WATER PRICING FOR SLUM DWELLERS IN DHAKA METROPOLITAN AREA: IS IT AFFORDABLE?

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Abstract

Bangladesh is facing serious water management challenge to ensure affordable water supply for all, especially in urban areas. Both the availability and the quality of water are decreasing in the poor urban areas. Besides, the population situation of the country is getting worst in Dhaka, the capital of Bangladesh, which became one of the megacities in the world in terms of population and urbanization. The aim of this research is to address the following question: "Are slum dwellers in Dhaka Metropolitan Area capable for paying for Dhaka Water Supply and Sewerage Authority's (DWASA) services?". This study focused on three slums in Dhaka Metropolitan Area namely Korail slum, Godown slum and Tejgaon slum to determine the current water price in these slums and to compare it with water price of other cities of the world. A field study has been conducted during July and August 2014. It involves semi structured questionnaire survey and focus group discussions with slum dwellers and various stakeholders. For secondary data source, a wide range of books, peer-reviewed articles, researcher documents, related websites and databases have been reviewed. Result shows that for domestic water use slum dwellers are paying about 7 to 14 times higher than legal connection holders covered by DWASA. Slum dwellers are spending about 13% to 23% of their average monthly income for domestic water supply, whereas in most of the countries, legal connection holders are spending less than 5% of their average monthly income for the same purpose. Finally, it is concluded that the slums dwellers in three selected slums in Dhaka Metropolitan Area are capable to pay for DWASA services.

1. Introduction:

Water, which is now more precious than ever in our history, and is essential for almost all the sectors related to human survival that includes agriculture, forestry, industries, navigation, fisheries, drinking and sanitation and mining etc. With decreasing availability and increasing demand for water, some have predicted that clean water will become the "next oil" in world (cf. Rahaman, 2012). Within recent decades, increasing urbanization in low and middle-income countries led to the development of megacities with more than 10 million inhabitants [Kraas, 2007; United Nations, 2012]. Megacity development is often combined with a lack of effective governance due to weak political structures [Kraas, 2007]. In addition, health and social infrastructures are poor or nonexistent, and the housing sector is incapable of fulfilling the demand of the high numbers of rural migrants flushing into the cities of developing countries every day [Montgomery *et al*., 2003].

Bangladesh is under serious fresh water crisis especially in the urban areas. Both the availability and the quality of water are decreasing in the poor urban areas. Besides, the population situation of the country is getting worst in Dhaka, which became one of the mega cities in the world in terms of population and urbanization. The percentage of slum population within the overall population has increased from 25 percent in 1996 to 37.4 percent in 2007 occupying an area of only 4 percent of the total Dhaka Metropolitan Area (DMA) [UN, 2012].

These slum dwellers in DMA face several social, economic and political problems. Among tthese, crisis or scarcity of fresh water is one of the major concern for them. Because, due to increase of Dhaka Metropolitan Area's population, the gross daily water demand will rise from 2460 MLD (million liters per day) to 7970 MLD within next 15 years, assuming a system loss of 20 percent [Huda & Islam, 2012]. There is already a major shortage of required supply of safe water. Due to over abstraction and loss of recharge areas, the groundwater table in Dhaka has declined at an alarming rate over the last couple of decades. Thus water governance has become one of the most important issues for the poor urban people living in slum areas.

1.1 Background

In village there is peace but no happiness, in city there is happiness but no peace. And happiness comes from financial affluence. Actually in Bangladesh people enjoy rural life. They in general do not like the city rush, traffic and pollution, but they move to cities for

food, money and job. They enter into the cities with some objectives, and in almost every case the move is mainly to improve financial condition. Dhaka is the living place of 11.9 million people [BBS, 2011]. Here, a huge number of people are involved with the informal job like rickshaw pulling, hawker, roadside business, domestic worker etc.

The phenomenon of slums and squatters in Dhaka is as old as the city itself [Taylor, 1840; Geddes, 1917; Arams, 1964]. But the city has experienced a prolific growth of slums and squatters since the independence of the country in 1971 [Figure 1; Qadir, 1975]. By the end of 1976 only 10 slums existed in Dhaka with a population of 10,000. The number increased to 2,156 settlements with a population of 718,143 in 1993, and 3007 settlements with a population of 1.1 million in 1996 [CUS, Dhaka, 1996a]. About 90% of the total numbers of slums and squatter settlements have developed in the last three decades. The highest concentration of growth (45%) took place between 1981 and 1990, followed by the previous decade's 26%. Only 18% of these clusters were established since 1991 [CUS, 1996b].

The distinctive aspect of urban poverty in Dhaka Metropolitan Area's slums is its close connection with recent migration. The slum dwellers have mostly migrated to the city from rural areas. As Dhaka is well linked to the entire country by land, water and air, and can be reached within a day from any part of the country, there are opportunities for migrants to arrive in the city using transport within their reach [Islam, 1996]. The majority of urban poor migrate to Dhaka City from a few districts like Faridpur, Barisal and Comilla [Siddiqui *et al*., 1993]. The rural poor migrate to Dhaka city due to some push and pull factors. The push factors include over-population, floods and natural disasters, river erosion, growing landlessness and exploitation by the rural elites and moneylenders [Shakur, 2008]. In this agriculture-based country, land is the main means to generate asset to the rural poor. Increased loss and fragmentation of land among the poor and increased concentration of land among the rich, coupled with a high natural growth rate of population raise the number of landless and the hungry. In the absence of other sustenance opportunities in villages, many of the landless in rural Bangladesh are forced to migrate to cities to seek better opportunities although their chances of improving their conditions are limited [Alamgir, 1993].

