ends. It defines the agreed and settled courses for adoption by the government and the institutions. Policy provides a basis for formulation of strategies, plans, legislation and other framework documents. *(PDO-ICZMP Working Paper, 2003: p-3)*

Thomas R. Dye defines public policy as anything a government chooses to do or not to do. Here Dye specifies clearly that the agent of public policy making is a government. This means that private business decisions, decisions by charitable organizations, interest groups, individuals or other social groups are not public policies. (Howlett and Ramesh, 1995: p-4)

William Jenkins defines 'public policy' as a 'set of interrelated decisions taken by a political actor or group of actors concerning the selection of goals and the means of achieving them within a specified situation where those decisions should, in principle, be within the power of those to achieve.

So, policy can be defined as a set of principles or decisions with a target or goal by institution(s) to address issues or problems. A policy is the identification of what needs to be done; or a description of what usually is done, along with design of institutions and authority to do it. A policy can be divided into several programs or projects in order to realize the broader objectives as included in the policy. When it is concerned with public interest and formulated by legal government mechanism, then it's a public policy.

3.2 Process of Formulation and Approval of National Policies:

3.2.1 Policy formulation

'National policy document is a broad mandate enunciated by the authority governing the country with respect to something for formulating acts and rules to be applied towards that end to achieve the desired objectives. Some desirable steps, generally lead to achieve good policy, are:

- a form of participatory process;
- national determination of clear goal;
- agreement on ways to set priorities;
- implementation arrangement with clear cut task distribution;
- better monitoring mechanism of activities for improvement of services and strategic information;
- devolution of decision making power to where potential contributions for sustainability are greatest.' *(PDO-ICZMP Working Paper, 2003: p-3)*

In the past, the policy formulation was almost a unilateral and departmental activity of the government. Participation of the stakeholders was limited. With the passage of time, the process of the policy formulation has changed to a great extent. Now, the Ministries concerned formulate the policy with the assistance from the professionals under its control, more or less through some sort of participatory approaches. Dialogues are frequently held with the stakeholders, experts, professionals, NGOs, and private sectors. Besides, the govt. institutions directly and indirectly connected with proposed policy are also consulted. Broadly, the Ministries are responsible for policy formulation at the national level. Prevailing socio-economic, environmental and political factors are largely reflected in policy documents.

3.2.2 The policy formulation process

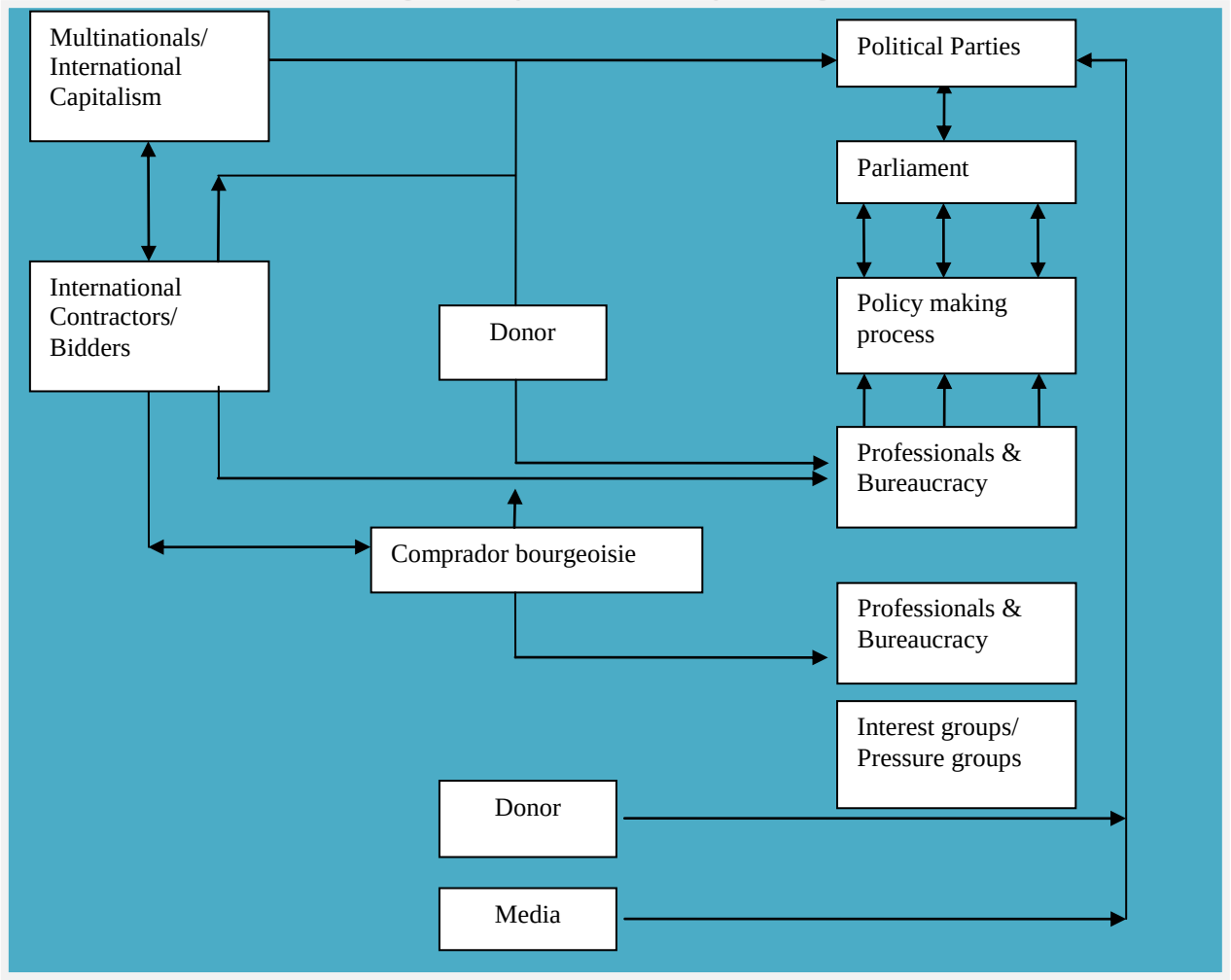
‘At present, there are no officially approved modalities to be followed for formulation, preparation and approval of national policies of the government. So, there is a great variety of ways of policy formulation. A general description of steps followed in the formulation and approval of the national policies are as follows:

1. Formation of a working group or expert group with the representatives of the concerned agencies, departments, consultants, etc. with a view to prepare a draft policy. Sometimes, experts are hired from outside.
2. Review existing sector policy and legislation by the group.
3. Data collection, scrutiny of the data and studies by the group for preparation of the draft.
4. Preparation of discussion paper on 'proposed policy directions.
5. Arrange workshop, inter-ministerial meetings, etc. on proposed policy direction, which are attended by various interest groups including Ministers.
6. Wider consultations with civil society, stakeholders, target groups, local govt. functionaries and formal & informal local and public representatives.
7. Revision of the draft using feedback from the workshop and the meetings.
8. Circulation of the first draft to different Ministries, agencies, groups, institutions and organizations for their review and written comments.
9. After incorporating the comments and observations on the first draft, consultations or workshop are arranged with wider representation.
10. Finalize the draft policy proposal through an inter-ministerial meeting after discussing the comments and observations received through the consultations, discussions and workshop.
11. The sponsoring Ministry formally approves the draft policy through the Ministry's usual procedures.
12. The sponsoring Ministry then sends the draft policy to the cabinet division for placing it in the Cabinet/ Council of Ministers for final approval.
13. The Cabinet / Council Ministers accords the final approval to the draft policy after discussions in its formal meeting.

14. The approved policy is then published in the official gazette for information of the members of the public.
15. The sponsoring Ministry initiates institutional and administrative actions for implementation of the policy statements.
16. The sponsoring Ministry also initiates formulation of strategies, plans and programs supporting the approved policy.' *(PDO-ICZMP Working Paper, 2003: p-4)*

The following figure illustrates the dynamics of policy making process in Bangladesh.

Figure 3: Dynamics of Policy Making



Source: Salahuddin M. Aminuzzaman Dynamics of Project Management in Bangladesh- An Institutional Analysis, Development Review Vol. IX, No.2, 1993

3.2.3 Revision of Policies:

'Government priorities are changed over time to adjust with the national socio-economic, environmental, strategic, political and economic changes and the development needs. Such situation calls for the revision of the government policies. Presently, The National Energy Policy- 1996, The National Land Use Policy–2001, The National Rural Development Policy-2001, etc. are also being considered for revisions.' *(PDO-ICZMP Working Paper, 2003:pp-4)*
Here we will discuss the housing, water and environment policy of the Government of Bangladesh basically those provisions that addressing the issue of slum dwellers.

ENVIRONMENT AND NATURAL RESOURCE MANAGEMENT: Existing Policies Focusing Issues of Urban Poor

Recent decades are the witnesses of rapid urbanization. Socio economic opportunities in urban areas have brought about more speed in urbanization. Because of this transformation – migration of people from rural to urban areas have made changes in every aspect of urban life including the state of natural resources. Induction of such happenings includes more housing for more people and necessity of more resources to manage these issues. In urban life, services like supply/arrangement of housing, water, sewerage, electricity, gas have major role in shaping the standard of living. In managing these issues, here comes the aspect of natural resources. In Dhaka, the capital city of the country, we see the pressure over natural resources like land and water resources in case of dealing with mentioned issues. We see tremendous pollution of natural resources (especially water resources in the city) and while talking about poor sector of the city inhabitants we find their direct role in pollution of natural/water resources such as water bodies.

So far, government has several policies and action plans to manage the matters of urban areas. In the policy regime I will review some policies, specifically *National Housing Policy, National Water Policy and National Environment Policy*. In my view these policies directly tell about the issue of housing and environmental pollution in the urban slum area. I will mention only the provisions those deals with housing, water and environment of urban areas.

3.3 Housing policy:

As mentioned before, several literatures show aspects of rapid urbanization in the country since late eighties. *The current urban growth rate is 5-6% per annum. A prediction shows that more than 50% of Bangladesh population will be living in urban areas by the year 2030(Dr. Hossain, 2010, p-3).*

To manage issues derived from urbanization like rural to urban migration, availability of economic and social opportunities, expansion of territory and population etc. government and other stakeholders should come up with appropriate policy options, strategies, plans and programmes. Keeping all these issues in consideration government of Bangladesh has *National Housing* Policy to deal with aforesaid and other related issues.

3.3.1 National Housing Policy, 2008 (Draft)

The existing *National Housing Policy* includes provision to provide arrangements for housing or settlement for all classes of people. The main objective as mentioned in the policy is "*To provide the political, economic, environmental, technical, moral and spiritual guidance for suitable Housing and sustainable human settlement development for all*". It also targets to ensure housing for all with particular emphasis on the disadvantaged, destitute, the shelter less poor and the low and middle-income group of people and also develop mechanisms to discharge formation of slums and squatter settlements, unauthorized constructions and encroachments.

Some other objectives of National Housing Policy include– *"to ensure all types of human rights in accordance with the United Nations and other international charters, the National Constitution and laws in order to-*

1. ensure everyone's equal right to access to the opportunities of housing, health, food and education regardless of Race, religion, color, language, doctrine
4. develop quality of life on the basis of Social, economic, environmental and cultural resources, features of rural and urban materials and ranges, style and beauty, the type of land use, land and the density of population, communication system, opportunity of housing and benefits of the citizens.

7. ensure appropriate housing and basic services and facilities for everyone through the participation and involvement of Public, private, voluntary and area-based organizations, cooperatives, NGO, individuals and groups.
8. express solidarity with the basic needs of the backward, neglected and endangered populations.
9. initiate separate program to provide housing opportunities for working women"

These objectives express the target of the country to manage the housing problems of people from several classes. In the urban areas these issues are more important to focus as housing is a major phenomenon as a result of rapid urbanization.

3.3.2 The provisions of the policy to achieve those goals

According to the draft policy document, 'Now a days people come from rural to urban areas in search of better livelihood due to a lot of reasons like; degradation of socio-economic condition of rural areas, frequent natural disaster, landlessness, unemployment etc. As a result, homeless and workless people gathered and crowded in the big cities which results development of slum and squatter settlement in the urban areas. These poor people contribute a notable portion in the national economy although they live in a substandard physical and social condition in the slum and squatter settlements. In this context government is planning to control the urbanization process with a view to reduce the extreme poverty by assisting the poor family to increase their income level with an objective to solve the housing problem by improving the environment and infrastructure of the slum and squatter settlement. Government will take the following steps:

5.9.2 The government will develop the environment and infrastructure of already build-up slums and will give priority to the inhabitants to live the slums.

5.9.3The government will prevent unauthorized construction and building-up private slums by strictly following the rules.

5.9.4 The government will ensure ambulance, fire service and essential transportation facilities in any kind of housing even in permanent/ temporary, katcha/ pucca.

3.9.5 The government will ensure safe drinking water, health friendly sanitation, electricity, drainage, waste management and other basic facilities especially in those areas where slum and poor people are living. Co-operative Associations, non-profit organizations, local service

provider institutions and the inhabitants will be connected and coordinated to ensure such facilities for the slum people.' *(National Housing Policy, 2008 (Draft), pp-13-14)*

As mentioned in the policy, there are provisions of developing overall housing and other environmental issues. Also we see private slums are discouraged, but empirically (based on literature and study) we get very poor environment and infrastructure in the slums; at the same time several private slums within the city.

There are also provisions of social services for the poor people along with increasing lawful ownership of land. Arrangement of collaboration among stakeholders is also mentioned in the policy. Following provisions can be mentioned here –

'5.9.6 Social services like maternity center, educational institute, child welfare center, health care center will be established and maintained by the local government authority in collaboration with the local people and the volunteer institution.

5.9.7 The government will ensure safe drinking water, sanitation facilities, night shelter and public toilets for the floating people.

5.9.8 The government will increase lawful ownership, availability and purchasing capacity of lands giving priority to the women, children, women lead family, socially neglected, vulnerable, sick and the deprived, poor and homeless people.' *(National Housing Policy, 2008 (Draft), pp-13-14)*

An interview was taken in the National Housing Authority on 14 December, 2014 with the **Executive Engineer, Dhaka Circle, NHA.** He commented that right at this moment NHA does not have any projects for the housing of urban slum dwellers of Dhaka city. NHA is working with the project for the slum people named Pro-Poor Slum Integration Project (PPSIP) in collaboration with World Bank which is working in 5 main cities of Bangladesh outside Dhaka. According to the interviewee, PPSIP will be implemented 5 other cities not in Dhaka as there is a risk of failure of the project in Dhaka city. His opinion is that if such settlements like PPSIP will build in Dhaka city then the rate of migration will increase rather than decrease. He also added that the National Housing Policy of 2008 has become reviewed but still under processing in the ministerial meeting level. National Housing Policy 2013 still in the rough stage not finalized.

Pro-poor ideology has become the focal objective of many development projects. It is the concerted effort of the policy makers for the development of greater quality of life including essential quality building for the poor. The planning and designing of PPSIP emphasizes the assessment of the environmental concerns. (NHA, 2014)

Box 4: Slum Up gradation Program by National Government

Pro-Poor Slums Integration Project (PPSIP)

The Pro-Poor Slums Integration Project (PPSIP) has been initiated by the Government of Bangladesh (GoB) with financial support from the World Bank to improve the quality of life and overall living condition of the poor community living in the urban slums. National Housing Authority (NHA) under the Ministry of Housing and Public Works (MoHPW) will lead in planning and implementing the PPSIP. Poverty alleviation has engendered a strong emphasis for the PPSIP on the basis that a higher standard of living will be achieved by enhancing security of tenure, improving infrastructure, and facilitating access to credit.

Urban poverty is the most significant predictor of environmental health risks. In Bangladesh, out of 40 million people living in urban areas, around 62 percent of urban populations are living in 'informal settlement' or 'slum'. This segment of the population is deprived of physical assets, political influence, basic services and access to social capital. It is realized that global efforts to improve living conditions of slum dwellers, as enshrined in the Millennium Development Goals would not be achievable unless the slum dwellers are upgraded as communities with secure livelihood and the primary needs. Thus, the focus of the PPSIP is not limited to a housing project only; rather implement a sustainable solution enhancing the community's self-assurance, livelihood sustainability, and resilience.

The proposed PPSIP planned to be implemented in five City Corporations/ Pourashavas of Bangladesh includes Comilla, Narayanganj, Barisal, Sirajgang and Dinajpur. Environmental management will get a great concern in this project. Urban utility services like management of drains, solid waste and liquid waste, protection of natural water bodies and aquatic lives will deserve significant attention

Source: PPSIP Draft Final of NHA, 2014

Another official of NHA was interviewed on the same day. He is the **Deputy Director, National Housing Authority, Ministry of Housing and Public Works**. He commented that according to the rules and regulations NHA just orders the related organizations to implement the policies. They do not have any project exclusively for the dwellers of Dhaka city. NHA does not directly deal with the issue of pro-poor people of urban slums. They referred City

Corporation, WASA, RAJUK for dealing with the issue of slum dwellers. Furthermore NHA has a slum related section; they can do something for the slum people. Actually everything in the papers level not in the practical field level. He added that NHA has a plan to pilot a rehabilitation program in Uttara and Purbachal of Dhaka city where shelter for slum people will be ensured with all housing facilities.

3.4 Water Policy:

We need to review the water policy to stop the pollution in natural water bodies. Availability of water, including rainwater, surface water, and groundwater, in usable forms calls for its sustainable development, a responsibility that has to be shared collectively and individually by members of the society. Water resources management in Bangladesh faces immense challenge for resolving many diverse problems and issues. National Water Policy mention that, as water is essential for human survival, socio-economic development of the country and preservation of its natural environment, it is the policy of the Government of Bangladesh that all necessary means and measures will be taken to manage the water resources of the country in a comprehensive, integrated and equitable manner. Here managing water issues in specially urban areas is a real challenge for the government. Though, there are several provisions for managing this issues nevertheless there are illegal process of water supply in the cities especially in the capital city. More than that, pollution of water bodies/resources within the city is perhaps the most common scenario.

It is also mentioned that, the National Water Policy will be reviewed periodically and revised as necessary. It will guide management of the country's water resources by all the concerned ministries, agencies, departments, and local bodies that are assigned responsibilities for the development, maintenance, and delivery of water and water related services as well as the private users and developers of water resources.

3.4.1 Objectives of National Water Policy:

The water policy of the government aims to provide direction to all agencies working with the water sector, and institutions that relate to the water sector in one form or another, for achievement of specified objectives. These objectives intend:

a. To address issues related to the harnessing and development of all forms of surface water and ground water and management of these resources in an efficient and equitable manner
b. To ensure the availability of water to all elements of the society including the poor and the underprivileged, and to take into account the particular needs of women and children
c. To accelerate the development of sustainable public and private water delivery systems with appropriate legal and financial measures and incentives, including delineation of water rights and water pricing
d. To develop a legal and regulatory environment that will help the process of decentralization, sound environmental management, and improve the investment climate for the private sector in water development and management. To develop a state of knowledge and capability that will enable the country to design future water resources management plans by itself with economic efficiency, gender equity, social justice and environmental awareness to facilitate achievement of the water management objectives through broad public participation.

So, we see that there are government arrangements to manage the water supply for all people with special consideration of poor and underprivileged at the same time special cases of woman and children. In the delivery system, there are provisions to maintain legal ways and price, but in urban areas in the cities especially in Dhaka it is a challenge to maintain these. Based on both secondary and primary data, it is seen that illegal water connection, profit making by some specific persons or groups are common scenario of the city.

3.4.2 Provision of Water Policy to Achieve the Goals:

Water Supply and Sanitation (Provision 2.6 of the policy)

Water supply and sanitation problems have obvious implications for public health. Diarrheal diseases, arising largely from drinking unsafe water, are a leading cause of death in the rural

areas. Lack of proper sanitation and drainage facilities, inadequate water supply, and insufficient health and hygiene education are the primary causes of diseases in the urban areas. Lack of access to safe water supply in the rural areas is a special hardship for women who have to carry water over long distances, with significant impact on their health and productivity.

To address these problems, it is the policy of the Government to:

a. Facilitate availability of safe and affordable drinking water supplies through various means, including rainwater harvesting and conservation.
b. Preserve natural depressions and water bodies in major urban areas for recharge of underground aquifers and rainwater management.
c. Mandate relevant public water and sewerage institutions to provide necessary drainage and sanitation, including treatment of domestic wastewater and sewage and replacement of open drains and construction of sewers, in the interest of public health.
d. Empower, and hold responsible, municipalities and urban water and sewerage institutions to regulate the use of water for preventing wastage and pollution by human action.
e. Mandate local governments to create awareness among the people in checking water pollution and wastage. (National Water Policy, 1999, p-10)

Thus, there are policy arrangements for preservation of water including rain water and at the same time preserving water resources of urban areas. But water bodies or other water resources are not being preserved practically; moreover these are being suffered by massive pollution by human actions. Water from urban water bodies (Dhaka city) are totally unlikely to use for any activities.

Water for the Environment (4.12 of the Policy)

Protection and preservation of the natural environment is essential for sustainable development. Given that most of the country's environmental resources are linked to water resources, it is vital that the continued development and management of the nation's water resources should include the protection, restoration, and preservation of the environment and its bio-diversity including wetlands, mangrove and other national forests, endangered species, and the water quality. Accordingly, water resource management actions will take care to avoid or minimize environmental damages.

Water quantity and water quality issues are uniquely linked. Poor water quality affects the availability of fresh water for different uses. Contamination of surface water bodies and groundwater aquifers by agricultural pollutants, industrial discharge, domestic pollution, and non-point source urban runoff exacerbate water quality problems and endanger both natural ecosystem integrity and public health. Other environmental problems include: excessive soil erosion and sedimentation, waterlogging and salinization of agricultural land, groundwater depletion, watershed degradation and deforestation, reduction of biodiversity, wetland loss, saltwater intrusion, and coastal zone habitat loss.

Henceforth, all agencies and departments entrusted with water resource management responsibilities (regulation, planning, construction, operation, and maintenance) will have to enhance environmental amenities and ensure that environmental resources are protected and restored in executing their tasks. Environmental needs and objectives will be treated equally with the resources management needs. It is, therefore, the policy of the government that all water management agencies and related natural resources departments will:

a. Give full consideration to environmental protection, restoration and enhancement measures consistent with the National Environmental Management Action Plan (NEMAP) and the National Water Management Plan (NWMP).
b. Adhere to a formal environmental impact assessment (EIA) process, as set out in EIA guidelines and manuals for water sector projects, in each water resources development project or rehabilitation programme of size and scope specified by the Government from time to time.
c. Ensure adequate upland flow in water channels to preserve the coastal estuary eco-system threatened by intrusion of salinity from the sea.
d. Protect against degradation and resuscitate natural water-bodies such as lakes, ponds, beels, khals, tanks, etc. affected by man-made interventions or other causes.
e. Completely stop the filling of publicly-owned water bodies and depressions in urban areas for preservation of the natural aquifers and environment.
f. Take necessary steps to remove all existing unauthorized encroachments on rivers and watercourses and to check further encroachments that cause obstructions to water flows and create environmental hazards.

g. Stop unplanned construction on riverbanks and indiscriminate clearance of vegetation on newly accreted land.
h. Encourage massive afforestation and tree coverage specifically in areas with declining water table.
i. Enforce the "polluter pay" principle in the development of regulatory guidelines for all regulatory actions designed to protect public health and the environment.
j. Provide education and information to the industrial and farming communities on self-administered pollution control mechanisms and their individual and collective responsibilities for maintaining clean water sources. *(National Water Policy, 1999, p-14)*

So there are provisions and targets in the policy to protect water bodies or natural resources. Also there is provision of penalty for polluting natural resources. As all these arrangements are for the preservation of natural resources, nevertheless we see that the lack of these policy provisions is the common scenario. However, during the field study when sample of water is collected for testing its quality it is seen that the Department of Environment still does not have any complete guidelines for the quality of water which can give the guideline for the standard parameter of drinking water and surface water or natural water body .

3.4.3 Urban Water Supply and Sanitation

In Dhaka city, WASA is the authority of managing water and sanitation issues. Followings are the scope of activities of WASA and other organizations in water and sanitation issues-

8.3.3 Water Supply, Sewerage Authorities (WASAs) shall be responsible for sustainable water supply in the metropolitan areas where WASAs exist.

8.3.10 Monitoring of water quality for the purpose of ensuring an acceptable standard will be the responsibility of DPHE, DOE, BSTI, Atomic Energy Commission (AEC) and CBOs and they will send their report to the water quality control committee in the Local Government Division.

8.3.11 WASAs and relevant agencies shall support and promote any collective initiative in slums and squatters in accessing water supply services on payment.

(National Policy for Safe Water Supply & Sanitation 1998, p-10-13)

Thus, according to the policy, WASA and other government institutions can have their roles in water supply and related issues. To manage Urban Sanitation and waste management, there are several policy provisions. Followings can be mentioned -

8.4.1 The sanitation system shall have to be self-sufficient and self- sustaining. Sanitary latrine in every household will be promoted. Along with individual sanitation, public and community latrines will be set-up by City Corporation/Paurasabha and leased out to private sector for maintenance.

8.4.2 The City Corporations or Paurashavas shall be responsible for solid waste collection, disposal and their management. These organizations may transfer, where feasible, the responsibility of collection, removal and management of solid waste to the private sector. Where WASAs exists, they shall be responsible for sewerage and storm water drainage systems.

8.4.5 Drainage system in the cities and municipalities will be integrated with the overall drainage system with the coordination of Ministry of Water Resources.

8.4.8 Department of Environment will be consulted on solid waste management.

8.4.9 Measures will be taken to recycle, as much as possible, waste materials and to prevent contamination of ground water by sewerage and drainage.(Ibid)

An interview which was taken place in Dhaka City Corporation on 15 December, 2014 with the Chief Waste Management Officer**,** Dhaka South City Corporation, Nagar Bhaban, Dhaka. In response to the question of what DCC do in area basis to collect waste and maintain drainage system, he replied that DCC done all activities with the help of different projects. They do not have any direct activities on area basis. Actually sanitation, sewerage, drainage and waste management of the slum dwellers are not exclusively addressed by DCC. DCC have area basis supervisor who are conducting the activities of DCC by different NGOs or local agencies or associations. Furthermore, DCC has area-specific dumping point for the collection of kitchen waste, tannery waste or industrial waste. Block supervisor will collect waste which will then be recycled or reused. But the official functions of DCC as described in their official website are well enough to deal with the housing problem of urban slum.

Box 5: Functions of Waste Management of DCC

Functions of Waste Management Department of DCC

- Street sweeping: All kinds of road sweeping inside the ward boundary.
- Giving permission of PCSP (Primary Collection Service Provider)/ door to door waste collection from household /Van services.
- Collect solid waste from domestic, business, hospital, street, public toilets and drains.
- Provide dustbins and other receptacles for accumulating the waste.
- DNCC cleaners clean the roads, drains and sewerage lines.
- Collection and transportation of medical waste.
- Development of hospital waste landfill
- Arrange community meeting for promoting community base solid waste management
- Development of sanitary landfill
- DNCC started community based waste management activities in collaboration with JICA
- Manage the private solid waste management and NGO based solid waste management

Source: http://www.dncc.gov.bd/departments-with-function/department-s/solid-waste.html

Another official of DCC was interviewed on the same day with the Chief Slum Development Officer (Ad-Charge)**,** Dhaka South City Corporation**,** Nagar Bhaban, Dhaka. In response to the question of what DCC do for the housing condition of the slum people of Dhaka city, he mentioned that DCC does not do any task by itself rather they engage in collaboration with different NGOs, agencies and volunteer organizations. He added that DCC has Urban Participation Poverty Reduction (UPPR) Project. It exclusively deals with the livelihood development of the slum people. DCC in collaboration with different NGO's are doing some development activities for the rootless street children. These projects run as per the contract with different NGOs financed by Concern World Wide, Sajeda Foundation, Nari Maitri, Social Economic Enhancement Program (SEEP), Cooperation Project for Urban Poor (CUP), Amrao Manush. However, the functions of slum development wing as mentioned in the official website of DCC is well concerned about the housing and environment of urban slum issue.

Box 6: Functions Slum Development Wings of DCC

Functions Slum Development Wings of DCC

- Housing and shelter for the slum and squatter dwellers.
- Increasing the potable water supply for slum dwellers
- Improving sanitary conditions at slums
- Improving drainage systems at slums
- Providing 3-meter run of footpath for slums
- Improving street lighting at slums
- Improving the garbage disposal system at slums
- Providing pre-primary, grade-1 and 2, and non-formal education to urban slum dwellers
- Providing adult literacy courses
- Provision of Micro-Credit for Self-employment and income generation activities, based on their existing skills.

Source: http://www.dncc.gov.bd/departments-with-function/department-s/social-welfare-and-slum-development.

3.5 Environment Policy:

3.5.1 National Environment Policy, 1992

National Environment Policy of Bangladesh was approved in May 1992 with a view to addressing issues of water pollution, air pollution, soil degradation, depletion of forest resources, unplanned urbanization, discharge of untreated industrial effluents etc. and degradation of environment.

3.5.2 Objectives of National Environment Policy

The objectives of environment policy include -

2.1 Identify and regulate of all types of activities which pollute and degrade the environment

2.2 Ensure environmentally sound development in all sectors

2.3 Ensure sustainable, long term and environmentally sound use of all national resources

Also the policy addressed 15 broad sectors to address overall environmental issues among which there are issues of Housing and Urbanization, Population, and Education & Public awareness

Environment policy of Bangladesh gives importance on preserving water resources such as water bodies, infrastructures etc. In Section 3.5 of the Policy, there are provisions to -

3.5.1 Ensure environmentally sound utilization of all water resources (3.5.1)

3.5.3 Ensure that all steps taken for flood control, including construction of embankments, dredging of rivers, digging of canals etc. Be environmentally sound at the local, zonal and national levels (3.5.3)

3.5.5 Keep the rivers, canals, ponds, lakes, haors (wetland), baors (wetland) and all other water bodies and water resources free from pollution (3.5.5)

According to Section 3.12 of the Policy, there are arrangements to – "*Control housing and urban development schemes having adverse impact on the local and overall environment*" and also we see to *"Focus greater importance on the role of water bodies in enhancing beautification of the cities"*

3.5.3 Legal Framework to Implement the Policy

Section 4 of the policy focuses on the Legal Framework to implement the policy which tells to -

4.1 Amend all laws and regulations related to protection of environment, conservation of natural resources, and control of environmental pollution and degradation with a view to meet present day's need (4.1)

4.2 Frame new laws in all sectors necessary to control activities concerning environmental pollution and degradation (4.2)

4.3 Ensure proper implementation of all relevant laws / regulations and create wide spread public awareness in this regard (4.3)

4.4 Ratify all concerned international laws/ conventions / protocols which Bangladesh considers rectifiable and amend / modify existing national laws / regulations in line with the international laws / conventions / protocols (4.4)

3.5.4 Institutional Arrangement to Implement the Policy

Section 5 of the policy has its focus on Institutional Arrangements to implement the policy.

Table 4: Institutional Arrangement and Implementing Authority of National Environment Policy for Water Resources

Sector	Implementing Authority
Water Development, flood Control and Irrigation	
Government will strictly control any kind of pollution (household waste or industrial waste) in the rivers, canals, ponds, lakes, haors, baors and all other water bodies and water resources.	A. Ministry of Industry B. Ministry of Environment and Forests C. Department of Environment D. Board of Investment E. State owned Industrial Institutions F. Department of Textiles and Jute G. Bangladesh Board of Rayon Silk
Government will undertake special planning so that the flow of natural water bodies and water and sanitation would not be hampered for any kind of development activities like establishment of irrigation project, roads, embankment.	A. Local Government Division B. Ministry of Communications C. Ministry of Irrigation, Water Development and Flood Control

Table 5: Institutional arrangement and implementing authority of National Environment Policy for housing and urbanization

Sector	Implementing Authority
Housing and Urbanization	
Government will ensure environmentally sound and planned rehabilitation system for the slum dwellers in the urban areas.	A. Ministry of Housing and Public Works B. Local Government Division C. Department of Urban Development
Government will undertake intensive and combined development for to maintain the environment basically in the overcrowded main cities.	A. Urban Development Agencies B. Naval Authority C. Ministry of Housing and Public Works

Source: National Environment Policy, 1992

PART FOUR
KEY FINDINGS FROM EMPIRICAL RESEARCH

4.1 Selection of the Study Area:

For the purpose of carrying out the research and to attain the objective, two slums have been selected as the study area. The selection is based on the location of the slums as those are located besides and adjacent to the main water bodies in the Dhaka city. Here the land price is high and the site has a potential for urban development. Moreover, the people of the study areas served the surrounding neighborhood for many purpose. Most of them are maid, driver, hawker, day laborer, shopkeeper, garments worker and worked in the small retail store as helper. They are important part of the surrounding area and the city as a whole. These study areas will help to understand the picture of environmental pollution specially the water resources by the slum dwellers and for the city as a whole.

A study was undertaken to assess the environmental conditions i.e. water supply, sanitation and solid waste management etc. of the Lautola slum and Balur Math slum of DCC area, and to identify the deficiencies for the improvement of existing situation. In order to achieve the objectives, a comprehensive literature review, household surveys and field visits, and a questionnaire survey were conducted. 'Household head' means the person who plays the main role in the decision-making process of a family. In absence of the household head, the second-important adult member of the family was interviewed. A questionnaire survey was also conducted upon 50 respondents (selected randomly) of each Slum. Information was also collected through 'non-participatory observation' and 'photographic observation'. Moreover, some data and information were collected from website of DCC & both slums and interviews with different people of selected locations.

Table 6: A synoptic view of the study area

Location	**Lautola Slum, Ekota Kacha Bazar, Mohammadpur**	**Balur Math Slum, Kalshi, Mirpur**
Permanency	7/8 years	19 years
Area	200 decimal, 7 acers	
Number of Households	300	700
Population	2000	5000
Water Facility	No supply by WASA. Only source is underground water. 2 deep tube well with motor pump. One is provided by DSK and another is by land owner.	5 legal line of water (All supplied by DWASA with the help of NGO's). Another 12 connections are going to be connected
Sanitation Facility	A few sanitary latrines established by DSK, Shiree Project	50 water seal latrines, No bucket latrines, No Hanging latrines
Drainage Facility	No drainage or sewerage system in the slum	Discontinuous semi-pucca drain
Solid waste Facility	Open place	Open place
DCC Ward No.	Ward No. 33, DNCC, Zone-5	Ward No. 2, Block-E, DNCC, Zone-2

Source: Field Survey, 2014

Lautola Slum

Ekota Kacha Bazar, Mohammadpur.

Picture 1: Lautola Slum in Mohammadpur, Dhaka

4.1.1 General Information of Lautola Slum:

Location:

The slum is located in Mohammadpur area of Dhaka city. This locality is known as Lautola or *Ekota Kacha Bazar (Ekota Vegetable Market)* as situated beside this market, which is opposite to the Rayer Bazar Martyred Intellectuals Memorial.

Water body or canal adjacent to the slum:

This slum is located beside a canal which is a *branch of Turag River* and connected with *Buriganga river.* As slum dwellers said, this locality is also known as *Mohammadpur Khaler Parr.* Four areas can be mentioned located beside the canal – charuddan, bishkatha, *Khaler* gora (beginning of canal) and Katasur. Our study area is a part of *Charuddan area*.

It was found based on discussion with the slum dwellers, couple of years ago people used to use the canal water for bathing, cleaning and other purposes. They also mentioned that previously it was deep and some people had boat to carry goods through this canal. But now this canal is almost dead and totally polluted because of land grabbing and pollution by several factors.

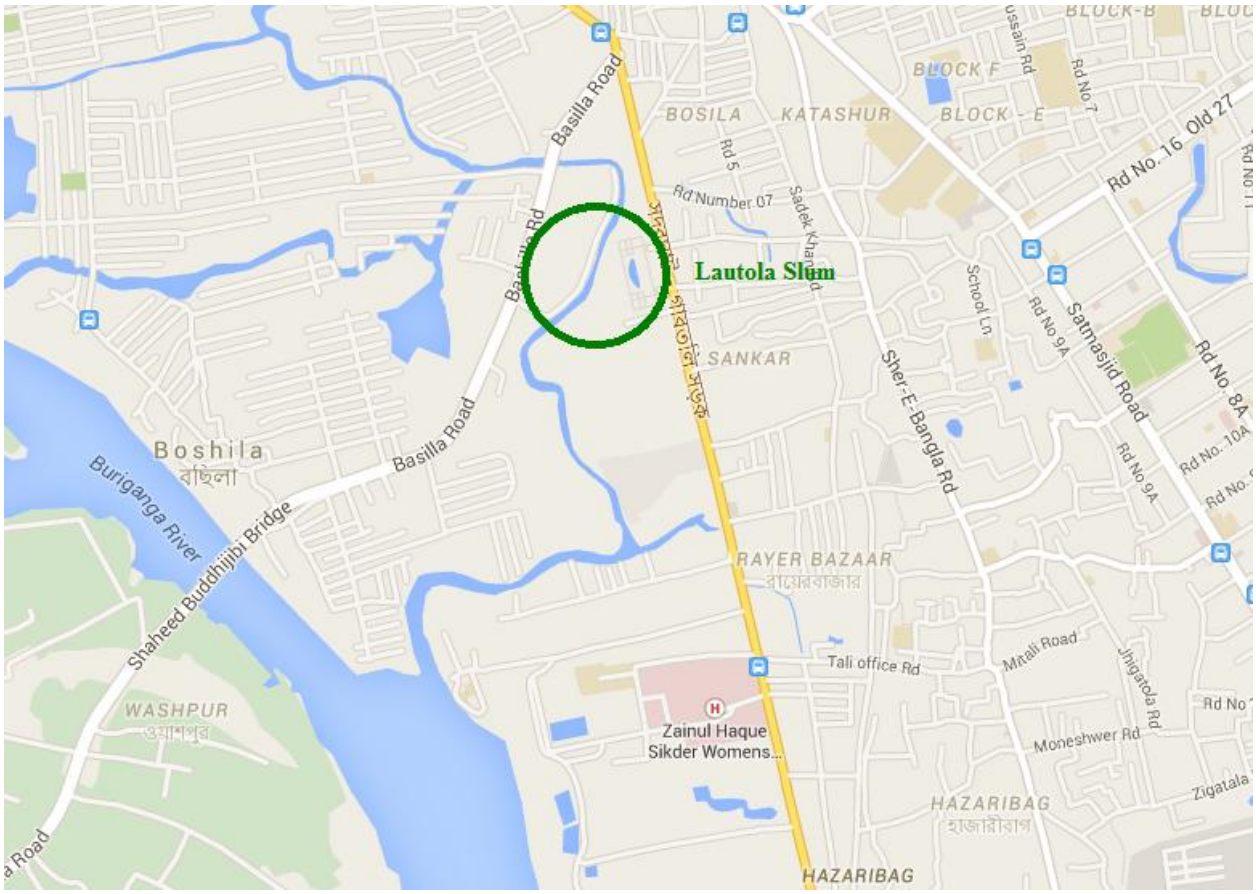


Image 2: Location of Lautola Slum in Google Map, Mohammadpur, Dhaka
(Source: https://www.google.com/maps/@23.74633,90.3507432,15z)

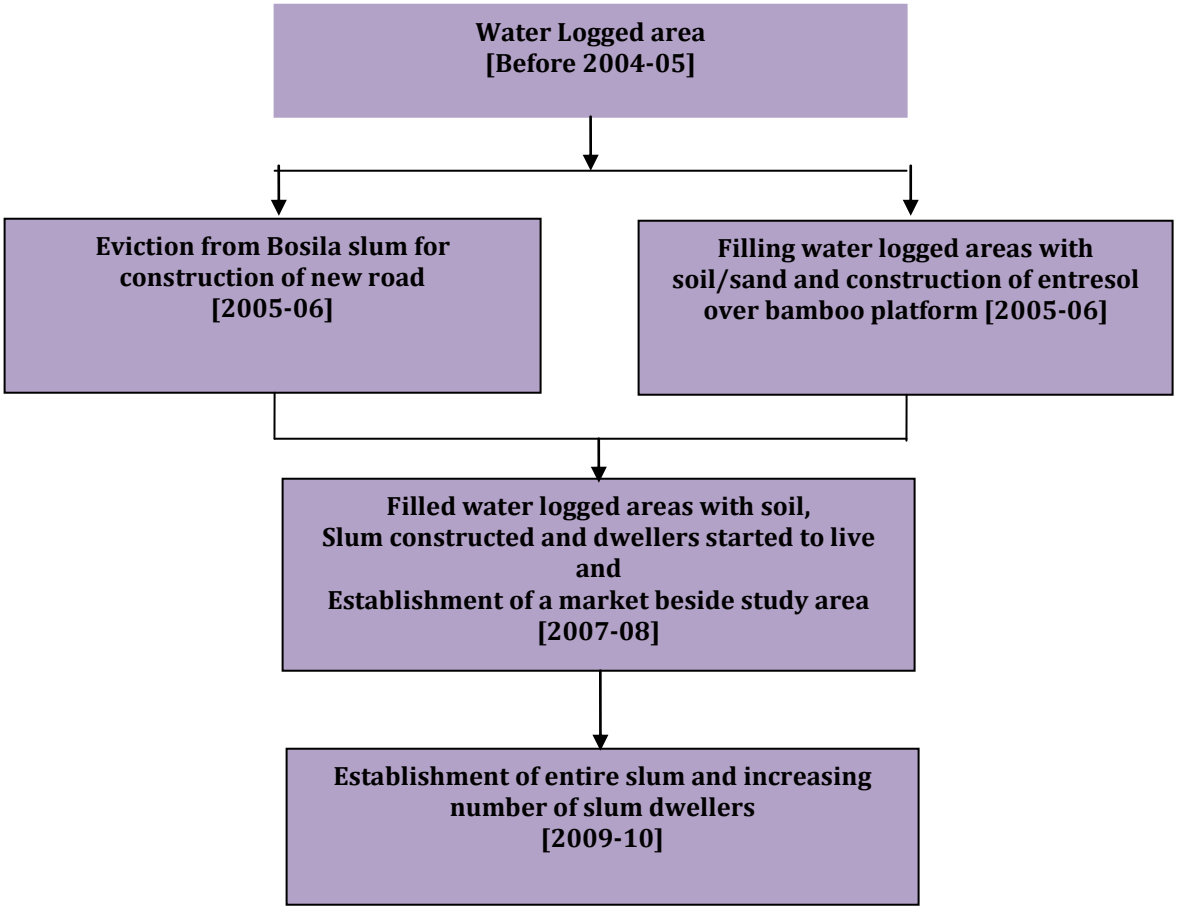
History of Slum Establishment:

According to the participants, existing community/slum was established in 2010 where dwellers started to live here first were relocated from another slum situated beside *Bosila Road* of Mohammadpur area. Participants mentioned that, before 2005-06, there was no community residence in this locality. They told about slum beside *Bosila Road*, they added that some years ago poor people started to live there and as the area was lower land so water logging was a common issue. So people made entresol on bamboo platform to live. All these happenings were before year 2005-06.