Along with push factors the pull factors also contribute to the increasing rural-urban migration in Bangladesh. These pull factors are mainly employment opportunities in the

informal sectors of the economy, better opportunities in the city and relative freedom for female workers [Shakur, 1987]. Slum dwellers in the city are disadvantaged in terms of their access to urban services like safe water, electricity, gas supply, toilet facilities and garbage disposal. The quality of these services has been found to be poor and the supply remains highly irregular and inadequate [CUS, 1993]. Most slum dwellers have access to safe water for drinking purpose only. And most use unsafe water for washing, bathing and other purposes.A small proportion of the urban poor (20%) use sanitary latrines and the majority still use a variety of non-hygienic latrines [CUS,1996c].

The study shows that 67% use electricity and another 33% still have no access to electricity. The study also found that 72% of the urban poor use traditional fuel for cooking and only 22% have access to gas facilities. More than 60% of the poor just dump their garbage on the road or on the ground [Ahsan *et al*., 1996]. And a very small proportion (12.4%) of these poor households has access to the underground drainage system [Siddiqui *et al*., 1993]. Slum populations also have limited access to health and education. Though theoretically, the urban poor have equal access to the public health facilities in the city, in reality very little are available to them.

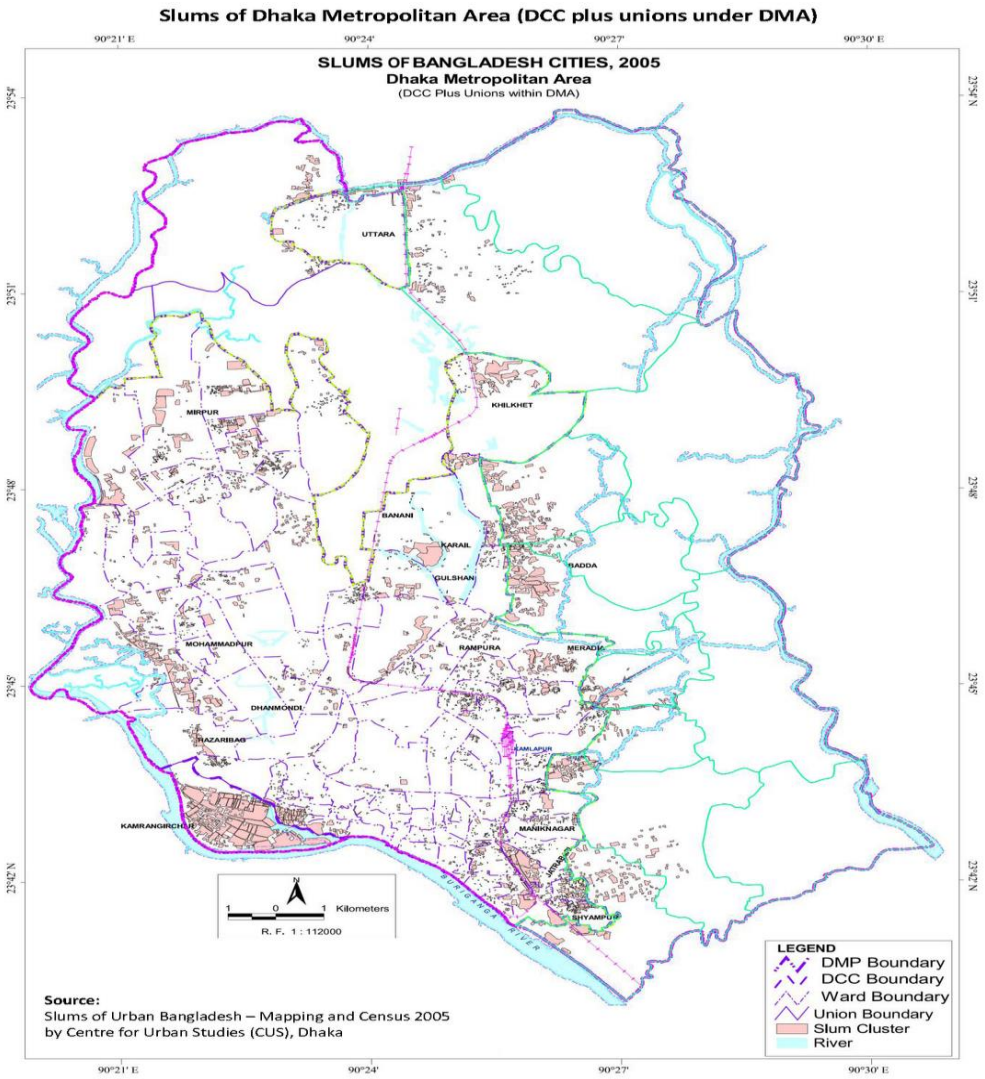

Figure 1: Slums of Dhaka

Source: CUS, 2005

Various slum classifications exist in the literature, yet there is no universal definition for a slum community or for slum housing. Moreover, slum characteristics are not consistent across countries or even across cities. Widely applied is the notion of the UN-habitat group [Khan, Gruebner and Krämer, 2013], which defines a slum household as one or a group of individuals living under the same roof in an urban area and lacking one or more of the following five amenities: (1) Secure tenure, (2) Sufficient living area, (3) Access to improved water, (4) Access to improved sanitation facilities, and (5) Durable housing.