Approximately, in 2007-08 this area started to fill with soil and became higher which was actually a result of constructing new road. Because of starting construction of new road in these areas, people living beside Bosila road were evicted. At the same time, lower places of Ekota

Bazar which was then named as *Lautola* was filled with soil and became higher land. Owners (in some cases occupiers) of these lands started to construct some houses and thus we see starting of a private slum.

Figure 4: Establishment history of Lautola slum



Source: Analyzed from Field survey, 2014

Households:

There are approximately three hundred families living in this slum. Activities (labor, shopkeeper etc.) related to the business of vegetables is a common occupation of people living in this area. There are also other different professionals like driver, hawker etc. Some people living here are also unemployed.

Balur Math Slum,

Kalshi, Mirpur

Picture 2: Picture of Balur Math slum, Mirpur, Dhaka

4.1.2 General information of Balur Math Slum:

Location:

Research area is *Balur Math Slum* situated in Kalshi, Mirpur of Dhaka city. This slum was established in 1995-96. Based on the discussion with the slum dwellers, it was found that this slum was established on the *Khas land* which was grabbed by the local politician or other influential actors of this area. Balur Math Jhil is adjacent to the slum. Slum dwellers mentioned that some people tried to get lease this land from government and this is why they filled lower land with sand but they failed to have lease. From that time this locality is known as *Balur Math* or field of sands.

History of Slum Establishment:

People living in the nearby areas were evicted because of construction of new road in Kalshi area. Then the evicted people came here to live in this area and started the slum. At the same time local political and influential people started to occupy Khas land to establish houses. Thus the slum was established. Poor people from several areas of the country who are landless and work in surrounding areas then started to live here. Some people who came in this area

searching for job or came in this area because of river erosion also started to live here in the slum.

Households:

There are almost 600-700 households living in the slum as the slum dwellers mentioned and the people are in number of 4000-5000. Maximum people are day laborer. Also there are people of several professions – driver, rickshaw puller, small businessmen etc.

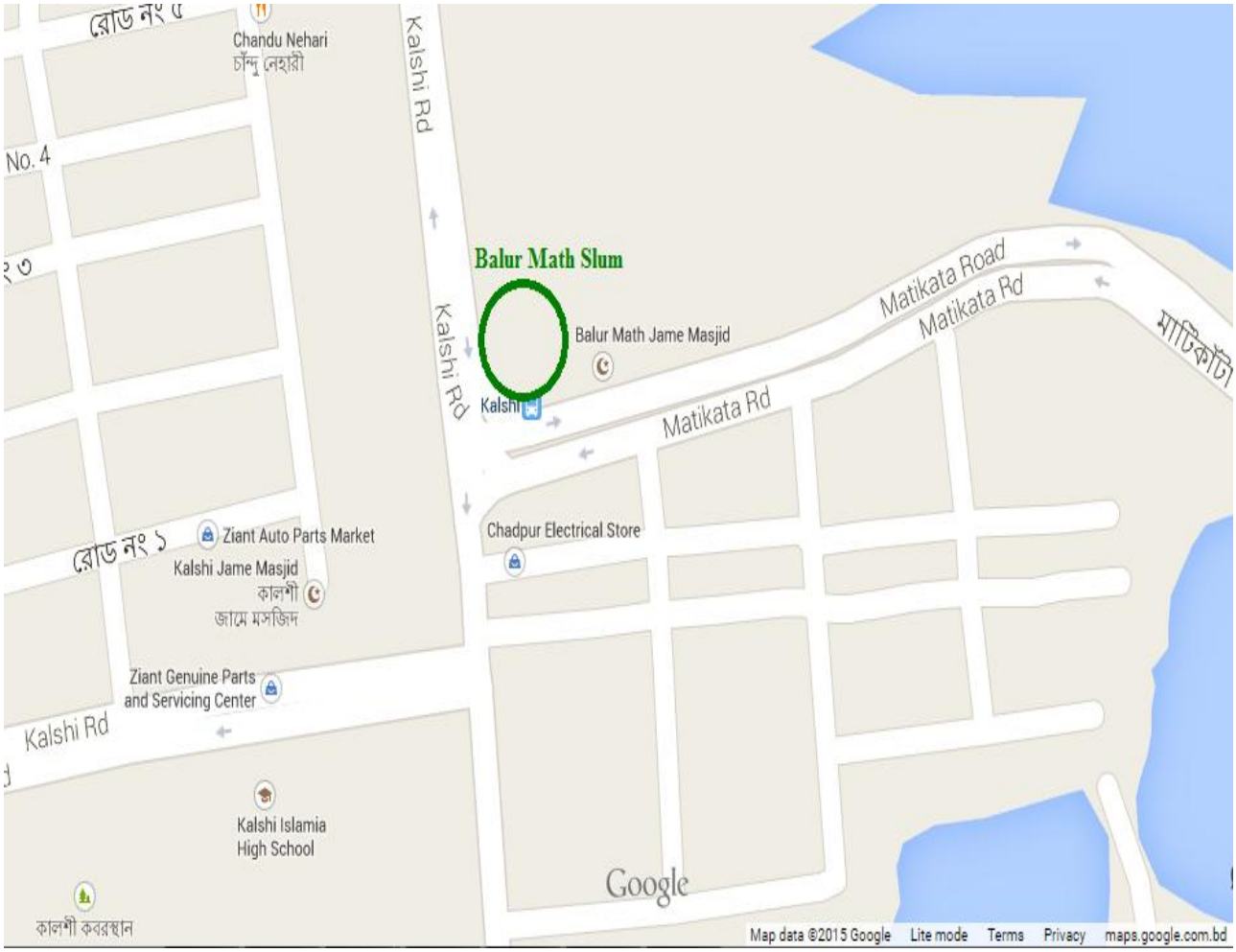


Image 3: Location of Balur Math Slum in Google Map, Kalshi, Mirpur, Dhaka
Source: (https://www.google.com/maps/@23.8231114,90.3783578,18z)

4.2 Socioeconomic Profile of the Slum Dwellers:

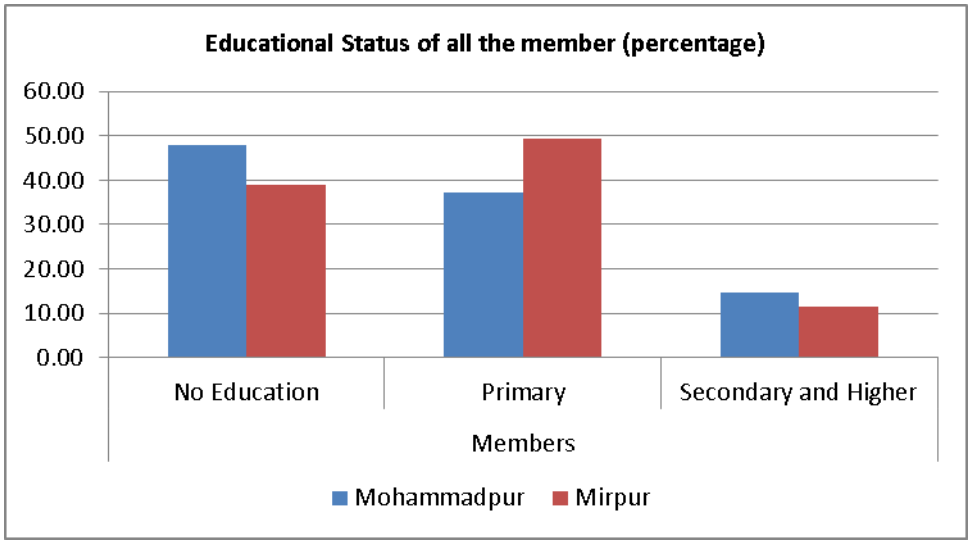
The overall socioeconomic condition of the urban slum people is not up to the standard. Socioeconomic characteristics include education level, occupational status, annual income level etc.

4.2.1 Educational Status of the Slum Dwellers:

Education is considered as an important factor of the socioeconomic characteristics of the household. In slum areas formal education facilities for the slum people are not so sufficient. Maximum slum people are out of formal education. But recently some initiatives with a small scale to educate the slum people have been taken by different NGO's. Across the surveyed members from the Mohammadpur, a major proportion of the members who were above five years were found to have no education.

Among all the members aged above five years and above in the Mirpur slum, 39 percent did not have any education. About 37 percent of all the members (above 5 years) from the Mohammadpur slum had primary level of education, while about 49 percent of the members from Mirpur slum had primary level of education. A small proportion of the household members from both Mohammadpur and Mirpur slum had secondary or higher education.

Chart 1: Educational Status of the Slum Dwellers



Source: Analyzed from Field survey, 2014

***** For this graph, the definitions of education are as below:***

No Education – if the member did not attend school

Primary – the education level of the member is from Class 1 to Class 5

Secondary and Higher – If the education level of the member was higher than primary and up to class BA / B.com.

4.2.2 Occupation of the Inhabitants in the Study Area:

Occupation is one of the determining factors of household to know the status of different earning members of the slum. A major portion of slum people of the both slums are involved in subsidiary occupation like petty business, day labor, rickshaw puller, hawker, garments worker, maid servant, beggar etc.

Out of 5O households, surveyed, in the Lautola slum in Mohammadpur area about 36 percent of the household heads are self-employed in the non-agricultural sector. The second major occupation of the household head in the Lautola slum is agricultural worker or day laborer (22 percent), while approximately 20 percent were found to work in others house as maid servant or were driver of vehicle (manual and automatic).

On the other hand out of 50 households, surveyed, in the Balur Math slum in Mirpur about 30 percent of the household heads were found to have salaried employment or had their own small business. Another 24 percent are involved in the agricultural sector or are day laborer.

About 51 percent of the respondents from Mohammadpur and 36 percent from Mirpur were unemployed or were solely housewife. About 18 percent of the respondents from Mohammadpur slum were found to be working in non-agricultural sector or were self-employed. Whereas 30 percent respondents of the Mirpur slum were found to be working in others' house as maid servant.

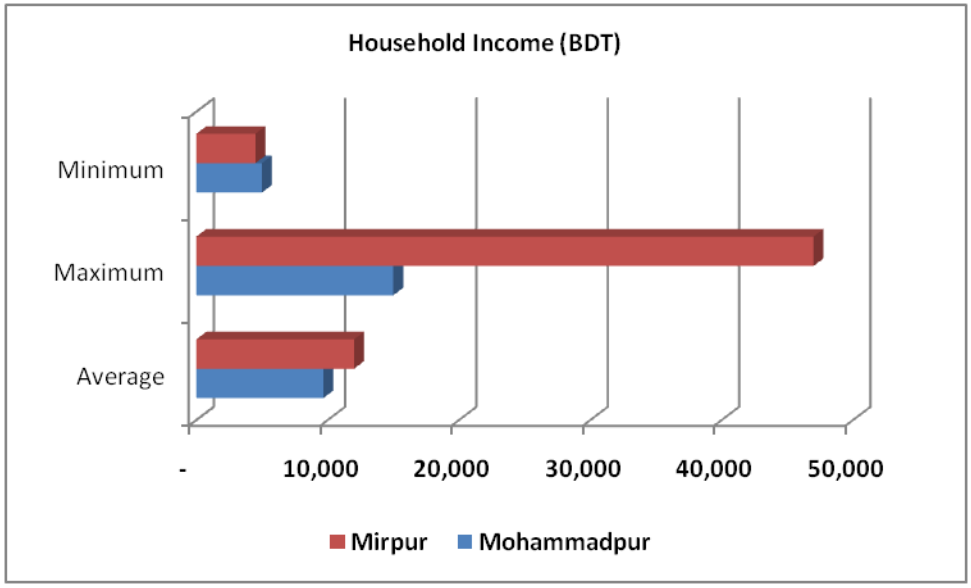
Table 7: Occupation of the household head and respondent (Percentage)

	Household Head		Respondent	
	Mohammadpur	**Mirpur**	**Mohammadpur**	**Mirpur**
Unemployed / Housewife	4	8	51.02	36
Agriculture / Day Laborer	22	24	10.20	12
Self Employed (Non Agricultural)	36	4	18.37	4
Salaried Employed / Small Business	18	30	8.16	14
Work in others house / Driver of vehicle	20	34	12.24	30

Source: Field Survey, 2014

4.2.3 Monthly Income of the Slum Dwellers:

Chart 2: Monthly Income of the Household (BDT)



Source: Analyzed from Field survey, 2014

During the questionnaire survey it is obtained that monthly income level of the people living in the slums is very low. On an average the monthly income of the people of Mohammadpur slum is BDT 9600, while the people of Mirpur slum is getting monthly little more higher which is approximately BDT 12000.

4.3 Housing Scenario:

4.3.1 Tenure of living in the community:

52 percent of the surveyed respondents from the Mohammadpur slum were found to have been living in the particular settlement for more than three years, while 38 percent of the Mirpur slum respondents were found to have been living in their settlement for more than three years. 22 percent of the surveyed respondents from Mohammadpur were found to be living there for less than three years, while 30 percent of the Mirpur slum dwellers were found to be living there for less than a year. Tenure of living can be shown by the following table:

Table 8: Tenure of living in the community (number)

	Mohammadpur	Mirpur
Less than one year	18	30
Less than two years	8	22
Less than three years	22	10
More than three years	52	38

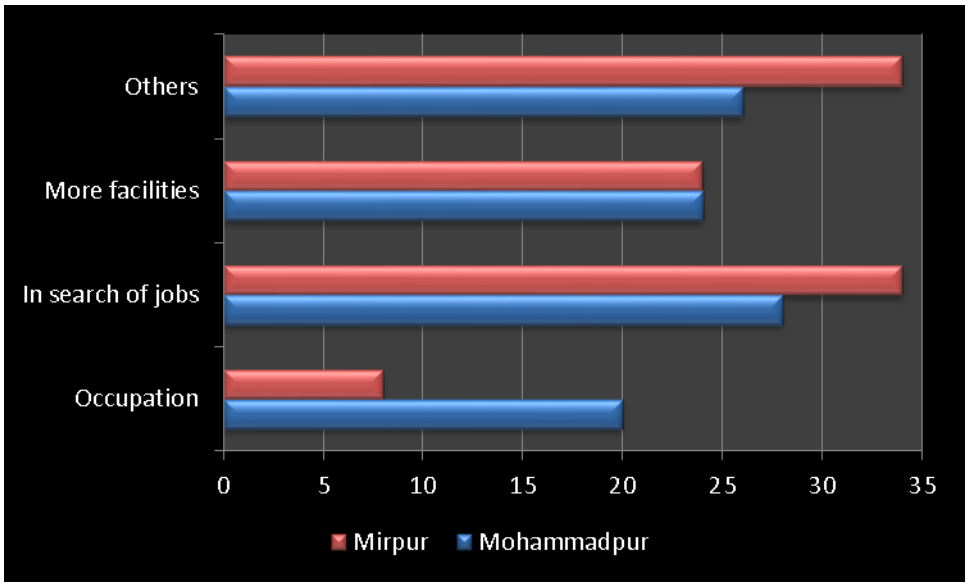
Source: Field Survey, 2014

4.3.2 Reason for staying in the current settlement

28 percent of the surveyed respondents from the Mohammadpur slum said that they started living in this slum in search of jobs, while 26 percent said that the reason was others which included eviction (from other area), natural disasters, place to live easily, shelter by relatives/others, safety, because of having relatives, environment is good, no cost for house rent and less house rent. 24 percent of the respondents said that they started living because the slum had more facilities.

34 percent of the surveyed respondents from the Mirpur slum said that they started living in this slum for in search of jobs, while another 34 percent said that it was for other reasons.

Chart 3: Reason for staying in the current settlement (percentage)



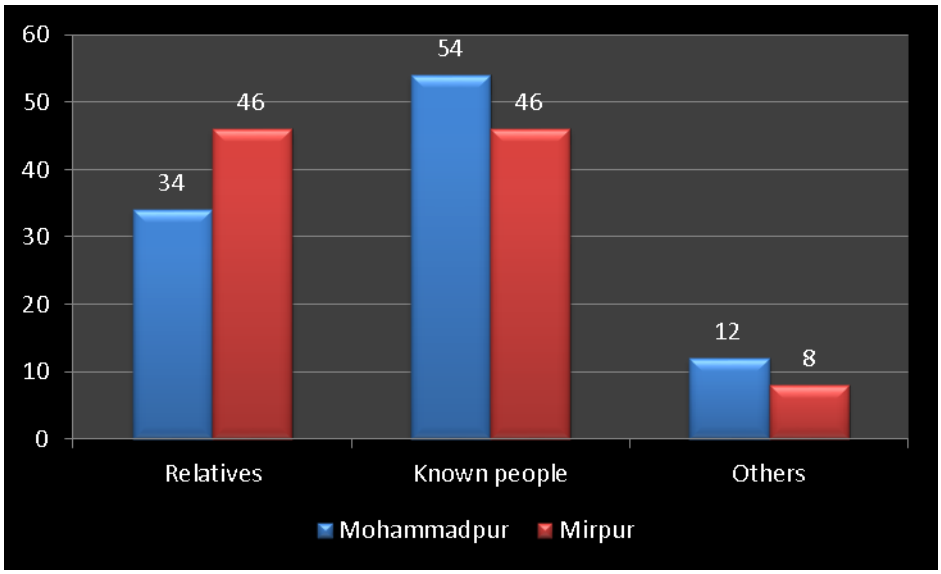
Source: Analyzed from Field survey, 2014

Others include: Eviction (from other area), Natural disasters, Place to live easily, Shelter by relatives/others, Safety, Because of having relatives, Environment is good, No cost for house rent and Less house rent

4.3.3 With whose Help the Respondent Started to Live in the Settlement:

54 percent of the respondents from the Mohammadpur slum reported that they started to live in the slum with the help of their known people, while 34 percent said that their relatives helped them. 46 percent of the surveyed Mirpur slum dwellers said that they started living in the slum with the help of their relatives, and another 46 percent said that people they know helped them start living in the slum.

Chart 4: With whose help the respondent started to live in the settlement (percentage)



Source: Analyzed from Field survey, 2014

4.3.4 Land and Housing:

Land:

The Mohammadpur slum has started its journey since four years back. It acquires an area of almost 200 decimal Land. Participants mentioned that it's a private property. Someone named Md. Shohel and his friend jointly own the property and thus they are the ultimate authority of this slum and other properties here.

Though the area is a private land, some of the participants mentioned that both sides of the canal are being occupied by the land grabbers. Participants don't know from whom or which authority land owners get this land or if it's received by inheritance.

Slum Dwellers have no idea about the authority that permits them to live there or build house or establish the slum. They only know the slum owners. As most of them are tenants, they came here and took a room in rent and thus living. So they are unaware of these issues. But in Mirpur slum the land in this area is mainly *Khas land* owned by the government. People say that, this land is actually owned by Ministry of land and Janata Housing limited. Also some say that there is land of Ministry of Shipping of Bangladesh government.

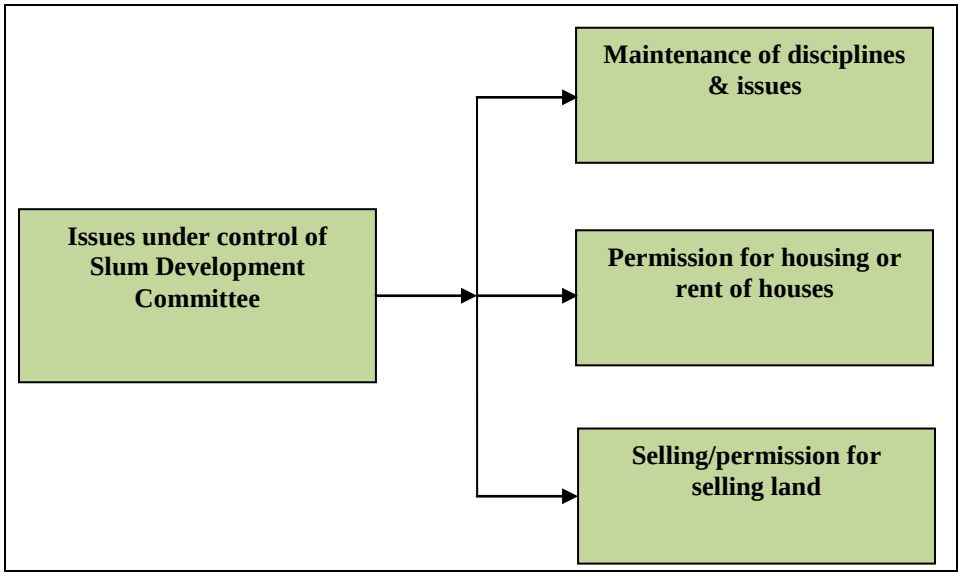
Condition of housing:

Mainly two types of houses are seen in Mohammadpur slum – building or *Pucca* that means its roof is made of tin and floor is made of concrete. There are also semi-building/*pucca* rooms, where both floor and roof is made of tin. Most of the houses have *semi-pucca* structure. *Semi-pucca* structure is a type of construction where walls are made of bricks or thatch or bamboo and roofs are made of CI sheet. They need to pay 1600-2000 Tk. monthly for semi *pucca* single room and approximately 2500 Tk. for *pucca* single room. Households are densely populated, as all the family members have to live in one room or rarely some families live in two rooms. They don't have different rooms for living, cooking or for other purposes.

There is one sanitary latrine for each two households. It should be mentioned that there is no different sewerage line for the latrines and thus these are connected directly to the canals. Almost all the people are tenants here, so they are unknown about the process of establishing houses here in the slum. People who started to live from the beginning of the slum mentioned that they were evicted from other places and then came here to live. Usually people come here being informed by familiar persons living in the slum.

Whereas in Mirpur slum people can live as tenants and also they can have land to construct their own households as the slum dwellers mentioned. Usually people have to take permission from the *Slum Development committee* to live in the slum. Also they get cooperation from the *Ansars* of *Ansar Camp* situated in this area. No specific rate is found for the land on which someone wants to have his households, but they have to pay some amount of money. Slum Development committee deals with the land sale or giving permission to stay in the slum. They are also the authority to maintain issues related to the slum.

Figure 5: Process of Building Houses in Balur Math Slum



Source: Analyzed from Field survey, 2014

4.3.5 Construction Materials of House:

The urban poor have little access to urban land. They mostly build their houses with low cost materials. Most of them are living in self-made houses locally known as *Jupri*. These houses are made of low cost housing materials like CI sheet, bamboo, straw and polythene and are highly vulnerable during the rainy season. (Hossain, 2004). The construction material of roof and wall for dwellers of both the slums were mainly tin. A considerable proportion of the Mirpur slum respondents (24 percent) were found to have concrete walls. In both the Mohammadpur and Mirpur slum, the major floor material was concrete.

Table 9: Construction Material of Roof, Wall and Floor (Percentage)

		Mohammadpur	Mirpur	Total
Roof	**Tin**	100	78	89
	Concrete	-	22	11
Wall	**Tin**	86	76	81
	Concrete	12	24	18
	Wood / Bamboo	2	-	1
Floor	**Tin**	-	2	1
	Concrete	96	90	93
	Wood / Bamboo	4	6	5

4.3.6 Type of Ownership:

Major proportion of the surveyed respondents from both the slums were found to be staying in rented house. Only 12 respondents from Mohammadpur slum and 9 from Mirpur were found to be staying in their own house.

Table 10: Type of Ownership of the House (Number)

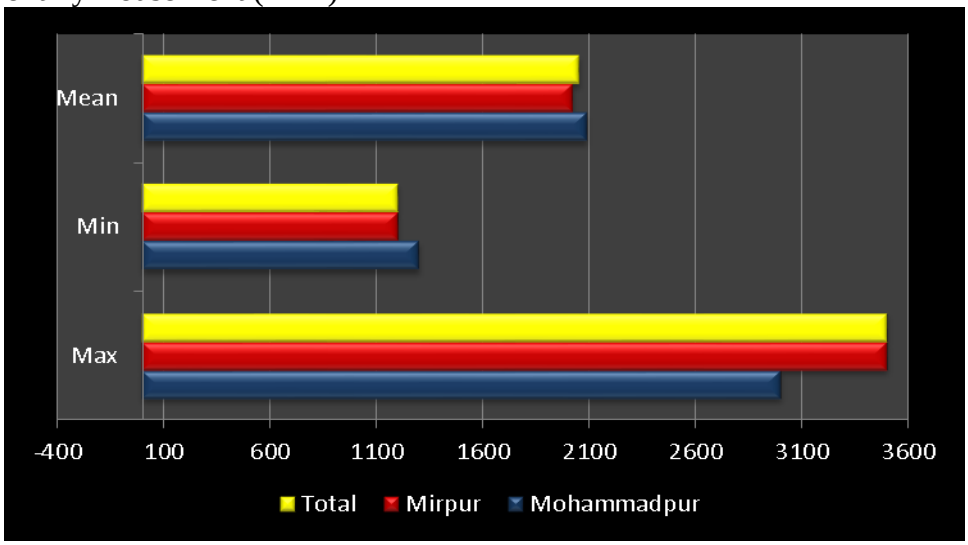
	Mohammadpur	Mirpur
Own	12	9
Rented	37	40
Shelter	1	1

Source: Field Survey, 2014

4.3.7 Monthly Rent of House:

On an average, a household, irrespective of the slum, paid BDT. 2,000 per month as rent. The highest rent paid by a respondent in Mirpur was BDT. 3,500 and in Mohammadpur, the highest rent paid was recorded at BDT. 3,000.

Chart 5: Monthly House Rent (BDT)

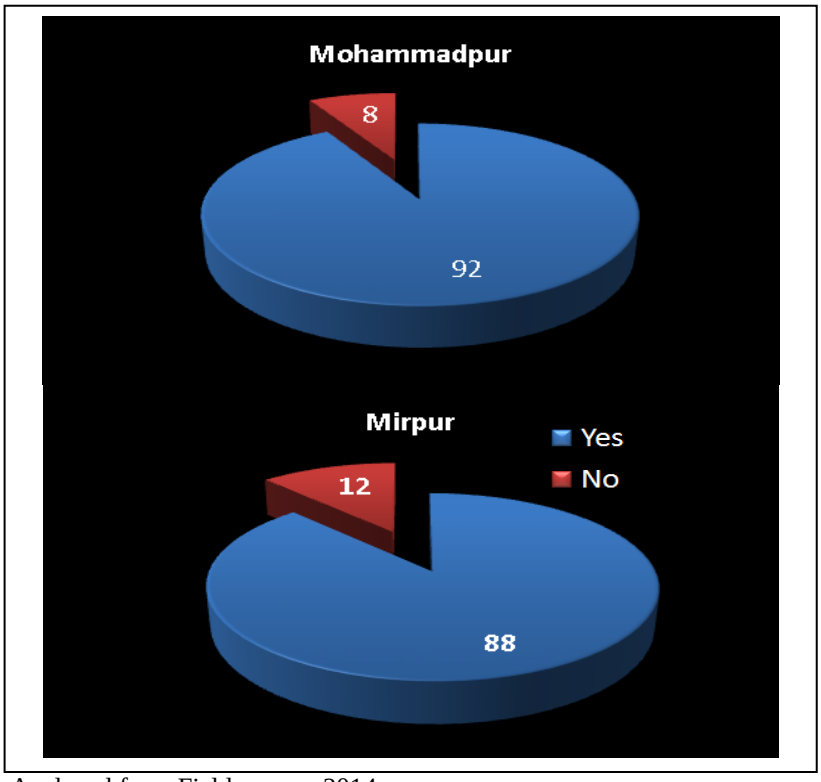


Source: Analyzed from Field survey, 2014

4.3.8 Different Rooms for Living and Cooking:

A majority of the surveyed households from both the slums were found to have different rooms for living and cooking. Only 8 percent of the households from Mohammadpur did not have separate living and cooking rooms. Only about 12 percent of the surveyed households from Mirpur slum did not have separate rooms for living and cooking.

Chart 6: Different Rooms for Living and Cooking (Percentage)



Source: Analyzed from Field survey, 2014

4.4 Other Basic Services:

Services available in Lautola slum are – Gas, electricity and water. As slum dwellers mentioned, almost all of them are tenants, so they have to pay monthly and the owners provide utility bills from the rent.

Gas connection is available for all the households. Participants argued that though there is Gas connection but sometimes there are problems with gas line and almost every day supply is sometimes less than necessary.

There is electricity supply in the community but inhabitants mentioned that there is frequent load shedding.

For water supply, dwellers have tube well with motor/pump. They collect water from this motor, and this is their only source of water for all activities – bathing, cleaning, washing and drinking.

Though participants said that owners pay the entire utility bill but at the same time they think that owners include the bills in their monthly rent. Even they don't know how the bill is being paid to the authority. Though tenants know that all the services they get are legal but they don't have any knowledge about how owners get the legal services or how bills are paid to the authority.

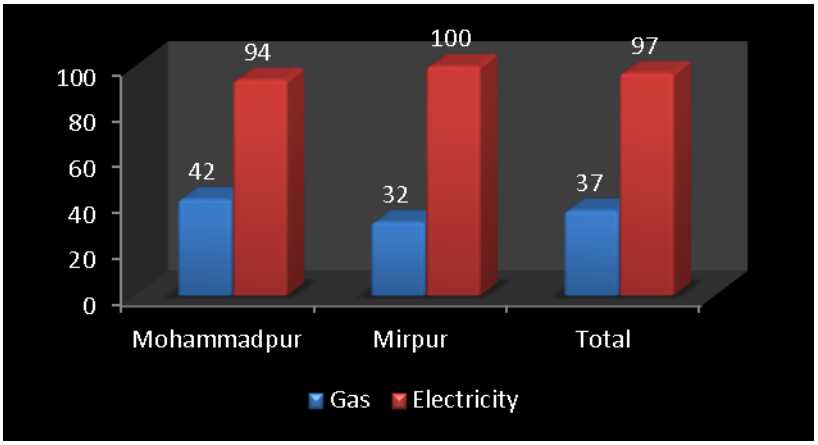
Services in Balur Math slum include only electricity and water services, both legal and illegal lines/connections can be found here. There is no Gas connection in the slum.

There are some legal electricity connections as the slum dwellers mentioned. They argued that, there is only one main meter/connection for electricity services and ten sub meters/connections through which slum dwellers get electricity connection. Only some households have electricity supply in this process. Other inhabitants have electricity services in their households but all these connections are illegal. Usually dwellers have to pay monthly 60 taka for each connection point, but if there is freeze in the households, they have to discuss for the payment with the service providers. There are middlemen for providing such services; also some people related to DESCO are paid for these illegal connections.

4.4.1 Gas and Electricity Connection:

About 42 percent of the surveyed Lautola slum dwellers were found to have gas connection and 94 percent had access to electricity. In Balur Math slum, 32 percent of the surveyed respondents were found to have gas connection in their household, while the entire surveyed household had electricity connection.

Chart 7: Gas and Electricity Connection (Percentage)

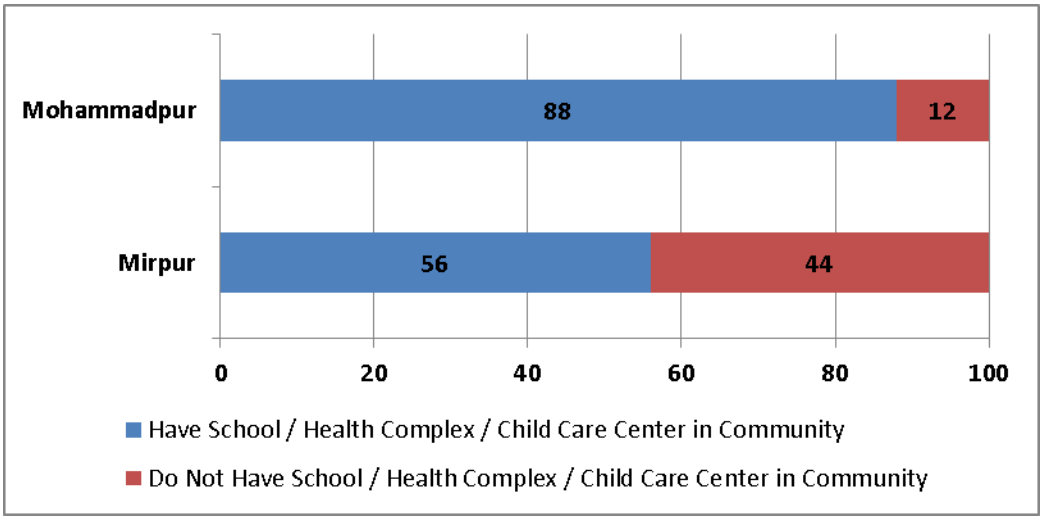


Source: Analyzed from Field survey, 2014

4.4.2 School / Health Complex / Child Care Center in Community:

About 88 percent of the dwellers from Mohammadpur slum and 56 percent from the Mirpur slum said that they had school / health complex / child care center in the community.

Chart 8: School / Health Complex / Child Care Center in Community (percentage)



Source: Analyzed from Field survey, 2014

Picture 3: School in Balur Math Slum

4.5 Sanitation, Drainage and Waste Management:

4.5.1 Sanitation:

The male household members of the Lautola slum were found to mostly use sanitary type of latrine (52 percent), followed by ring slab without water seal (24 percent) and a latrine that is connected with river, pond or canal. The female household members from the Lautola slum were also found to mostly use sanitary type of latrine (53 percent). The other mostly used latrine by the female members were ring slab and latrine connected with river, pond or canal. In Lautola slum, households that had children mostly used latrine connected with river, pond or canal. In Mirpur slum, the households mostly used sanitary type of latrine for their male, female and child members.

Condition of Sanitation in Lautola slum

Picture 4: Sanitary Latrines in Lautola Slum Built by DSK Shiree Project

Condition of Sanitation in Mirpur slum

Picture 5: Sanitary Latrines in Balur Math Slum built by UK aid and UNDP

Table 11: Sanitation Facilities in the Household (Percentage)

		Mohammadpur	Mirpur	Total
Male	Open hole	-	-	-
	Connected with river/pond/canal	22	12	17
	Ring slab (with water seal)	2	-	1
	Ring slab (without water seal)	24	4	14
	Sanitary	52	84	68
Female	Open hole	-	-	-
	Connected with river/pond/canal	21.28	12	16.49
	Ring slab (with water seal)	2.13	-	1.03
	Ring slab (without water seal)	23.40	4	13.40
	Sanitary	53.19	84	69.07
Children	Open hole	-	18.18	9.23
	Connected with river/pond/canal	59.38	18.18	38.46
	Ring slab (with water seal)	-	-	-
	Ring slab (without water seal)	15.63	6.06	10.77
	Sanitary	25	57.58	41.54

Source: Analyzed from Field survey, 2014

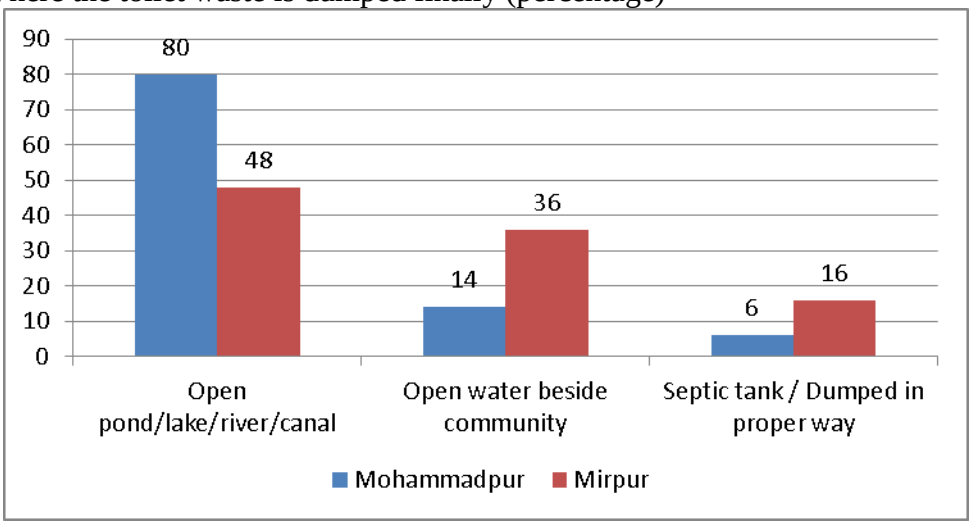
4.5.2 Waste Management:

Though Lautola slum is situated in the city area, but City Corporation does not collect wastes from this area or they don't have any mechanism to dispose garbage of this place. The ultimate destination of all wastes is canal water. And the result is pollution of canal water along with over all environment pollution in this area.

In Balur Math slum there is no effective mechanism for waste management of the community, so they use to dump wastes in the lake. Also wastes are dumped here and there in the community. Thus, water and overall environment is being polluted by the slum dwellers.

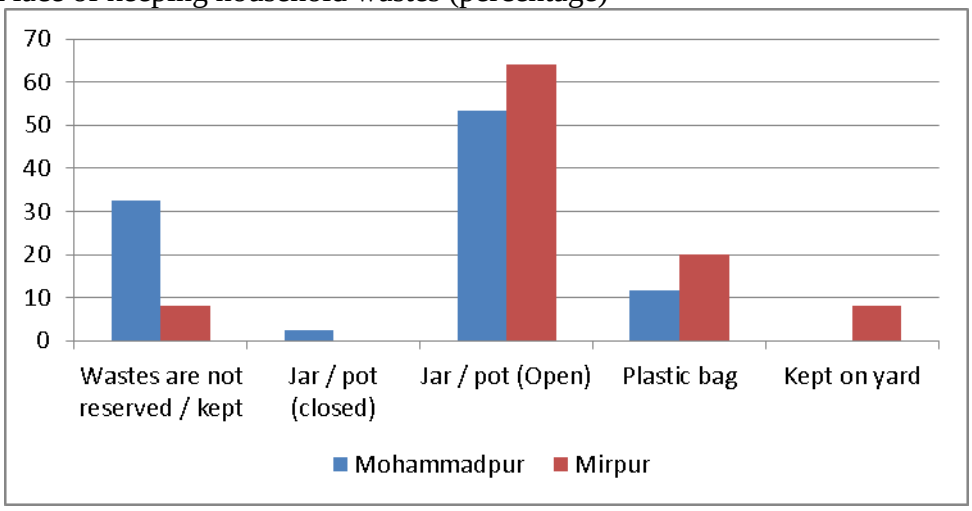
Majority of the slum dwellers (80 percent of the Mohammadpur slum and 48 percent of the Mirpur slum) said that the toilet wastes are dumped into open pond/lake/river/canal. 36 percent of the respondents from Mirpur slum said that the toilet wastes are dumped into open water besides the community

Chart 9: Where the toilet waste is dumped finally (percentage)



Source: Analyzed from Field survey, 2014

Chart 10: Place of keeping household wastes (percentage)

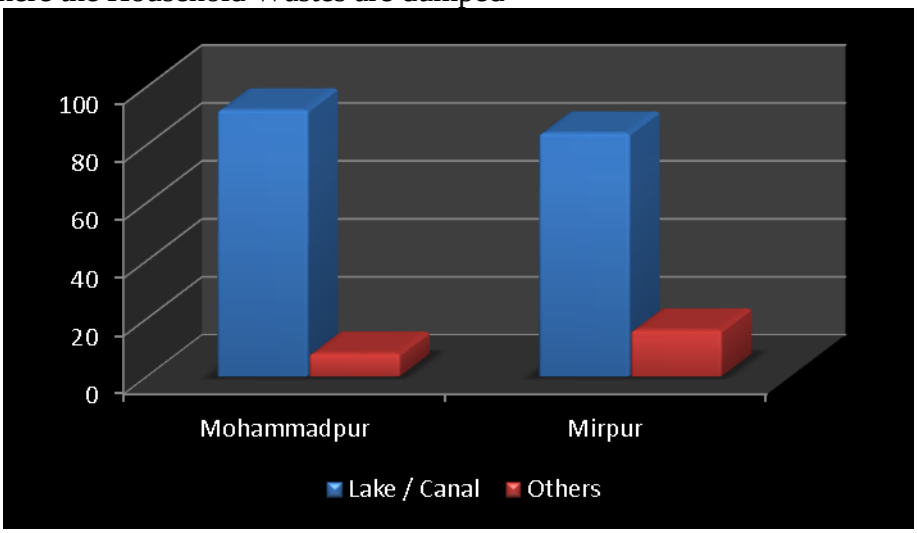


Source: Analyzed from Field survey, 2014

Picture 6: Waste disposal of Lautola Slum

All of the surveyed households were found not to have any waste collection arrangements in their slum. 53 percent of the surveyed respondents from Mohammadpur were found to keep their household wastes in open jar or pot. 64 percent of the surveyed respondents from Mirpur were found to keep their household wastes in open jar or pot. A considerable proportion (33 percent) of the respondents of Mohammadpur slum were found not to keep any household wastes. A considerable proportion of the households from Mirpur (20 percent) were found to keep their household wastes in plastic bag.

Chart 11: Where the Household Wastes are dumped



Source: Analyzed from Field survey, 2014

The others category include: over the road, here and there, open space and specific place

Majority of the slum dwellers were found to dump their household wastes into the lake or canal.

Picture 7: Garbage disposal of Balur Math slum

4.5.3 Drainage System:

There is no drainage or sewerage system in Lautola slum, so direct connection of latrines with canal is seen. In the rainy season, water logging takes place within the community as the land is lower than other areas.

Picture 8: Drainage of Lautola slum

In Mirpur slum there is also no proper drainage /sewerage system. So there are connections of latrines with the lake. Thus the water of the lake is being contaminated.

About half of the surveyed households from Mohammadpur slum were found not to have any drainage system, while the remaining half said that their community had RCC drain. 24 household respondents from Mirpur slum said that they did not have any drainage system, while 16 said that their drainage system was made of brick, and 9 households said that they had RCC drain.

Table 12: Drainage System (Number)

	Mohammadpur	**Mirpur**	**Total**
Brick made	-	16	16
RCC drain	24	9	33
No drainage system	26	24	50
Made of pipe	-	1	1
Total	50	50	100

Source: Field Survey, 2014

Table 13: Authority that Constructed the Drainage (number)

	Mohammadpur	**Mirpur**	**Total**
House owner	-	1	1
NGO/Co-operatives	23	24	47
Don't know	1	1	2
Total	24	26	50

Source: Field Survey, 2014

Across all the surveyed households from both the slums, those who had drainage system in their respective slum said that the drainage system was constructed by NGOs or Co-operatives.