1.2 Dhaka Water Supply and Sewerage Authority (DWASA)

Dhaka Water Supply and Sewerage Authority (DWASA) is responsible for providing water and sewerage services in Dhaka Metropolitan Area (DMA). However, DWASA is not legally allowed to provide services to illegal settlements in DMA, e.g. slums dwellers. DWASA is a service oriented autonomous commercial organization in the Public sector, entrusted with the responsibility of providing water supply, sewerage disposal (wastewater), and storm water drainage services to the urban dwellers of the fast-growing metropolitan Dhaka, the capital of Bangladesh. It covers more than 360 sq. km service area with 12.5 million people with a production of almost 2110 million liters per day (MLD). DWASA faces a number of challenges. These include unplanned city development and informal settlements, transitioning to using surface water instead of groundwater, and large investment funding**.** [DWASA, 2015; Rhodes, 1996].

1.2.1 The major responsibilities and functions of DWASA:

The major responsibilities of DWASA are following (DWASA, 2015):

- Construction, operation, improvement and maintenance of the necessary infrastructures for collecting, treating, preserving and supplying potable water to the public, industries and commercial concerns
- Construction, operation, improvement and maintenance of the necessary infrastructures for collecting, treating and disposing domestic sewerage and industrial wastes, and
- Construction, operation, improvement and maintenance of the necessary infrastructures for drainage facilities of the City.

Dhaka city is surrounded by four rivers namely Buriganga, Balu, Turag and Tongi Khal, but only 12.28 percent of supplied water is obtained from these rivers. Dhaka city faces two major problems in supplying water to its residents: i) gradual decrease of raw water sources and ii) discharge of large quantities of polluted water [Serajuddin, 1993]. Surface water sources from surrounding rivers and lakes have already exceeded the standard limits of many water quality parameters because of the discharge of huge amount of untreated and municipal waste materials. Treatment of this water has become so expensive that water supply agencies

have to depend on groundwater aquifer for drinking water production. Table 1.2.1 summarizes the water production overview in Dhaka city.

Table 1.2.1: Water production in Dhaka City by DWASA

Water connections	286911 no.
Daily water production	2087.50 MLD
Deep Tube Well (DTW) in operation	560 no.
DTW of other agencies	1330 no.
Overhead tank in operation	38 no.
Water treatment plant	4 no.
Strom water drainage	185 Km
Strom water pumping station	3 no.
Religious institutions	1898 no.

Source: DWASA, 2015

Total production of DWASA is 1980 million liters per day (mld), whereas total production capacity is 2182 mld (DWASA, 2015). Table 2.2.3 and table 2.2.4 show the water treatment capacity of various treatment plants of DWASA and various aspects of drainage system covered by DWASA.

Table 2.2.3: Surface Water Treatment Capacity

Sayedabad	225 mld
Chadnighat	39 mld
Narayangonj	28 mld
Total Surface Water Production	257 mld

Source: DWASA, 2015

Table 2.2.4: Various aspects of drainage system of DWASA and its coverage

Coverage Area	110 sq.km
Population served	25%
Treatment plant	1
Treatment capacity	120000 m^3
Actual treatment	30000 – 50000 m^3
Connections	59510 nos
Sewerage line	881 km

Source: DWASA, 2015

1.3 Objectives of the study

This key aim of this research is to find out whether slum dwellers in Dhaka Metropolitan Area is capable for paying for DWASA. This paper has two objectives. These are :

a. What is the current water price in selected slums in Dhaka Metropolitan Area?
b. What percentage of income slum dwellers are spending for water?

2. Methodologies:

For this study following methodologies have been used:

- A field study has been conducted between July and August 2014. It involves a semi structured Questionnaire survey and Focus group discussion with selected slum dwellers and various stakeholders.

- Various stakeholders for this research includes local water supply agents, DWASA (Dhaka Water Supply and Sewerage Authority) information officer, DWASA Director, local DWASA agent, power elite and middlemen; activists of national NGOs and legal connection holders in the study area.

- For secondary data source, a wide range of books, articles, paper clippings, research documents, seminar papers, concepts notes and related websites had been reviewed.

3. Introduction to the study area

The total number of slums in the Dhaka City Corporation area is approximately 4,500. For this study, three slums named Korail slum, Godown slum, Tejgaon slum were surveyed. Figure 2 illustrates the locations of the study area. The detail of each slum is provided in section 4.