Picture 9: Drainage of Balur Math Slum

Table 14: Problems Faced Related to Drainage Line (Percentage)

	Broken (construction)	**Hole in the line**	**Stopped flow of passing wastes**	**Overflows**
Mohammadpur	-	-	40	90
Mirpur	12.50	-	25	81.25
Total	7.69	-	30.77	84.62

Source: Field Survey, 2014

Out of the households in Mohammadpur slum that had a drainage facility in their community, 40 percent said that in the past one year they faced problems related to stop flow of wastes passing, and 90 percent said that they faced overflowing problems. Out of the households in Mirpur slum that had a drainage facility in their community, 81 percent faced overflow related problem, and 25 percent faced problems related to waste passing flow stoppage.

Table 15: Frequency of Problems faced (both slums combined) (number)

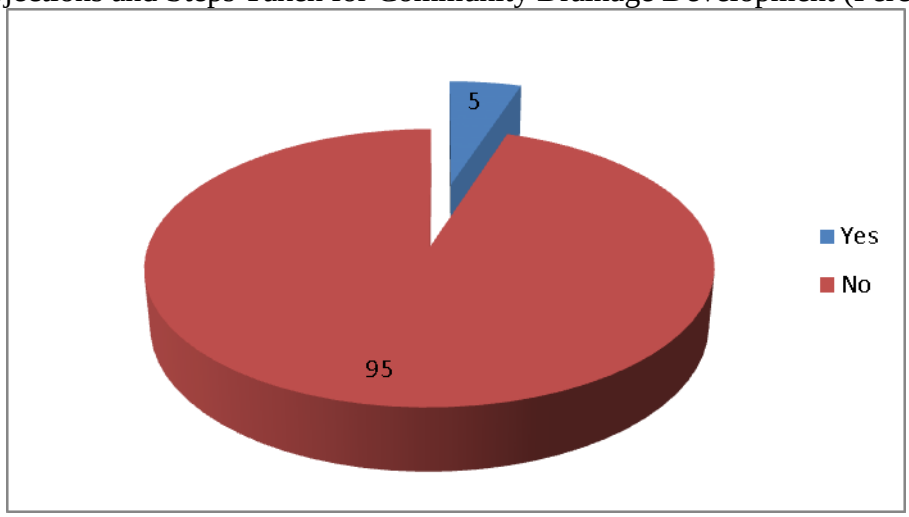
	Broken (construction)	Hole in the line	Stopped flow of passing wastes	Overflows	Total
Daily	-	-	-	3	3
Monthly	1	-	-	1	2
Quarterly		-	1	5	6
Half-yearly	1	-	7	12	20
Yearly		-	-	1	1
Total	2	-	8	22	32

Source: Field Survey, 2014

The severity of the problems faced related to drainage system was not much. The households mostly faced problems once in six months.

Steps towards Drainage System:

Chart 12: Objections and Steps Taken for Community Drainage Development (Percentage)



Source: Analyzed from Field Survey, 2014

Only five households were found to have made any objections or taken steps for the development of the drainage system in the community.

4.6 Water:

In Mohammadpur slum for water supply, only source is underground water. There is a tube well with electric pump and slum dwellers use to get supply from this motor/pump as they mentioned. Though it's an area in the city, but there is no source of supply water provided by government as the participants mentioned.

Usually there is no scarcity of water faced by the inhabitants as all the year they get water from the motor connected to the tube well. But there are problems with collecting water as there are many households with only one source of water. Several times there were conflicts because of this issue but now these are past. At present or near past there is no such happenings. Slum dwellers face some problems in collecting water during summer/ dry season because of load shedding.

Usually people use to reserve water in tanks or other pots in the household. Slum dwellers think that as they use ground water so it's quite good in quality. They have never tested arsenic in the water. And the reality is that they don't know whether it is contaminated or not.

In Mirpur slum there were three legal connections of water supply in the slum provided by CARE Bangladesh but now all the connections are illegal. Slum dwellers

Box 7: Case of Lautola Slum for Conflict for Water

Case one: Conflict for water

Sabuj Majhi (26), Day laborer
Ekota Kacha Bazar, Lautola,
Mohammadpur, Dhaka.

Mr. Sabuj has been living in this area for several years. He told that there were conflicts for water here even one year ago. There were several happenings of hassles among slum dwellers and then it became a regular issue. Mr. Sabuj mentioned that some years ago there was water flow in the canal and people use to use water for several purposes. At that time this slum was located beside canal. Some of the families had entresols over the canal. But after starting of construction of road, they were relocated to this slum which was established on private land. Before filling, it was a lower place with water. Mr. Sabuj added that, after started living in this area, they used to get water from canal for cleaning and other purposes and used to buy water for drinking. When number of tenants was increased, household owners arranged pump to supply water. But they had to be in serial/line to get water as the pump was switched on for approximately 2 hours. So there were regular hassles in the line for water. Even sometimes conflicts were severe, but now water is more available from water pumps than previous years but still quarreling is a common phenomenon of this private slum.

mentioned that there are middlemen or service providers who provide services of water supply for the slum dwellers. Usually they have to pay monthly 80-100 taka for water services.

Water is available all the year but the connections are illegal. Water supply connections are from the WASA pump in *Balur Math*. There is scarcity of water in dry seasons as at that time people are in need of more water.

Slum dwellers used to collect water in serial as many people have to collect water from one point. Water is available in five lines of WASA pump in *Balur Math* at the same time. People use this water for bathing, cleaning, washing cloths and utensils and for other purposes. As slum dwellers think overall quality of water is good but in some cases water is received through the hidden illegal pipe line, here the water is sometimes polluted because of linkages in pipe line.

Usually people reserve water in buckets or other pots. Many people use to boil water for drinking but maximum drink without boiling water.

Picture 10: Water source in Lautola slum **Picture 11: Water source in Balur Math slum**

4.6.1 Use of Water:

52 percent of the surveyed slum dwellers from Mohammadpur slum were found to use water from shallow or deep tube well for their daily needs including drinking, cooking, bathing, cleaning, washing utensils, washing hands before serving food, before eating and after defecation.

About 28 percent of the surveyed Mohammadpur slum dwellers had access to supply or piped water for their daily needs including drinking, cooking, bathing, cleaning, washing utensils, washing hands before serving food, before eating and after defecation.

Majority (52 percent) of the dwellers from Mirpur slum were found to use supply or piped water for their daily needs including drinking, cooking, bathing, cleaning, washing utensils, washing hands before serving food, before eating and after defecation, while about 40 percent were found to use shallow or deep tube well for the same purpose.

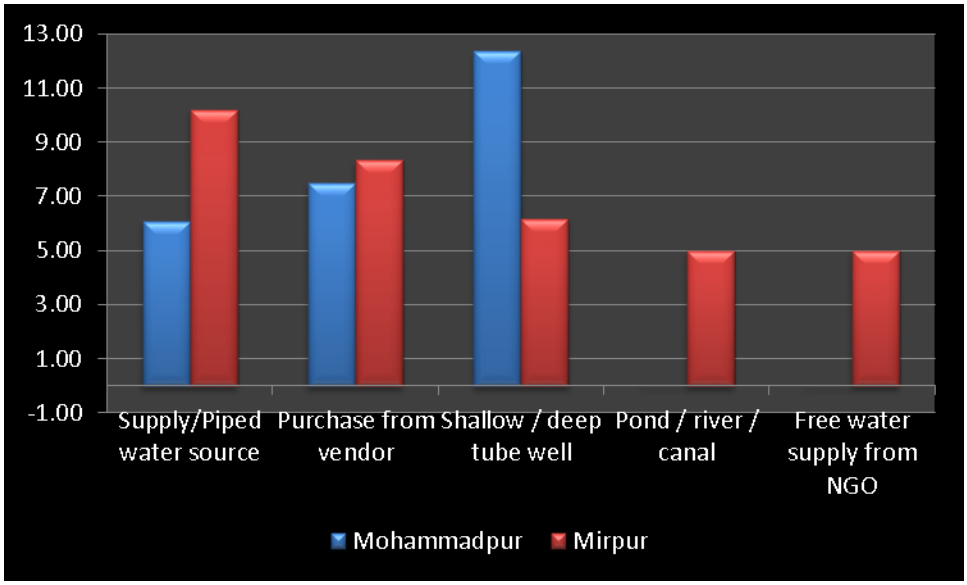
Table 16: Water Source for Different Daily Needs (Percentage)

Water Source	Mohammadpur								
	Types of water use								
	Drinking	Cooking	Bathing	Cleaning	Washing utensils	Washing hands before serving food	Washing hands before eating	Washing hands after defecation	Total
Supply/Piped water	28	28	28	28	28	28	28	28	28
Purchase from vendor	20	20	20	20	20	20	20	20	20
Shallow / deep tube well	52	52	52	52	52	52	52	52	52
Mirpur									
Supply/Piped water	52	54	50	52	50	52	54	54	52.25
Pond / river / canal	2	-	4	-	2	2	-	-	1.25
Purchase from vendor	6	6	6	6	6	6	6	6	6
Shallow / deep tube well	40	40	40	40	40	40	40	40	40
Free water supply from NGO	-	-	-	2	2	-	-	-	0.5

Source: Field survey, 2014

4.6.2 Water Collection Time:

Chart 13: Water Collection Time for Daily Needs (Minutes)



Source: Analyzed from Field survey, 2014

For the Mohammadpur slum dwellers, collecting water from shallow or deep tube well for daily needs was the most time consuming. On average a household spent 12 minutes to collect water.

Picture 12: Water collection source in Lautola slum

For the Mirpur slum dwellers, collecting water from supply or piped source for daily needs was the most time consuming. On average a household spent 10 minutes to collect water.

Picture 13: Water Collection Source in Balur Math Slum

4.6.3 Quality of Water:

A major proportion of the slum people of Mirpur slum collect water from supply or piped source. They have reported that the water contain iron, while a considerable proportion have said that it is not polluted during both the rainy and dry seasons. Majority of the Mohammadpur dwellers collected water for daily needs from shallow or deep tube well reported that their water was not polluted during either of the seasons.

It can be generalized that the water the slum dwellers collected for their daily needs, which included water for drinking, cooking, bathing, cleaning, washing utensils, washing hands before serving food, before eating and after defecation, were not polluted. However, a considerable proportion of the dwellers from both the Mohammadpur and Mirpur slum were found not having access to safer and pollution free water.

Table 17: Water Quality During Rainy and Dry Season

	Mohammadpur							
	Rainy Season				Dry Season			
	Not Polluted	Contains Iron	Foul Smell	Polluted (contains germs)	Not Polluted	Contains Iron	Foul Smell	Polluted (contains germs)
Supply/Piped water source	35	42	7	14	35	42	7	14
Purchase from vendor	70	-	-	-	56	-	-	14
Shallow / deep tube well	175	7	-	-	175	7	-	-
Pond / river / canal	-	-	-	-	-	-	-	-
Free water supply from NGO	-	-	-	-	-	-	-	-
	Mirpur							
	Rainy Season				Dry Season			
	Not Polluted	Contains Iron	Foul Smell	Polluted (contains germs)	Not Polluted	Contains Iron	Foul Smell	Polluted (contains germs)
Supply/Piped water source	106	42	-	36	78	42	28	36
Purchase from vendor	14	-	-	7	14	-	-	7
Shallow / deep tube well	128	7	-	5	128	7	-	5
Pond / river / canal	1	-	-	2	1	-	-	2
Free water supply from NGO	2	-	-	-	2	-	-	-

Source: Analyzed from Field survey, 2014

Sample Collection Date: 24.12.2014

Water Quality Analysis of Balur Math Slum, Kalshi, Mirpur

Table 18: Water Quality Test Result of Balur Math Slum

Sl.	Parameters	Unit	Standard parameter of Surface water	Environmental water	Standard parameter of Drinking water	Drinking water	Analysis Procedure	Remarks
1	DO	mg/l	5	1.36 15.5%	6	4.78 55.7 %	Multimeter	
2	pH	mg/l	6-9	7.61	6.5-8.5	7.22	Multimeter	
3	Conductivity	µS/cm	Not available	676	Not available	304	Multimeter	
4	TDS	mg/l	Not available	355	1000	150	Multimeter	
5	Nitrite(NO_2)	mg/l	Not available	0.013	<1	0.005	Colorimeter	
6	Manganese (Mn)	mg/l	Not available	0.0	0.1	0.3	Colorimeter	
7	Total Hardness	mg/l as $CaCO_3$	Not available	235	500*	135	Titration	
8	Alkalinity	mg/l	Not available	144	500*	86	Titration	
9	Ammonia (NH_3)	mg/l	50	0.77 upper (limit)	0.5	0.0	Colorimeter	Limit at low range

Source: Test conducted at the laboratory of the Department of Zoology, University of Dhaka

* W.H.O. Drinking water standard
Other standard parameters have been taken from the guidelines of DOE
Water has been tested at the laboratory of the Department of Zoology of the University of Dhaka

According to the test result the quality of drinking water of Balur Math slum is moderate standard. As the water comes through piped line so it degrades its standard quality due to contains germs in the pipe line. However, they need to drink this water after boiling which they do not do. On the other hand, the quality of open water body is poor. It is highly polluted.

Sample Collection Date: 30.12.2014

Water Quality Analysis of Lautola Slum, Mohammadpur

Table 19: Water quality test result of Balur Math Slum

Sl.	Parameters	Unit	Standard parameter of Surface water	Environmental water	Standard parameter of Drinking water	Drinking water	Analysis Procedure	Remarks
1	DO	mg/L	5	0.54	6	5.46	Multimeter	
2	pH	mg/l	6-9	7.17	6.5-8.5	6.82	Multimeter	
3	Conductivity	µS/cm	Not available	1085	Not available	461	Multimeter	
4	TDS	mg/l	Not available	537	1000	223	Multimeter	
5	Nitrite(NO_2)	mg/l	Not available	0.0	<1	0.012	Colorimeter	
6	Manganese (Mn)	mg/l	Not available	0.0	0.1	2.1	Colorimeter	
7	Total Hardness	mg/l as $CaCO_3$	Not available	215	500*	155	Titration	
8	Alkalinity	mg/l	Not available	210	500*	85	Titration	
9	Ammonia (NH_3)	mg/l	50	0.77 upper (limit)	0.5	0.0	Colorimeter	Limit at low range

Source: Test conducted at the laboratory of the Department of Zoology, University of Dhaka

* W.H.O. Drinking water standard

Other standard parameters have been taken from the guidelines of DOE

Water has been tested at the laboratory of the department of Zoology of the University of Dhaka

According to the test result the quality of drinking water of Lautola slum is above the moderate level. As they use the water of deep tube well so they get less polluted ground water. Moreover, they need to use this water for drinking purpose after boiling properly. Conversely, the test result shows that the quality of natural water of Lautola slum is in a very alarming condition for the environment.

4.6.4. Method of Preserving Water:

The slum dwellers in Mohammadpur were found to use drum, cascade and bottle to store their drinking water. The Mirpur slum dwellers mostly used bottle to store drinking water. Majority of the dwellers of Mohammadpur slum stored water for cooking in cascade, while the Mirpur dwellers stored it in bottles.

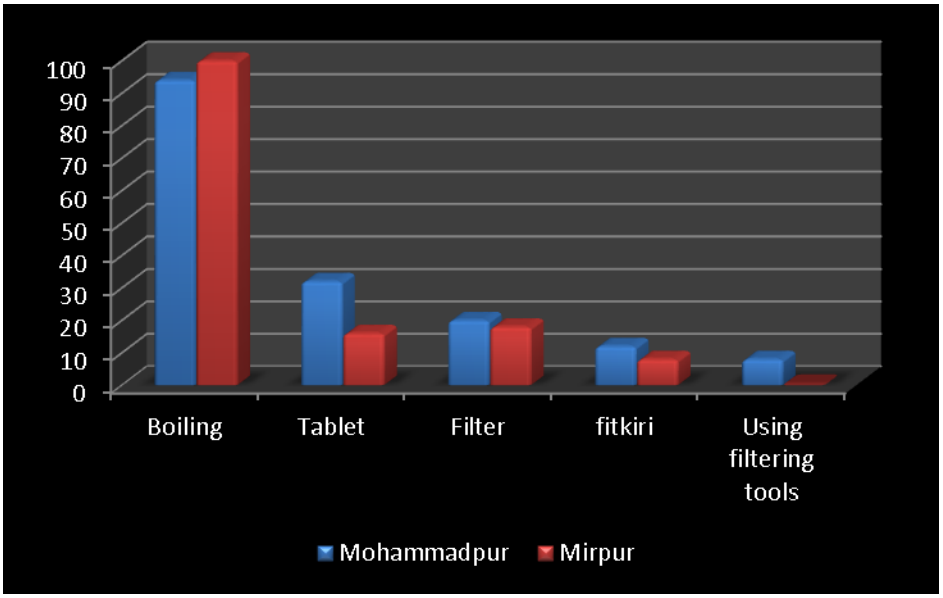
Table 20: Water Storage Container (Percentage)

	Drinking Water		**Cooking Water**	
	Mohammadpur	**Mirpur**	**Mohammadpur**	**Mirpur**
Pitcher	-	6.67	-	6.67
Bucket	13.95	20	15.91	20
Jala/Motka	2.33	-	25	8.89
Drum	27.91	13.33	-	-
Cascade (kolshi)	27.91	13.33	31.82	17.78
Bottle	27.91	46.67	27.27	46.67

4.6.5 Method of Purifying Water:

Majority of the surveyed respondents from both Mohammadpur and Mirpur slums had the knowledge that water can be purified by boiling. A considerable proportion (20 percent) of the respondents from Mohammadpur were found to have the knowledge that water could be purified by using purifying tablets. About 16 percent of the respondents from Mirpur slum had the knowledge that water could be purified by using fitkiri.

Chart 14: Methods of Purifying Water (Percentage)



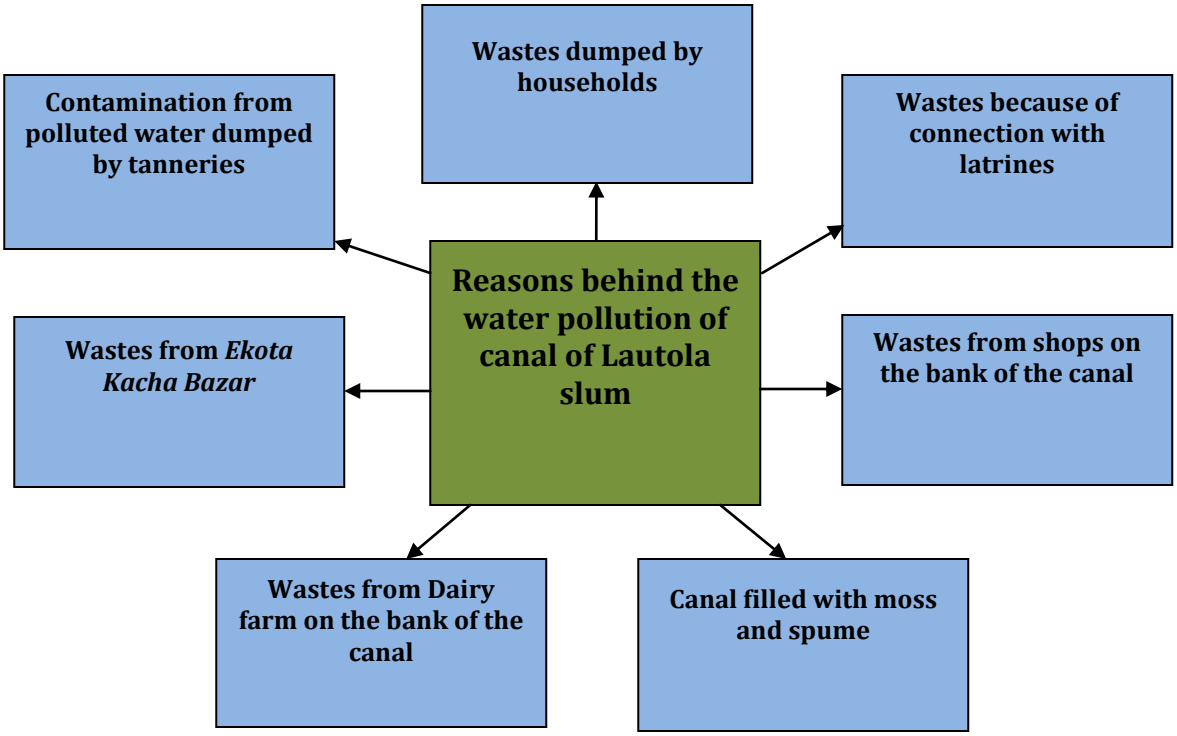
Source: Analyzed from Field survey, 2014

4.7 Environmental Impact at the Study Area: Water Pollution

In Mohammadpur slum community people through their day to day garbage in the cannel water. They don't have sewerage so all toilets are directly connected to the cannel. The canal is like a big dustbin where they dump almost all wastages. Wastes from households, nearby stores, waste from the vegetable market all are dumped into the canal. As a result water of the canal is polluted. Slum dwellers mentioned that chemicals and contaminated water from tanneries are dumped into Turag and *Buriganga* river, as the canal is connected with both the rivers so the water is polluted by this.

Because of polluted water people living here face diarrhea, and serious skin diseases. As children sometimes go to the canal and thus they have skin diseases from the water.