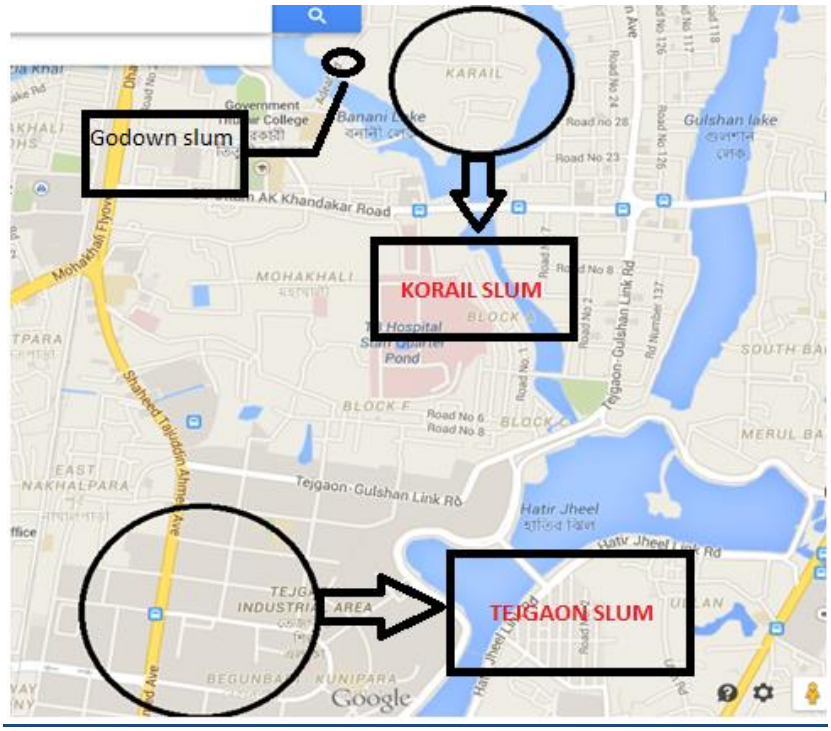

Figure 2: Locations of Study Area

Source: Google Map, 2015

4. Analysis and findings:

For this study, 150 respondents from the three selected slums were interviewed through questionnaire survey. Tables 1 and 2 show the background of the respondents.

Table 1: Background of the respondents

Name of Slum	Water source	No. of respondents observed	Average age of respondents	Average Income of respondents	Average educational background of respondents
Korail	Illegal water house	50	35-40 years	6000-7000	illiterate
Godown	DWASA pump house	50	40-45 years	6000-7000	illiterate
Tejgaon	Mosque	50	40-50 years	5000-7000	illiterate

Source: Field Survey, 2014

Table 2: Migration causes to slums in Dhaka (as % of total households)

Reason for coming to slum (as % of total households)	
River erosion	17.2
Uprooted	12.53
Driven out	2
Abandoned	1.22
Meager income	19.97
Insecurity	2.43
For job	39.53
Others	5.12
Total	100
Total households	334431

Source: DWASA, 2015

4.1 *Korail slum:*

Korail is one of the largest slums in Bangladesh and is located in Latitude 23° 46' 36.7752" N and Longitude 90° 24' 25.2720" E under wards 19 and 20 of Dhaka City Corporation, adjacent to Gulshan-Banani Lake. The slum can be accessed by several roads or by water across Gulshan Lake. The main two units of Korail are known as Jamaibazar (unit-1) and Boubazar (unit-2). Within Boubazar, there are four sub sections known as Ka, Kha, Ga and Gha. In addition to the main Korail slum area, BeltoliBosti, T&T Bosti, BaidarBosti, Ershadnagar and GodownBosti are also part of greater Korail. The slums are gradually expanding across the lake by land reclamation and through the dumping of waste and soil.

In 1961, the area concerned was acquired by Telephone and Telegraph (T&T), now Bangladesh Telecommunication Company Limited (BTCL). As communications technology progressed, use of the land by BTCL for transmission equipment became increasingly obsolete prompting a large proportion of the land (90 acres) to be formally handed over to the Public Works Department (PWD) in 1990. This was allegedly in violation of a previously established agreement with former private land owners. Legal complications ensued and eventually BTCL reclaimed the 90 acres of land from PWD. Thus three parties have become stakeholders in the disputed ownership of Korail area: BTCL, PWD and the former private landowners (ICDDRB, 2009).

In the early 1990's, as a result of the unresolved issue of ownership, various T&T affiliates, local middle men (strong men) and influential elites from different political parties unofficially captured sections of the uninhabited land. Occupiers went on to informally rent out the land and housing to impoverished city dwellers at low rates. With increasing urbanization and evictions in other parts of Dhaka city (such as Agargaon) the demand for low-cost housing increased. Under these pressures, the number of inhabitants and expanse of slum housing at Korail grew to create the slum as it is today. More than 20,000 families now reside in Korail, comprising a significant element of Dhaka's work force in the garment, transportation, construction, land development, domestic help, waste management, small industry and informal sectors. Despite their significant contribution to the economy slum dwellers from Korail and elsewhere remain excluded from basic services principally because slums are considered to be "illegal settlements".