Figure 6: Causes of Water Pollution in Lautola Slum



Source: Analyzed from Field survey, 2014

Water of Balur Math Jheel/lake is being polluted by the slum dwellers mainly. Also the water body is being grabbed by the land grabbers. People use to dump wastes of households into the lake/Jheel. Also the shops beside the water tank dump wastes into the water. As there is lack of proper waste management system in the slum so slum dwellers use to dump wastes directly into the lake. Also there is no proper drainage /sewerage system. So there are connections of latrines with the lake. This is how lake water is being contaminated. And now water of lake is totally polluted and it's impossible to use the water for household or other activities.

Because of water pollution in the lake slum dwellers have to suffer from some water borne diseases like Diarrhea, Cholera, and Dysentery etc. They go to nearby pharmacies for such diseases. If these are serious, then they go to government or private hospitals.

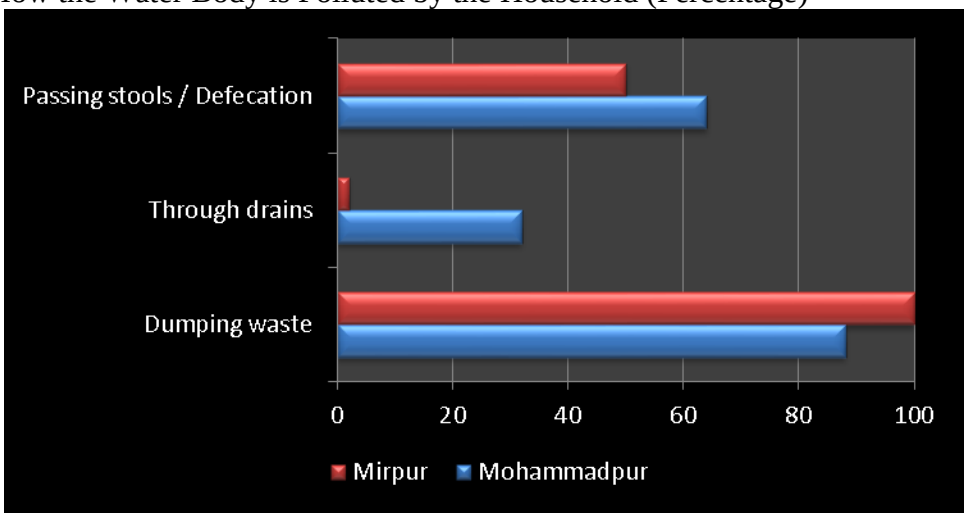
4.7.1 Pollution of Main Water Body by the Household:

All of the surveyed respondents from the Mirpur slum were found to have been polluting the river or canal water through dumping wastes into the river or canal, while 50 percent were found to have been polluting the river or canal by passing stools or defecation into the river / canal. Of the surveyed respondents from Mohammadpur, 88 percent were found to dump wastes and 64 percent passed their stools or defecation into the rivers or canals.

Picture 14: Pollution of water in Lautola slum

Picture 15: Pollution of water in Balur Math slum

Chart 15: How the Water Body is Polluted by the Household (Percentage)



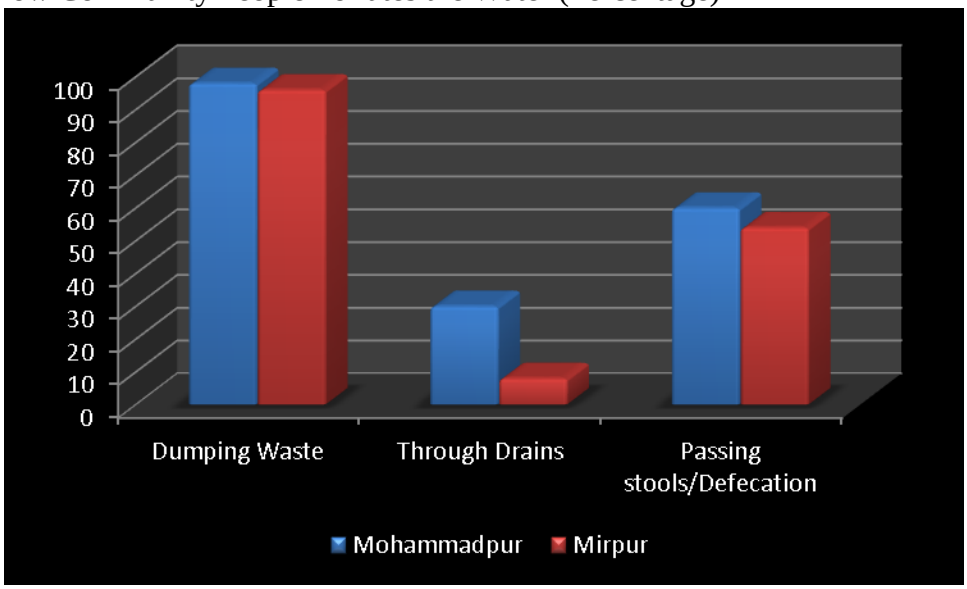
Source: Analyzed from Field survey, 2014

Majority of the surveyed respondents from both the slums said that community people polluted the river / canal water through dumping wastes. 60 percent of the Mohammadpur slum respondents and another 30 percent from the same location said that the community people polluted the water through passing stools or defecation and also through drains respectively. About 54 percent of the respondents from the Mirpur slum said that the people from the community polluted water through passing stools or defecation.

Picture 16: Open Disposal of Solid Waste at Balur Math slum

Picture 17: A View of Hanging Toilet Connected with Canal in Lautola Slum

Chart 16: How Community People Pollutes the Water (Percentage)



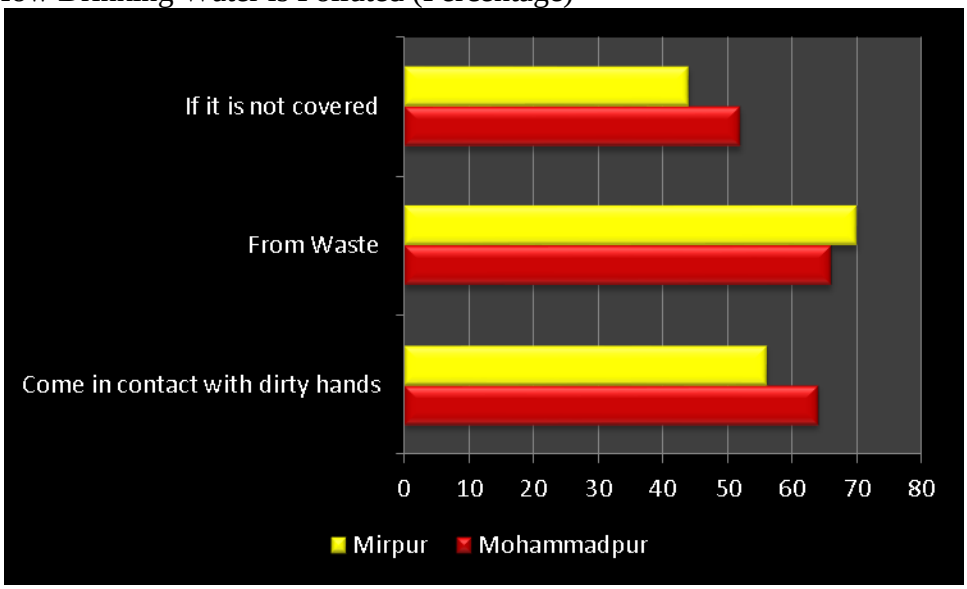
Source: Analyzed from Field survey, 2014

4.7.2 Pollution of Drinking Water:

A major portion of the respondents from both the slums were found to have knowledge about how water gets polluted. Of the respondents from Mohammadpur slum, 64 percent had the knowledge that water gets polluted if it comes into contact with dirty hands, while 66 percent said that it gets polluted from wastes and 52 percent had the knowledge that water gets polluted

it is not covered. Of the respondents from Mirpur slum, 56 percent had the knowledge that water gets polluted if it comes into contact with dirty hands, while 70 percent said that it gets polluted from wastes and only 44 percent had the knowledge that water gets polluted if it is not covered

Chart 17: How Drinking Water is Polluted (Percentage)

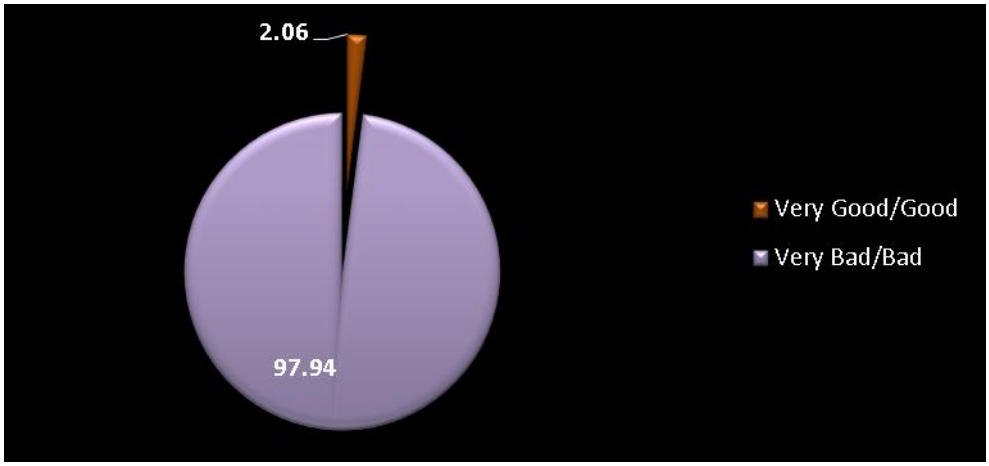


Source: Analyzed from Field survey, 2014

4.7.3 Perception about the Quality of Water of River or Canal:

Across all the surveyed households, majority (98 percent) perceived that the water quality of river or canal was bad or very bad.

Chart 18: Perception about the Quality of River/Canal Water



Source: Field survey, 2014

4.8 Disease Faced by the Community People for Polluted Water:

48 percent of the surveyed slum dwellers from Mohammadpur and 36 percent from the Mirpur were found not to know about any diseases or problems that the community residents face or suffer from as a result of water pollution. Of those who had some knowledge about the disease and problems faced by the community people, 88 percent from the Mohammadpur slum said that people suffer from diarrhea, 81 percent said dysentery, and 38 percent said that people suffered from other diseases due to polluted water. Of those who had some knowledge about the disease and problems faced by the community people, 78 percent from the Mirpur slum said that people suffer from diarrhea, 22 percent said dysentery, and 78 percent said that people f suffered from other diseases due to polluted water.

Box 8: Case study of Water borne Diseases in Balur Math Slum

Case Two: Water borne diseases from polluted water

Sajeda Begum (30), Housewife
Balur Math Slum, Kalshi, Mirpur, Dhaka.

Mrs. Sajeda Begum has been living in Balur Math Slum, Kalshi, Mirpur since 2006. She is the mother of two sons and one daughter. Her elder son Shakil suffered from fever again and again. When he had fever, primarily his mother (Sajeda Begum) used to take him to local pharmacy and bought medicines from pharmacy. But same things happened – he became sick again and again. Then Sajeda Begum took Shakil to MBBS doctor and the doctor suggested several medical tests to identify diseases. And finally, after having the medical test reports, they came to know that he was suffering from Typhoid. Doctor told them that it is a water borne disease and happened because of polluted water. Mrs Sajeda told that it's a very common happening for the inhabitants of this slum that they suffer from such diseases because of polluted water. She mentioned that, water they use to drink comes through supply pipeline. These pipelines are illegal and are brought through drainage line. So when the pipes are damaged, water is mixed and contaminated by the drain water. This is how people are suffering from several diseases because of using this polluted water.

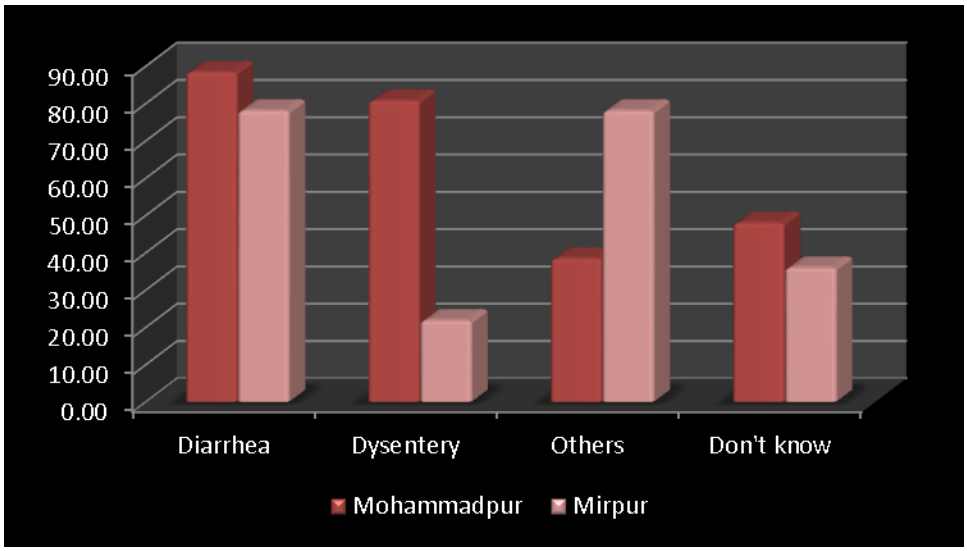
Box 9: Case study of Skin Diseases in Lautola Slum

Case Three: Skin diseases from polluted water

Fatema Begum (24), Housewife
Ekota Kacha Bazar, Lautola, Mohammadpur, Dhaka.

Mrs Fatema Begum has been living here for 2 years in the slum, she has two children. Her elder son is 4 years old. Mrs Fatema mentioned that skin diseases are very common happening for the children here. Her son is still suffering from skin disease. She said that children play beside canal and sometimes go to canal water. As this water is polluted so it causes skin diseases (itches, scabies) for them.

Chart 19: Disease Faced by the Slum People due to Water Pollution (Percentage)



Source: Analyzed from Field survey, 2014

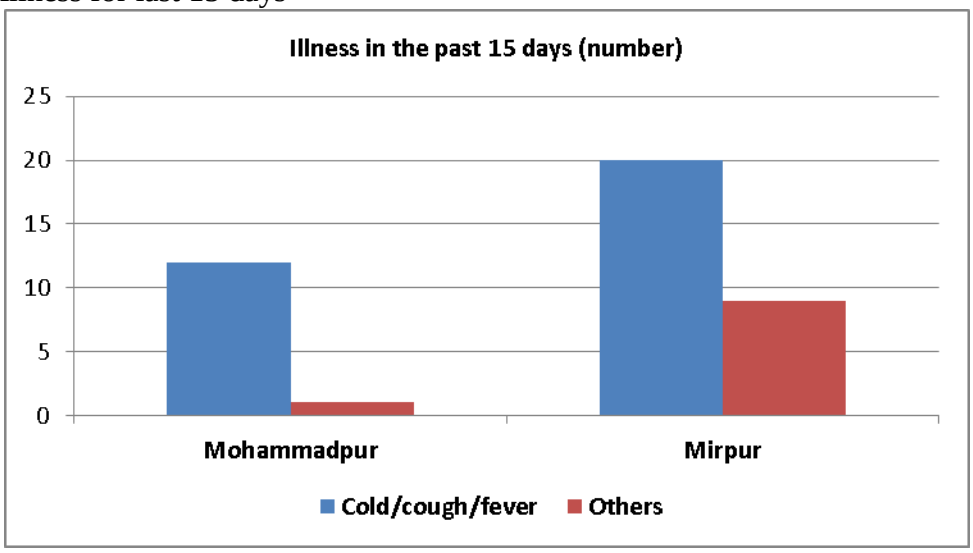
The other category of disease include: worms, jaundice, typhoid, cholera and indigestion

4.8.1 Physical Illness and Cost for Treatment of the Slum Dwellers:

In both the slums, the dwellers reported of suffering from cold, cough or fever in the past 15 days. Only 13 members from the Mohammadpur slum said that they suffered from illness in the past 15 days, of which 12 members were found to have suffered from cold, cough or fever. Only 29 members from the Mirpur slum reported of illness in the past 15 days. 20 members who

suffered from illness in the past 15 days said that they suffered from cold, cough or fever, while the remaining 9 members reported of suffering from Viral fever, Vomiting / Dyspepsia, Diarrhea, Typhoid, Cholera, Dysentery and Weakness/ Headache.

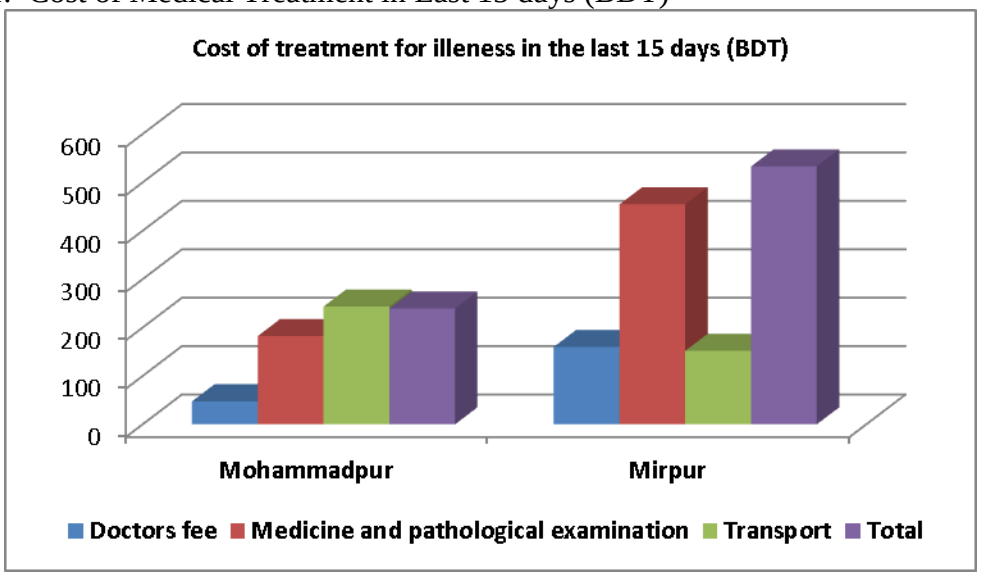
Chart 20: Illness for last 15 days



Source: Analyzed from Field survey, 2014

The others category of illness included Viral fever, Vomiting / Dyspepsia, Diarrhea, Typhoid, Cholera, Dysentery and Weakness/ Headache

Chart 21: Cost of Medical Treatment in Last 15 days (BDT)



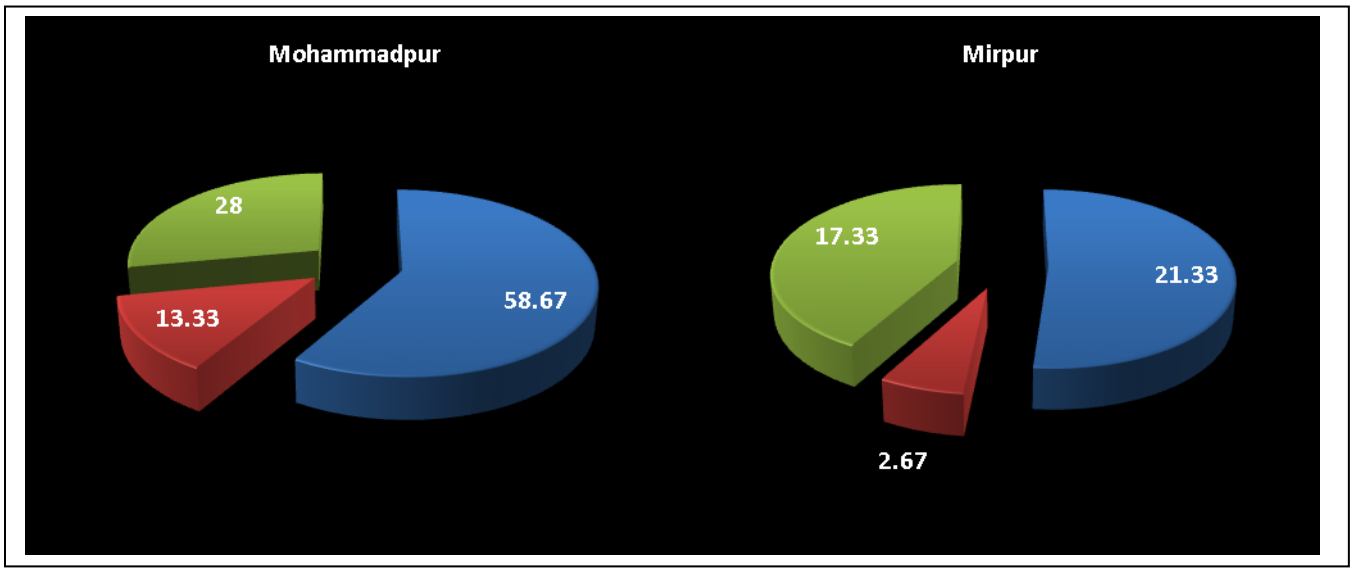
Source: Analyzed from Field survey, 2014

On an average, a household member from the Mohammadpur slum spent BDT 48 as doctor's fee, which was significantly higher for the Mirpur slum dwellers, where a member spent BDT 160. Expenditure for Medicine and pathological examination was also higher for the Mirpur slum dwellers, who were found to spend BDT 455 for this purpose, while the Mohammadpur slum dwellers significantly incurred a lower amount for this purpose (BDT 180). On an average, the cost of illness for a household member residing in the Mohammadpur slum was BDT 240. On an average, the cost of illness for a household member residing in the Mirpur slum was BDT 530.

4.8.2 Chronic illness for last 6 months:

Types of illness:

Chart 22: Type of Illness in Last Six Months Across Location (Percentage)



Source: Analyzed from Field survey, 2014

The other illness includes: Viral fever, Diarrhea, Dysentery, Skin disease, Lungs diseases, Gastric Ulcer, Blood contamination, Cancer/sore in uterus, Weakness/ Headache/pain, Itching, Pneumonia, Hemorrhoid and Pox

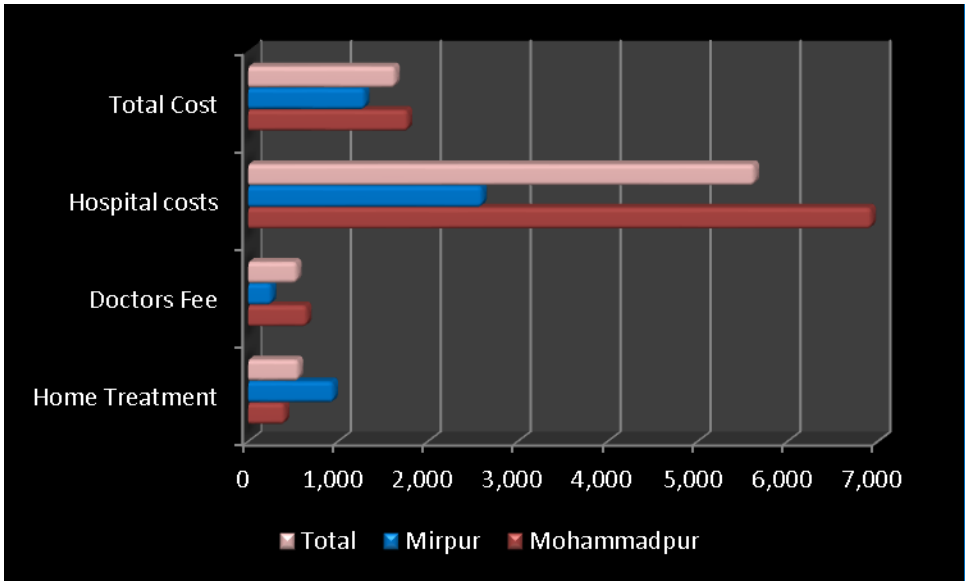
In both the slums, the major form of illness faced by the household members in the last six months was cold, cough or fever. 75 household members faced illness in the past six months in Mohammadpur, while 31 members from Mirpur faced illness in the past six months. In

Mohammadpur, approximately 13 percent of the members who reported about illness in the past six months faced jaundice

Cost of Treatment:

A household from the Mohammadpur slum on an average spent BDT 404 for home treatment during chronic illness, while it was BDT. 948 for Mirpur slum dwellers. Slum dwellers in Mohammadpur were found to have spent higher amount as doctor's fee and hospital costs than the Mirpur dwellers. During chronic illness, dwellers from Mohammadpur slum spent BDT. 6,900 on hospital fees, while the dwellers of Mirpur slum spent BDT. 2,600.

Chart 23: Cost of Medical Treatment in the Last Six Months



Source: Analyzed from Field survey, 2014

Consequence of Ill health:

Besides the direct cash expenditure there are a lot of consequences of illness of the slum people. A number of income earning persons losses their working days which results salary cuts and sometimes even loses their jobs. In many cases the young members of the family were forced to start work for which they need to stop their education sometimes. Some people have become full time disable for chronic illness.

4.9 Presence of Go-NGO Services:

In Mohammadpur slum, there are no government organizations or institutions that provide service to slum dwellers. The only organization works here is DSK which has a *samity* or cooperative for the slum dwellers.

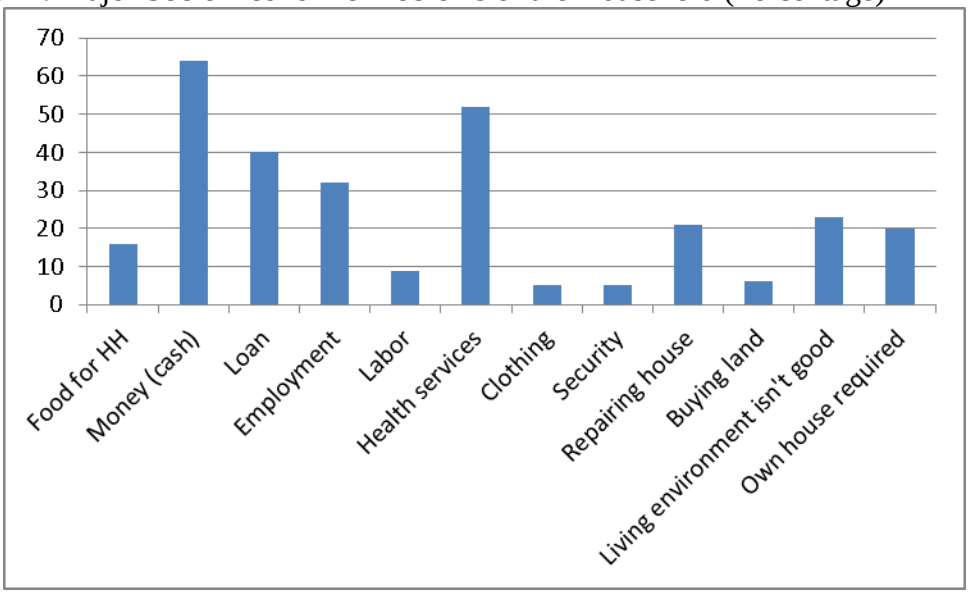
In Mirpur slum, NGO/ CARE Bangladesh provided water supply for the slum dwellers. BRAC has established and maintained some schools in the name of Urban Street Children Workshop under BRAC Children Center. During the field study it has observed that UK AID and UNDP have established some sanitary toilets for the slum people.

4.10 Major Socio-Economic Problems of the Household:

Needs and Problems (Important demands/ problems) Start from most important problem

- The major socio-economic problem of the surveyed slum dwellers was identified to be money (cash) as reported by 64 percent of the households
- About 52 percent of the households said that health services was a major problem, while 40 percent said that rent was a problem and 32 percent said that employment was a problem.

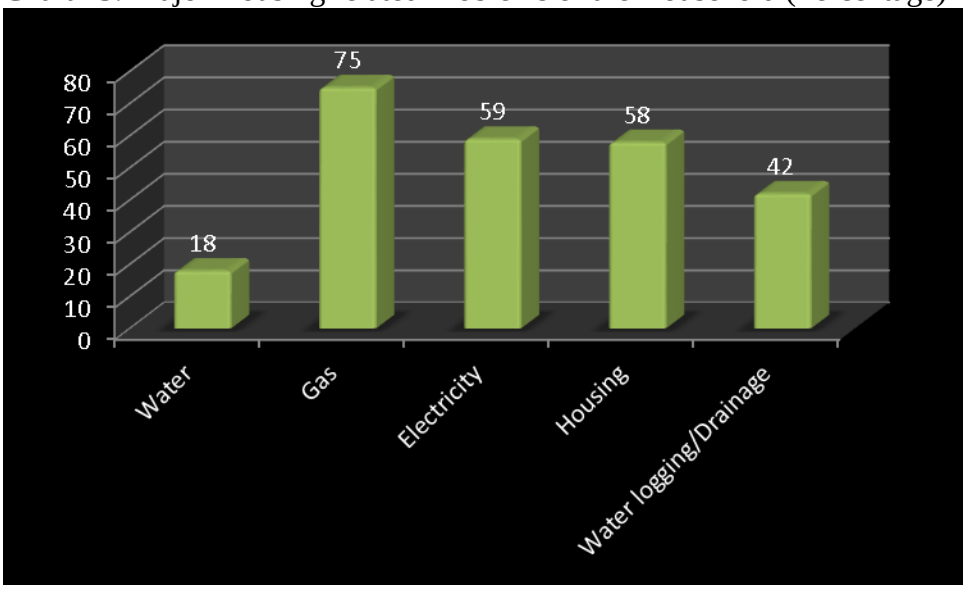
Chart 24: Major Socio-Economic Problems of the Household (Percentage)



Source: Analyzed from Field survey, 2014

4.11 Major Housing Related Problems

Chart 25: Major Housing related Problems of the Household (Percentage)



Source: Field survey, 2014

- The surveyed respondents identified gas as the major problem (75 percent of the respondents said gas was a problem)
- Other major problems included electricity (59 percent), housing (58 percent) and water logging / drainage (42 percent)

4.12 Recommendation of Community People to Prevent Water Pollution

Table 21: Opinion of Dwellers to Prevent Water Pollution (Percentage)

	Mohammadpur	**Mirpur**
Don't know	40	28
Cleaning & digging of canals	43.33	-
People should not dump waste into water	43.33	97.22
Government should take steps	**10**	**-**
Steps should be taken for drainage & sewerage	-	2.78

Some 40 percent of the Mohammadapur slum respondents and 28 percent of the Mirpur slum respondents did not know what was necessary in order to prevent water pollution. In Mohammadpur slum, of those who had some suggestions for what was necessary to prevent water pollution, 43 percent said that cleaning and digging of canals was necessary, while another 43 percent said that people should not dump waste into water in order to prevent water pollution. In Mirpur slum, of those who had some suggestions for what was necessary to prevent water pollution, major proportion (97 percent) said that people should not dump waste into water in order to prevent water pollution.

PART FIVE
POSSIBLE POLICY OPTIONS TO RESOLVE HOUSING & ENVIRONMENTAL ISSUES

Based on the analysis and findings of the study, some policy suggestions and appropriate measures can be taken to solve the housing and environmental issues of both Mohammadpur and Mirpur slum. In my view, the following measures may be effective:

- ***Proper Implementation of Existing Policies, Plans and Strategies:***

  In the context of overwhelming situation of housing of the urban poor and environmental degradation, the policy makers need to address the housing issues of pro-poor urban people with top priority. Government authorities should understand the intensity of the problems of pro-poor people and put special attention towards the implementation of the existing policies, strategies and plans. If possible the existing policies should be revised immediately. Comprehensive slum development plans should be implemented for permanent solution. International experience to deal with the housing issue of slum can be followed in times of preparing new plans, programs and strategies. Government can control environmental degradation by preserving the natural water bodies of the study area by implementing the Natural Water Bodies, Open Space, Playground, Park Protection Law, 2000. Success of any policy depends on the political will of the state authority.

- ***Effective Monitoring Mechanism:***

  Lack of government support and lack of citizen awareness are the dominant factor for environmental degradation in the study area. Therefore, local initiatives, NGO involvement and social mobilization are needed to solve environmental issues. Environmental monitoring to protect water resources by both government and private agencies should be ensured on a regular basis. Government can engage different communities for environmental monitoring and to arrange campaign for social awareness to control environmental degradation.

- ***Amendment of Rules and Policies Where Necessary:***

  The existing housing, water and environment policy of Bangladesh has a history of formulation in the long past. So with the change of time the dimension of challenge and issues has also been changed which demands for revision of existing policy. Therefore, a number of basic policy amendments are necessary to deal with the housing situation of urban slums of Dhaka city. Main reforms are needed in the policy and institutional framework.

- ***Prioritize Issues Related to Urban Poor People:***

  Urban planner should initiate pilot projects in poor areas on a priority basis. They need to ensure the best use of scarce resources in case of implementing any project.

  1. Identifying problems
  2. Priority selection
  3. Solution accordingly

  The selected slums are in already built-up areas. So serious attention should be given on the housing issues of the selected slums. However, pollution of the natural water bodies is a great challenge of the study area which is the main source of creating health hazards. So urgent attention should be given to reduce water pollution. Environmental Management is a profound issue of the selected slums.

- ***Long Term Planning for the Settlement of Urban Poor:***

  Any plan taken for the issue of urban poor should be on a long term basis. Housing, sanitation, relocation, establishment of slum, selection of slum site everything should be after a detail feasibility study. If government or any NGO plans to take any projects for slum people, any construction, construction of houses or sanitary latrines should be with long lasting construction materials so that it will sustain for a long time. Government can implement some projects like PPSIP in Dhaka. Furthermore, any kind of slum settlement must be constructed with the full concern, consent and involvement of the city development authority like NHA, DCCA, WASA

- ***Control Migration by Capacity Building:***

  Creation of multiple employment opportunity outside Dhaka in order to control urbanization rate ample scope of productive work should have to be created outside Dhaka so that people's attraction towards Dhaka is diversified. By establishing garments factory, different industrial institute or production sector local labor force could be attracted and employed.

- ***Involvement of NGOs and Other Stakeholders in Urban Housing:***

  In most of the cases it is unmanageable for the government authority to take care of all the issues of slum people. In that case, government can involve NGOs or Community Based Organizations (CBO's) or associations to deal with the issue of poor people of urban slum. NGO and CBO participation has proved to be an effective tool for ensuring local environmental management. However, in recent times, NGO initiative in urban slum has got some success in delivering some basic services like sanitation and waste management. So government should take initiatives in collaboration with NGO's like: BRAC, ASA, DSK which are working with sanitation system, made some community latrine in slums and drains or pavement for the better living of the slum. Government agencies need to actively work with a number of civil society organizations.

- ***Land Use Restrictions and Land Management:***

  Land grabbers, local mastaans (middlemen), local political elites are frequently involved in grabbing the adjacent open water bodies, lakes, canals, rivers etc. for constructing houses for the poor people. They are making money by using the goverenment khas land or open water bodies for the construction of slum settlement purpose. RAJUK the main planning authority of land management in Dhaka city can enforce restriction in land use. RAJUK can monitor and take relevant plans and actions where any illegal land filling in the natural water bodies, wetlands, low-lying areas for the construction of residential or industrial settlements by development projects.

- ***Effective Coordination Among Implementing Authorities:***

  From empirical research and interview to the key actors of government it is seen that there is a lack of effective coordination among the implementing authorities of government like NHA, RAJUK, City Corporation, DWASA, DESA, DoE. The attached departments of government can take coordinated actions to provide the basic services to the urban slum and to cope with the environmental challenges. To improve the living environment and to reduce local pollution, the concerned local authorities like DCC, RAJUK and DWASA can take appropriate legal, institutional and community action by environmental management.

- ***Awareness Raising Programs to Reduce Environmental Pollution:***

  Findings showed that in most of the cases the dwellers are not aware that they are polluting the water of the open water body. They only treat the canal or river as a garbage dumping point not as natural resources. So training and awareness raising programs can be arranged for them to make the slum people understand about the environmental degradation. Moreover, the level of hygiene knowledge and practice is found significantly low among the slum dwellers of the study area. On the other hand the slum dwellers do not have any idea about government rules, regulations or policies related to housing, environmental issues or the services provided to them. In this situation local campaign can be arranged for sustainable management of open water resources. Therefore, Government in some cases NGO's should be encouraged to arrange such awareness raising programs on a regular basis. Increased awareness among the urban poor will help to create strong democratic environment among the urban poor.

During field study the dwellers have commented about their advice on different issues and their own recommendations can be shown through the following table.

Table 22: Recommendations Provided by the People of Lautola Slum

Problems	Recommendations	Implementing bodies
Roads in the community	• To fill the lower place to solve water logging in the community • To construct a road (with brick and concrete) to solve communication problem in the rainy season	Government and Non-government organizations
Drainage	• To construct drains for the community to solve the problem of passing liquid waste and solve water logging problem	
Sewerage system	• Sewerage system is a necessity to stop the continuous pollution of canal water	
Canal excavation and cleaning	• To clean the moss and spume and other wastes dumped into the canal • To dig the canal to continue water flow or to make the canal clean so that people can use water • Replace the hanging toilets by sanitary latrines	

Source: Field survey, 2014

Table 23: Recommendations Provided by the People of Balur Math Slum

Problems	Recommendations	Implementing bodies
Sufficient water supply	Slum dwellers mentioned that they get water supply from middlemen or service providers. Though they get water from NGO/ CARE Bangladesh which is less than necessity. So this issue should be addressed.	Government and Non-government organizations
Drainage	• To construct drainage and sewerage for the community.	
Waste management system	• To arrange effective waste management system in the slum.	
Control of water pollution	• The water of Balur Math Jheel is tremendously polluted by the activities of the dwellers which is a matter of health hazards.	
Gas connection	As they don't have any legal gas connection so they need the legal connections of gas line.	

Source: Field survey, 2014

DIRECTIONS FOR FUTURE RESEARCH

In Bangladesh environment is comparatively a new topic in the research horizon of the social science wing especially in Public Administration seeing the environmental issues and natural resources management from policy perspective.

A volume of research have been conducted on various issues of environment majority of which have failed to provide significant way out to protect the environment from degradation and to manage the natural resources in a sustainable way. However, most of the previous researches in Bangladesh have lack of strong empirical foundation with a few exception.

This study has clearly identified that in Dhaka city in any kind of slum settlements there is a strong liaison between political leaders and local powerful business class. Local influential persons who have political powers usually grab the khas land of govt. which is being vacant. Moreover, land mafias and political mafias are closely involved to occupy major government resources. Multinational corporations may also involve such kind of illegal settlements. They establish slum without judging the environmental feasibility to construct the slum beside or over the natural water body. Majority slums are used by these political leaders for the business purpose. Why and how these local influential persons are getting political support, why the land grabbers are getting escaped from the legal system of the country and why the govt. agencies like Dhaka City Corporation Authority (DCCA) and National Housing Authority (NHA) do not interfere in such situation to control such interest groups. Obviously, to answer such questions a further in-depth research is needed.

There is policy, strategy, action plan, legal framework and clearly identified institutional framework well enough to address the issue of environment, housing for the pro-poor people and issue of water pollution but majority of them are ineffective. Why most of the policies with their action plan and strategies are not implemented, what is the reason behind this lack of implementation. This phenomenon particularly raised the importance of further investigation about the role and responsibilities of govt. agencies like DCCA, NHA, WASA. So policy research can be undertaken in recent future to explore such deep-rooted questions.

Our present study has been conducted only on two slums of Dhaka city for time and fund constraints. But there are 5000 slums only in Dhaka city. Such research can be carried out in other city corporations like in Chittagong, Khulna, Rajshahi etc. and in other cities of Bangladesh to address environmental degradation. So serious attention has to be given to some critical environmental issues like pollution in the natural water bodies. Therefore, future researcher should focus attention to the critical areas of environment like pollution in natural water bodies to draw the immediate attention of the govt. agencies.

CONCLUSION

Urban poor are the mostly deprived category. Environmental pollution due to their poor housing condition is much neglected by the urban authority. But government can no longer ignore the citizenry rights of the pro-poor people. Slum dwellers who are mostly hardworking represents an effective work force of the city life and contribute to a large proportion in the national economy. Therefore, it is judgmentally and critically necessary to incorporate these pro-poor people into the urban development strategies so that this productive force can live better and can contribute to the economic growth instead of being a social burden. Failure to address the issue of housing of the pro-poor people in the policy consequently impact on the environment of Dhaka city. Therefore, appropriate institutional and community actions must be taken with utmost priority to ensure sustainable development in the urban slum areas. In order to improve the living environment of the pro-poor people and to control the loss of natural resources and to reduce local pollution, government should regulate a well-planned slum settlement where economic development and environmental management should consider simultaneously. Rapid urbanization results growing disparity between slum people and the solvent city dwellers is undesirable not only from human rights perspective but it also creates social unrest in the city life. So there is an urgent need to find sustainable and affordable solutions to meet the basic needs of the pro-poor people of urban slum. Therefore, protection of environment and management of natural resources should be incorporated to the national plans, policies and strategies. Formulation and implementation of the national policy on environment must be incompatible to respond to the rapid urbanization, industrialization and with growing population.

The evidence presented in this study reflects the necessity and importance to address the above mentioned issues in policy and action otherwise the problem of environmental degradation will be magnified and the city will be unlivable very soon.

Finally, the study is expected to catch the attention of politicians, policy makers and policy implementing institutions of government to understand the intensity and severity of the issue of housing and environmental pollution of the pro-poor people of the urban slums of Dhaka city and to take appropriate mitigation strategy.

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Appendix-1
Sample Questions for Interview to the Key Actors

1. What are the measures taken to solve the residence problems of the pro-poor people of urban slums in Dhaka City? Issues like sanitation, sewerage, drainage and waste management.

2. Whether the facilities for slum dwellers are maintained or not? If the answer is yes; how?

3. How environmental issues are addressed in the housing policy for the slum dwellers?

4. How the water issues are addressed in the urban slums? Availability, Pollution and preservation of water.

5. In our field study we observed a big gap between policy and its implications at the real field level. So what measures should be taken now to solve such problems? What is your opinion?

Appendix-2
Survey Questionnaire

University of Dhaka
M. Phil Research Questionnaire for HH Survey/Interview – 2014

HHID	☐☐☐		
Date of interview:	☐☐-☐☐-☐☐	Starting time of interview:	☐☐-☐☐
	Day / Month / Year		Hour / Minute
Enumerator's name:	-- --	Code:	☐☐
Cross checked by :	-- --	Code:	☐☐
Respondent's name:	-- -- -- -- -- -- -- -- -- -- -- -- -- ---- -- -- -- -- -- -- -- -	Line number:	☐☐
Name of HH Head :	-- -	Line number:	☐☐
Religion of respondent	1 =Muslim; 2 =Hindu; 3 =Buddhist; 4 =Christian; Others (Specify)		☐
Ethnicity	1 = Bangali; 2 = Bihari; 3 = Aboriginal		☐

Consent of Respondent:

(Interviewer: Clearly read out the following to the respondent and take his/her consent before taking interview)

I am .....from University of Dhaka. As a requirement of my M. Phil thesis in Department of Public Administration, I am going to conduct a research in your locality. As it is not possible to collect information from all households, my intention is to collect information from some households which are randomly selected. Your household is one of the selected households. I will try to understand your household's socio-economic situation from the information you provide. I will ask detailed questions about overall status of housing, water, diseases, waste management and other issues related to your household and community. We will use this information only for research purposes. If it is possible for you to take part in our research and provide information then you can put your signature below. Participation is voluntary; you can stop providing information any time. Participating will not benefit nor harm you or put you in risk. If anything is unclear you can ask questions about this survey at any time. Do you agree to participate?