Figure 3: Location of Korail slum, Dhaka, Bangladesh

Source: Google Map, 2015

In Korail slum, a total of 50 people from 46 houses were interviewed. Four group discussions were organized to get better understanding of the situation. Table 4.1.1 shows an overview on Korail slum. It also gives a clear conception on water supply scenario of Korail slum.

Table 4.1.1: Overview on Korail slum

Water collection point	5
Distance from household	Nearly close to house
Frequency of water supply	3 times a day
Distribution process	Legal WASA line in water house
Role of NGO	Yes
Role OF DWASA	No
Distribution through pipe	Yes
Tube well	Yes
Alternative water source	Adjacent TNT water colony

Source: Field Survey, 2015

4.1.1Average family size in the Korail slum:

It is observed that 48% respondent of Korail slum have 3 to 5 members in their family. 30% have 2 to 3 members and 22% have 5 to 8 members.

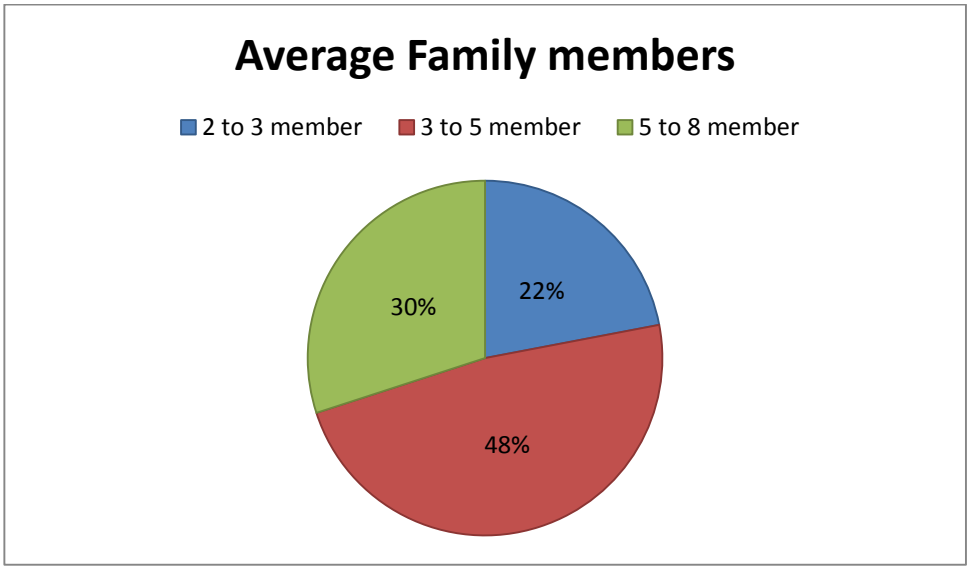

Figure 4: Average family members of Korail slum

4.1.2 Residency of the Korail slum:

It is observed that 12% of people staying have been in this slum for 0-1 year, 26% people have been staying here 1-3 years, 42% people have been staying in this slum 3-5 years and only 12% people have been staying here more than 5 years. It is observed that people don't stay longer period of time in this slum because of the government's eviction attempts and hazardous life in the slum.

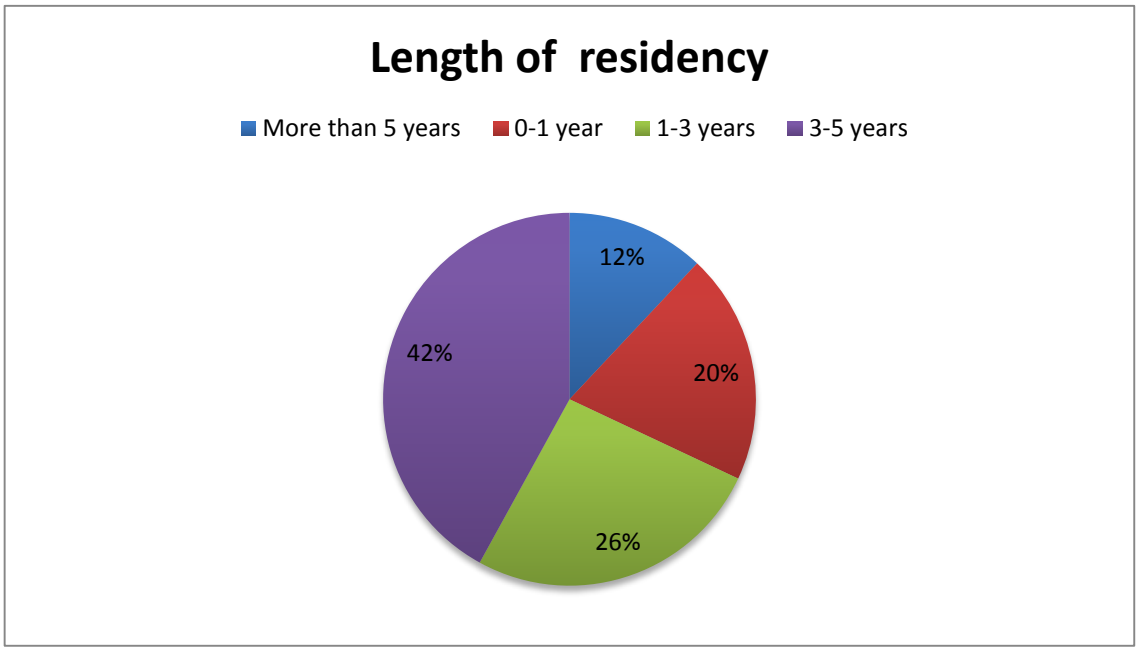

Figure 5: Length of residency of the respondents in Korail slum

4.1.3 Average monthly income of the respondent of Korail slum:

It is observed that among 50 respondents, 16% earn more than7000 taka, 10% earn 3000-4000 taka, 14% earn 4000-5000 taka, 22% earn 5000-6000 taka and 38% earn 6000-7000 taka.

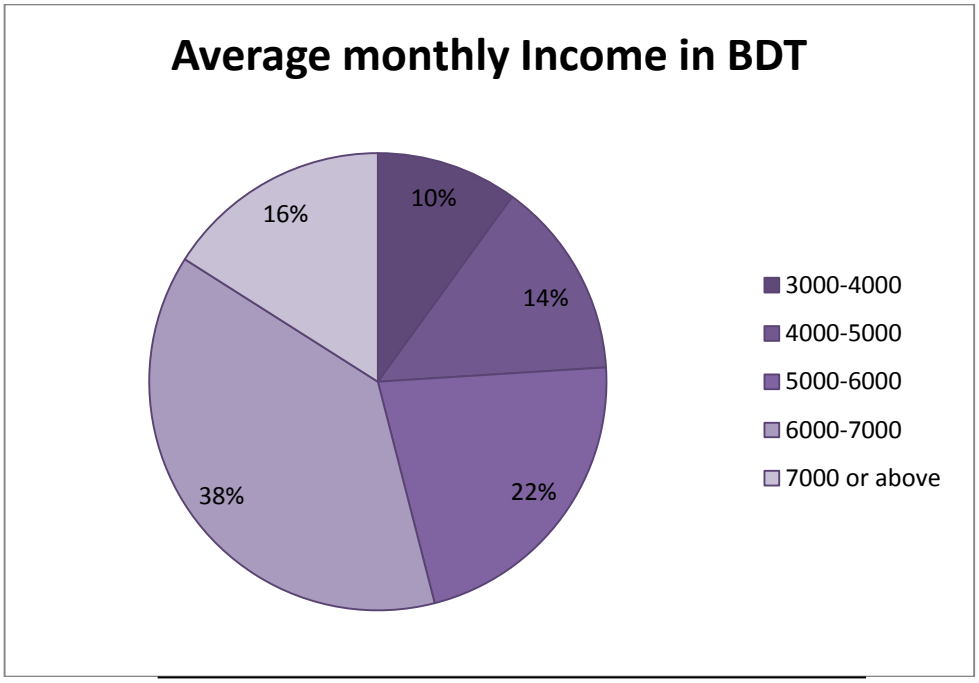

Figure 6: Average monthly income of the respondents of Korail slum in BDT

4.1.4 Water pricing in Korail slum:

Table 4.1.2 shows the existing water price for 1000 liters in Korail slum.

Table 4.1.2: Water pricing in Korail Slum

Existing water price in Korail slum per 1000 liters	DWASA rate per 1000 liters	Korail slum dwellers expected price per 1000 liters	Water demand (liter per capita per day)	Charge for bathing purpose
100 taka	7.33 taka	25 taka	20 liters average	5 taka

4.1.5 Comparative scenario of water pricing in Korail slum:

Table 4.1.3 shows comparative scenario of water pricing between DWASA connections holders and Korail slum dwellers.

Table 4.1.3: Comparative scenario of water pricing in DWASA and Korail Slum

Water price per 1000 liters in Korail slum	Water price per 20 liters of DWASA	Water price they are willing to pay for per 1000 liters	How many times than DWASA slum dwellers currently pay	How many times than DWASA rate they want to pay
100 taka	7.33 taka	25 taka	14 times	3.5 times