Yes ☐ No ☐

Signature:_____

Date:_____

Mobile no:

[The questions in this questionnaire should be answered by the respondent (male/female) most knowledgeable/experienced about the subject]

S.1. Household Roster

Line no	Name	Relation (with HHH)	Age (complete year)	Gender	Marital status	Education	Occupation	Monthly income (total)	Govt. / Non-govt. services received by HH members
	1	2	3	4	5	6	7	8	9
01.		HHH							
02.									
03.									
04.									
05.									
06.									
07.									
08.									
09.									
10.									

2.Relationship (with HHH)
02 = Husband/wife
03 = Son/daughter
04 = Son-in-law / daughter-in-law
05 = Father/mother
06 = Father-in-law/ mother-in-law
07 = Brother/sister
08 = Brother-in-law/sister-in-law
09 = Other relatives
10 = Grandson / Grand daughter
11 = Not relatives

4. Gender:
1= Male
2 = Female
3 = Third gender

5. Marital status
1 = Unmarried
2 = Married
3 = Divorced
4 = Widow/widower
5 = Separate

9. Govt./Non-govt supports
1 = Financial support at a time
2 = Old age allowance/widow allowance
3 = VGF/VGD
4 = Stipends
5 = Others (specify)

6.Education
00 = Illiterate/ never went to school
01 = Class 1
02 = Class 2
... ...
09 = Class 9
10 = SCC/ Dakhil
11 = HSC/ Alim
12 = BA/BSC/BCom/Fazil
13 =MA/MSC/MCom/Kamil
14 = Diploma/ Technical
15 = Religious education
16 = Literate

7. Occupations:
0 = Unemployed
1 = Housewife
2 = Agriculture
3 = Day laborer
4 = Non-agricultural; self employed
5 = Employment (salary paid)
6 = Student
7 = Working in others house
8 = Driver (vehicle and Physical)
9 = Small business
88 = Others

S.2 Health Seeking Behavior

2.1 Illness (Last 15 days)

Did you or HH members become sick in last 15 days? Yes [1]; No [2] ☐

Line no [from Hh roster]	Type of illness [according to respondent / patient]	Was any treatment provided? Yes [1] [write treatment codes] No [2] [go to Col 11]	(If the patient is taken to specialized doctors because of illness) after how many days of sickness, patient was taken? [days]	(If the patient is taken to specialized doctors because of illness) then how did it happen?	Cost for medical treatment in last 15 days				Duration [00=still sick]	Is there any effect of sickness over income? (>10 yrs. old) Yes (income is stopped/decreased) [1] No (no effect) [0]	What are the reasons of sickness? [water pollution/ others]
					Number of visit	Doctor's fees (Total)	Medicine and pathologic Examination (Total)	Transport cost (Total)			
1	3	4	5	6	7	8	9	10	11	12	14

2. Types of sickness: Because of heat [1] Because of cold [2] From oily foods [3] From dirty food [4] From stale food [5] Cold from rain water [6] Lack of Calcium [7] Because of Weakness [8] Because of polluted water [9] Constipation [10]	Lungs diseases [11] Gastric Ulcer [12] Blood contamination [13] Cancer/sore in uterus [14] Weakness/ Headache/pain in body [15] Itch [16] Pneumonia [17] Hemorrhoid [18] Pox [19]	**3. Codes for symptoms:** Cold/cough/fever [1]; Viral fever [2]; Vomiting / Dyspepsia [3]; Diarrhea [4] Typhoid [5] Cholera [6] Jaundice [7] Dysentery [8] Skin disease [9] Pneumonia [10] Others (specify)	**4. First treatment sought:** No treatment was provided [0]; treatment was provided at home/brought medicine [1] village doctor [2] Paramedic/others (PC/FWV/CHW/SS/HA/MA) [3] Allopathic medicine sellers (when identify disease and give treatment [4] Govt. / Private doctor (MBBS) [5] Non-govt health clinic[a] [6] Hakim / kabiraj [7] Maolana/healer [8] Homeopathy [9] Others (specify)	**6. How the consultation took place:** Patient was taken [1] Doctor came [2] Medicine was brought from the doctor describing about sickness [3]	**14. Reasons of sickness:** Because of heat [1] Because of cold [2] From oily foods [3] From dirty food [4] From stale food [5] Cold from rain water [6] Lack of Calcium [7] Because of Weakness [8] Because of polluted water [9] Constipation [10] Don't know [88]

2.3 Chronic illness for last 6 months

Did you/HH members get sick in last 6 months? Yes [1]; No [2]

Three major sicknesses. Collect information about sickness and write according to the time. [If answer is No, then go to nest module]

Line No	Type of illness [Write code according to Module 2.1]	Duration		Treatment	Was patient taken to hospital? Yes [1]; No [0]	[If yes] For what purpose? Treatment [1] Surgery [2]	Cost for medical treatment in last 6 months			Reasons of sickness [water pollution /others] [Write code according to Module 2.1]
		Month	Day				Treatment at home (Total)	Doctor's fees	Treatment at hospital (Total)	

Treatment sought: No treatment was provided [0]; treatment was provided at home/brought medicine [1]; village doctor [2]; Paramedic/others (PC/FWV/CHW/SS/HA/MA)[3]; Allopathic medicine sellers (when identify disease and give treatment [4]; Govt. / Private doctor (MBBS) [5]; Non-govt. health clinic [6]; Hakim / kabiraj [7]; Maolana/healer [8]; Homeopathy [9]; Others (specify)

3. Water
3.1 Use of water

Sl no	Type	Source		Ownership	How much time is spent for collecting water? [in minute]	How is the arrangement for collecting water?		Quality of water?		Container of reserving water [multiple answers]	Do you cover the reserved water?	Which things are used to cover water?
		Rainy season	Dry season			Rainy season	Dry season	Rainy season	Dry season			
		1.a	**1.b**	**2**	**3**	**4.a**	4.b	**5.a**	**5.b**	**6**	7 a	7**b**
A	Drinking water	☐☐	☐☐	☐		☐	☐	☐	☐	☐	☐	☐
B	Water for cooking	☐☐	☐☐	☐		☐	☐	☐	☐	☐	☐	☐
	Water for bathing	☐☐	☐☐	☐		☐	☐	☐	☐	☐	☐	☐
C	Water for cloning	☐☐	☐☐	☐		☐	☐	☐	☐	☐	☐	☐
	Water for washing utensils	☐☐	☐☐	☐		☐	☐	☐	☐	☐	☐	☐
D	Water for washing hands before serving foods	☐☐	☐☐	☐		☐	☐	☐	☐	☐	☐	☐
E	Water for washing hands before eating	☐☐	☐☐	☐		☐	☐	☐	☐	☐	☐	☐
F	Water for washing hands after defecation	☐☐	☐☐	☐		☐	☐					

1a/b. Sources of water:		**2. Ownership:**	**4. Water collecting arrangements**	**5. Quality of water**	**6. Water container**	**7. Things to cover water container**
01= water from Supply line/ pipe 02= Tube well 03= Pond / river / canal 04= Rain water 05= Buying water	06= Shallow / deep tube well 07= Free water supply from NGO 08= Buying water from legal water supplier 10= Wells Others (specify)	1= Own 2= Shared 3= Other's 4= Govt. water suppliers 5= NGO 6= Community ownership 7= Ponds/water tanks / river Others (specify)	1 = Very hard 2 = Hard 3 = Easy 4 = It's not a problem	01= Not polluted 02= Containing iron 03= Noisome 04 = full of germs 05 = containing arsenic 88 = Don't know Others (specify)	Pitcher [1] Bucket [2] Jala/Motka [3] Drum [4] Cascade (kolshi) Bottle Others (specify) Don't preserve [6] Water tank/house [7]	Things made of mud [1] cloth [3] plastic [4] Polythene [5] Paper [7] Metal things to cover [8]

Sl.	Question	Code	Write codes
1	In which month, water crisis is most severe?	01 = Dry season (March, April, May, June) 02 = Winter (November, December, January, February) 03 = Rainy season (July, August, September, October) 04= Whole year 05= No water crisis 88= Don't know	☐☐
2	How do you maintain during water crisis? [Multiple answers possible]	01 = Buying water 02 = Taken from neighbors 03 = Taken from WASA office nearby 04 = Bringing from neighboring schools/colleges/Mosques/Madrassah or other institutions 05= Bringing from nearby residential area 06 =Collecting water from WASA supply cars 07= Bringing from owner of houses 08= Decreasing use of water 09= From tube wells of neighbors/market 10= Using water of ponds/wells Others (specify)	☐☐ ☐☐
3	[If there is water crisis] What steps did you take individually to solve the problem? [Multiple answers possible]	1= Didn't take any step 2= tried to solve through buying machineries 3= communicating with the authority 4= communicating with house owners 5= Processions/Protest Others (specify)	☐ ☐ ☐
4	[If there is water crisis] What steps were taken by the community people collectively to solve the problem? [Multiple answers possible]	1= Didn't take any step 2= tried to solve through buying machineries 3= communicating with the authority 4= communicating with house owners 5= Processions/Protest Others (specify)	☐ ☐ ☐
5	Did you have any objection / step for continuous/regular water services in last one year? [If answer is No, go to next module] [Multiple answers possible]	1= Complain to City Corporation 2= Complain to WASA 3= Complain to political leaders 4= Meeting 5= Procession 6= Complain to house owner Others (specify)	☐ ☐ ☐
6	What was the role of authority after taking step?	1=took immediate steps 2= took steps lately 3=Did nothing	☐ ☐ ☐
7	Was your problems solved?	1=Yes 0= No	☐
8	What are the ways to purify water? [Multiple answers possible]	Boiling [1]; Tablet [2]; Filter [3]; fitkiri [4]; Using filtering tools [5]; Filtering with clothes[6]	☐ ☐ ☐

3.3 Water pollution

Sl.	Questions	Code	Write codes/numbers
1	Do you use water from river or canal?	Yes [1]; No [0]	☐
2	[If yes] For which purposes?	1= Drinking water 2= Cleaning clothes 3= Cleaning (house & others) 4= Washing utensils 5= Bathing 6= Cooking 7= Others (specify)	☐ ☐ ☐
3	What do you think about quality of river/canal water?	1= Very good 2= Good 3= Bad 4= Very bad	☐ ☐ ☐
4	Do you dump wastes directly into river or canal?	Yes [1]; No [0]	☐
5	Do you pollute river/canal water in any other way?	1= Dumping waste 2= Through drains 3= Dumping chemicals 4= Passing stools / Defecation 5= Others (specify)	☐ ☐ ☐
6	How do the community people pollute water? [water excluding river/canal]	1= Dumping waste 2= Through drains 3= Dumping chemicals 4= Passing stools / Defecation 5= Others (specify) Don't know[88] Not applicable [99]	☐ ☐ ☐
7	How drinking water is polluted? [Multiple answers possible]	From filthy hands [1]; From waste [2]; if it's not covered [3]; Others (specify); Don't know[88]	☐ ☐ ☐
8	What diseases or problems do community people face because of water pollution?	Diarrhea [1]; Dysentery[2]; Worms [3]; Jaundice [4]; Typhoid [5]; Cholera [6]; Arsenic[7]; Indigestion [8] Don't face problems [9] Others (specify); Don't know[88]	☐ ☐ ☐
9	Do you know about any rules/laws to prevent water pollution?	Yes [1]; No [0] Don't know[88]]	☐☐
10	Is regulation/rule/law is maintained?	Yes [1]; No [0] Don't know[88]	☐
11	What do you think is necessary to do to prevent water pollution/develop the situation?	Cleaning & digging of canals [1] People should not dump waste into water [2] Government should take steps [3] Steps should be taken for drainage & sewerage [4] Don't know [88]	

4.1 Housing

[Ask questions to most knowledgeable/experienced/old aged HH male or female member]

Sl.	Question	Code	Write Code/number
1	How long have you been living in this community?	1= Less than one year 2= Less than two years 3= Less than three years 4= More than three years	☐
2	Why did you start to live here in this community?	1= Eviction (from other areas) 2= Natural disasters 3= Occupation 4= In search of jobs 5= More facilities 6= Place to live easily 7= Shelter by relatives/others 8= Safety 9= because of having relatives 10= Environment is good 11= No cost for house rent 12= Less house rent Others (specify)	☐
3	By whose help you started to live here?	1= Relatives 2= Known people 3= Colleague 4= Political leader/activists 5= Local powerful people 6= By own Others (specify)	☐
4	Is it mandatory to have permission from govt/non-govt authority to build house and live in the locality?	Yes [1]; No[0] (>> go to Q**8**)	☐
5	Did you take permission from any authority?	Yes [1]; No [0]	☐
6	[If the answer is Yes] From which authority you took permission?	1= City Corporation 2= WASA 3= BWDB 4= RHD 5= Political leader/activists 6= Local powerful people 7= Others (specify)	☐
7	[If answer of Q5 is No] What types steps were taken by the authority?	1= try to evict 2= legal case 3= permitted to stay 4= promised for rehabilitation 5= Others (specify)	☐ ☐ ☐
8	Did you face any problem to build house or live in the community? [If HH lives in a rented house, go to next module]	Yes [1]; No [0]	☐
9	[If answer is Yes] What type of problem? (Multiple answers possible)	1= **to get permission** 2= Extortions / Chanda 3= construction materials were theft 4= Graft/payment 5= Others (specify)	☐ ☐ ☐

4.2 Condition of housing (building materials and others)

Sl.	Questions	Code	Write Code/nuber
1	What is the type of ownership of your house?	1= **Own** 2= shared 3= Rented 4= Shelter 5= Others (specify)	☐
2	[If answer is code 3] What amount do you pay monthly?	Taka	
3	How many rooms are there in your HH?	[In number]	
4	Are there different rooms for living and cooking?	Yes [1]; No [0]	☐
5	What is the main construction material of roof of your house?	1= Tin 2= Polythene 3= Concrete 4= Wood/bamboo/ 5= Mud 6= Others (specify)	☐☐
6	What is the main construction material of wall of your house?		☐☐
7	What is the main construction material of floor of your house?		☐☐
8	Does your HH have Gas line/connection?	Yes [1]; No [0]	☐
9	Does your HH have electricity line/connection?	Yes [1]; No [0]	☐
10	Is Gas/electricity connection legal?	Yes [1]; No [0]	☐
11	[If connection is illegal] How did you get gas/electricity connection?	1= from government/main line 2= from neighbors 3= from owner of slum 4= Others (specify)	☐☐☐
12	Is there any school/health complex / child care center in the community?	Yes [1]; No [0]	☐
13	What's your opinion about overall living environment of HH/community?	1= Very good 2= Good 3= Bad 4= Very Bad	☐

5. Sanitation, Drainage and Waste Management

5.1 Sanitation

1.	Does this HH own latrine?	Yes[1]; No [2]; Shared [3]	☐
2.	[If yes] What type of latrine?		☐
	Open hole[2] Connected with river/pond/canal [3] Dug well/hole[4] Ring slab (with water seal) [5] Ring slab (without water seal) [6] Sanitary[7] Others (Specify) [88] Not applicable [99]	Male	☐
		Female	☐
		Children (below 5years)	☐
3.	Where is toilet waste dumped finally?	1= Open pond/lake/river/canal 2= Open places 3= Dumped in proper way (sewerage line) 4=Open water beside community 5= Septic tank Others (specify)	☐
4.	For what purposes, polluted water is used by your HH?	1= Drinking 2= Cooking and washing vegetables 3= Bathing and cleaning clothes 4= Washing utensils 5= Others (specify) Not applicable [99]	☐ ☐ ☐
5.	For what purposes, community people use polluted water?	1= Cooking and washing vegetables 2= cleaning clothes 3= Bathing 4= Washing utensils 5= Others (specify) Not applicable [99]	☐ ☐ ☐
6.	What problems are faced because of using this water?	1= Health risk 2= Skin diseases 3= Other water borne diseases (Diarrhea, Dysentery, Typhoid, Jaundice, Cholera) 4= Others (specify)	☐ ☐ ☐

5.2 Drainage

No	Question	Code List	Code
1	**What type of drainage system is there in your community?**	1- Brick made; 2- RCC drain; 3- made of pipe; 4- unconstructed/Kacha drain 5- No drainage ssytem	☐
2	**Who constructed the drain?**	01- Own 02- Owner of house 03- NGO/Co-operatives 04- City Corporation 05- Community members 06- Individuals working for politicians 07 – Institutions excluding city corporation 88- Don't know; Others (Specify)	☐☐
4	**Was there any problems in drainage management in last one year?**	1- yes 2-No	☐

5	**Which problem(s) did you face?**						
Serial no	Problems of drainage line	Was there problem? 1- Yes 2 - No [If No, go to next problem]	Types of problems 01- Severe 02- Not a big problem 88- Don't know	How often do you face the problems? Approximately, 1- Daily 2- Weekly 3- Monthly 4- Quarterly 5- Half-yearly 6- Yearly	Which happenings were seen when the problems occurred? 1-Water logging 2- Bad smell 3- Wastes passing ways were blocked ; 4- filthy water entered into house, Others (specify) [Multiple answers possible]		Was the problem solved immediately? 1- Yes 2- No
		1	2	3	4		5
1	Broken (construction)	☐	☐☐	☐	☐	☐	☐
2	Hole in the line	☐	☐☐	☐	☐	☐	☐
3	Stopped flow of passing wastes	☐	☐☐	☐	☐	☐	☐
4	Overflows	☐	☐☐	☐	☐	☐	☐

5.3 Steps towards drainage system

No		Question			Code List	Code
		Did you take any steps / objections for development of drainage system of your community?			1- Yes 2-No	☐
Serial no		**Type of platform** 1- NGO; 2- Community residents; 3- Local politicians; 4- Civil society	**Which step(s) was/were taken?** 1- Complained to City Corporation 2- Complained to political leader 3- Meeting 4 – Procession 5- Complained to house owner Others (specify) [multiple answers possible]		What was response from authority after complain? 1-took immediate steps 2- took steps lately 3- No steps taken	**Was your problem solved?** 1- Yes 2-No
		1	**2**		**3**	**5**
1	**Individually**		☐	☐	☐	☐
2	**Collectively**	☐	☐	☐	☐	☐

5.4 Waste management

No	Question	Code List	Code
1	What is the current process of collecting waste in your community? [Multiple answers possible]	01=Collecting from HH 02=Collecting from specific place 03= No such arrangement Others (specify)	☐☐ ☐☐
2	How do you keep HH wastes? [Multiple answers possible]	0=Wastes are not reserved/kept 1= Jar / pot (closed) 2= Jar / pot (Open) 3= Plastic bag 4=Kept on yard Others (specify)	☐ ☐
3	Where do you dump your HH wastes? [Multiple answers possible]	1= into drain 2=over road 3=Anywhere / open spaces 4= Decomposed & used as fertilizers 5= taken away from home 6=Wastes are dumped into specific places 7= Lake / Canal Others (specify)	☐ ☐ ☐
4	Are there different arrangements for collecting HH or medical wastes?	1=Yes 0= No	☐
5	Is there any special arrangement of collecting garbage in special occasions (religious festivals)?	1= Yes 0= No	☐
6	Do you know where garbage collected from community is dumped?	1=Yes 0= No	☐
7	Do you know what are the activities done by City Corporation for waste managemnt? [Multiple answer possible]	00=No such activities of City Corporation in this area 01=Only constructing/providing dustbin 02= Collection/transport of wastes 03= Decompose wastages 88=Don't know Others (specify)	☐☐ ☐☐ ☐☐
8	**Was there any problem in waste management last year?**	1=Yes 0=No **[If No, >>>H.2]**	☐
9	**Problems faced in last one year**		

Serial no	Problems related to waste management	[ ] was there any problem? 1=Yes 0=No [If No, go to next problem]	Types of problems 01- Severe 02- Not a severe problem 88- Don't know	How often did you face the problem? 1- Weekly 2- Monthly 3- Quarterly 4- Half-yearly 5- Yearly	Was the problem solved immediately? 1=Yes 0=No
		1	2	3	4
1	Irregular collection from HH	☐	☐☐	☐	☐
2	Irregular collection from dustbin	☐	☐☐	☐	☐
3	Lack of specific place	☐	☐☐	☐	☐
	Others (specify)	☐	☐☐	☐	☐

6 Needs and Problem (Important demands/problems): Start from most important problem

Three major problems of your HH (a) Socio-Economic- three main problems (b) Housing related-three main problems [Note spontaneous answers. Ask one after another, starting from the most important one]							
Socio-Economic	**Housing related**	**1st**		**2nd**		**3rd**	
01 = Food for HH 02 = Money (cash) 03 = Loan 04 = Employment 05 = Labor 06 = Health services 07 = Clothing 08 = Security 09 = Repairing house 10 = Buying land 11= Living environment isn't good 12= Own house required Others (specify)	01 = Water 02 = Gas 03 = Electricity 04 = Housing 05 = Water logging/Drainage 06 = Others (specify)	a	b	a	b	a	B
		☐☐	☐☐	☐☐	☐☐	☐☐	☐☐