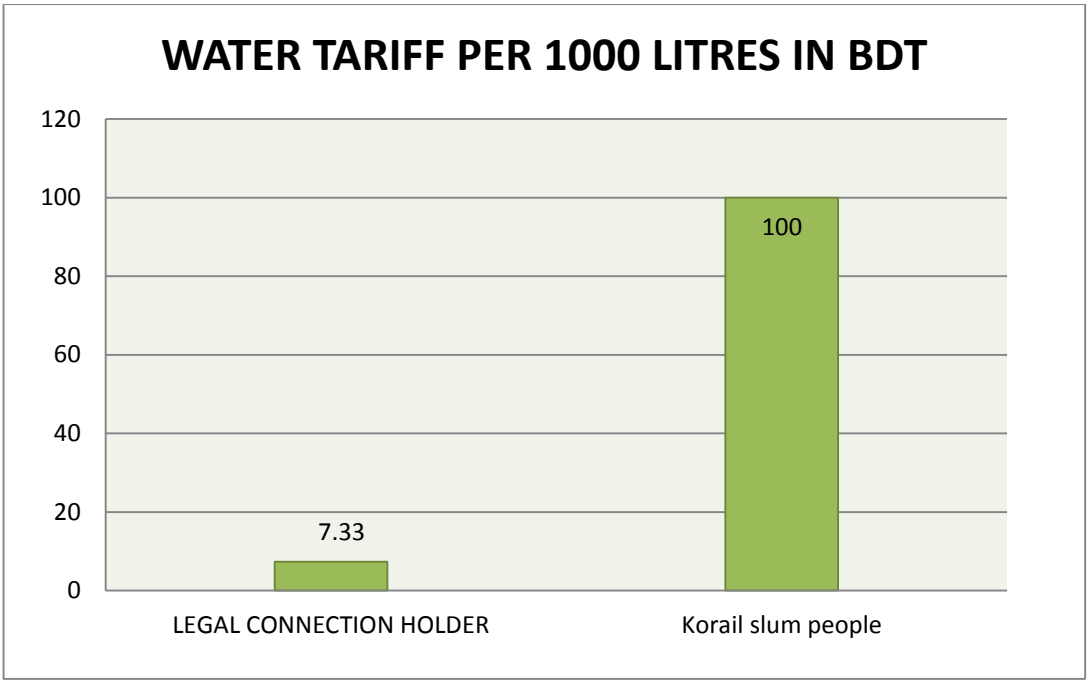

Figure 7: Water tariff per 1000 liters in Korail slum

4.1.6 Korail slum respondent's willingness to pay for DWASA:

Table 4.1.4 shows that all the respondents of Korail slum are willing to pay for DWASA services. But the problem regarding illegal settlement deprived them from it.

Table 4.1.4: Willing to pay for DWASA services in Korail slum

Decision	Willing to pay	Not willing to pay
Respondents numbers	50	0

4.2 Godown slum:

Godown slum is the part of greater Korail slum. It is situated near Bonani T&T field. It consists of 100-150 houses. Among those, this study covered over 50 respondents and 40 households. Three group discussions were arranged as well. Table 4.2.1 shows an overview on Godown slum.

Table 4.2.1: Overview of Godown Slum

Water collection point	1
Distance from household	Close to house
Frequency of water supply	3
Distribution process	DWASA pump line illegally
Role of NGO	No
Role OF DWASA	Yes
Distribution through pipe	No
Tube well	2
Alternative water source	None

Source: Field Survey, 2014

4.2.1 Average family size in the Godown slum:

It is observed that 49% respondent of Godown slum have 3 to 5 members in their family, 24% have 2 to 3 members and 27% have 5 to 8 members.

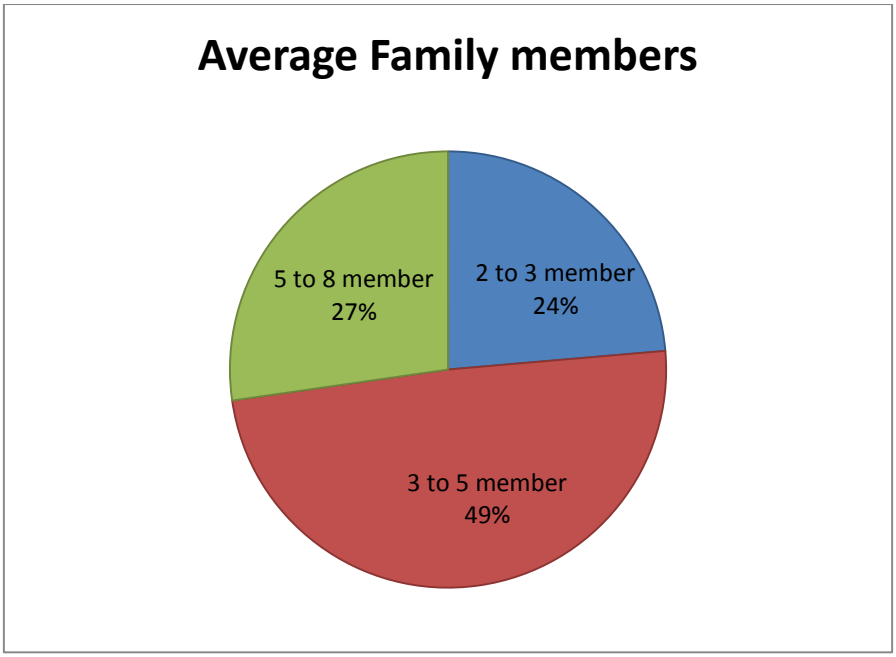

Figure 8: Average family members in Godown slum

4.2.2 Average monthly income of the respondent of Godown slum:

It is observed that among 50 respondents, 14% earn more than7000 taka, 16% earn 3000-4000 taka, 16% earn 4000-5000 taka, 28% earn 5000-6000 taka and 32% earn 6000-7000 taka.

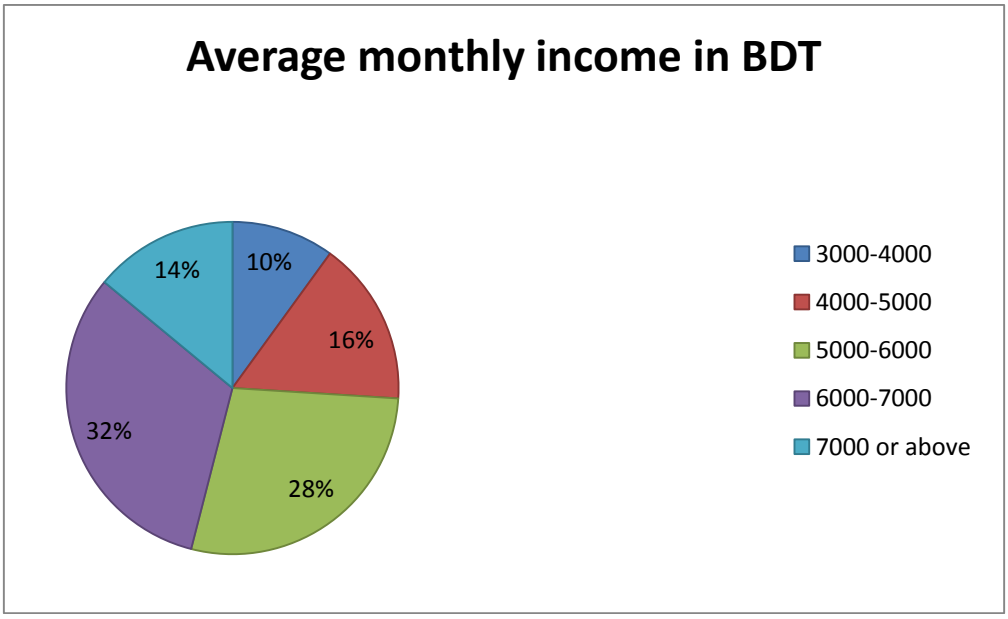

Figure 4.2.3: Average monthly income of the respondents of Godown slum (in BDT)

4.2.3 Residency of the Godown slum:

It is observed that 25% of people have been residing in Godown slum for 0-1 year, 32% people have been residing for 1-3 years, 30% people have been residing in this slum for 3-5 years and only 13% people say's that they have been staying here for more than 5 years. It is observed that people don't stay longer period of time in this slum because of the government eviction attempts & hazardous life in slum.

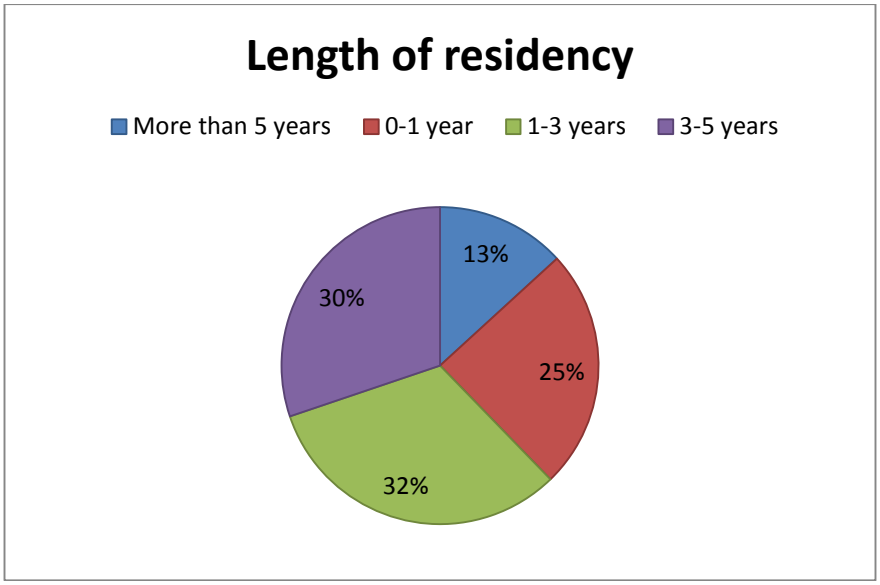

Figure 9: Length of residency of the respondents in Godown slum

4.2.4 Water pricing in Godown slum:

Table 4.2.2 shows water pricing scenario of Godown slum.

Table 4.2.2: Water Pricing in Godown slum

Existing Water price in Godown slum per 1000 liter	DWASA PRICE Per 1000 liter	Godownslum dwellers expected price per 1000 liters	Water Demand (liter per capita per day)	Charge for bathing purpose
50 taka	7.33 taka	25 taka	20 liter average	5 taka

4.2.5 Comparative scenario of water pricing in Godown slum:

Table 4.2.3 shows comparative scenario of water pricing between DWASA and Godown slum.

Table 4.2.3: Comparative scenario of water pricing of Godown slum

Water price per 1000 liters in Godown slum	Water price per 1000 liters of DWASA	Water price they are willing to pay for per 1000 liters	How many times than DWASA slum dwellers currently pay	How many times than DWASA they want to pay
50taka	7.33 taka	25	7 times	2.5 times

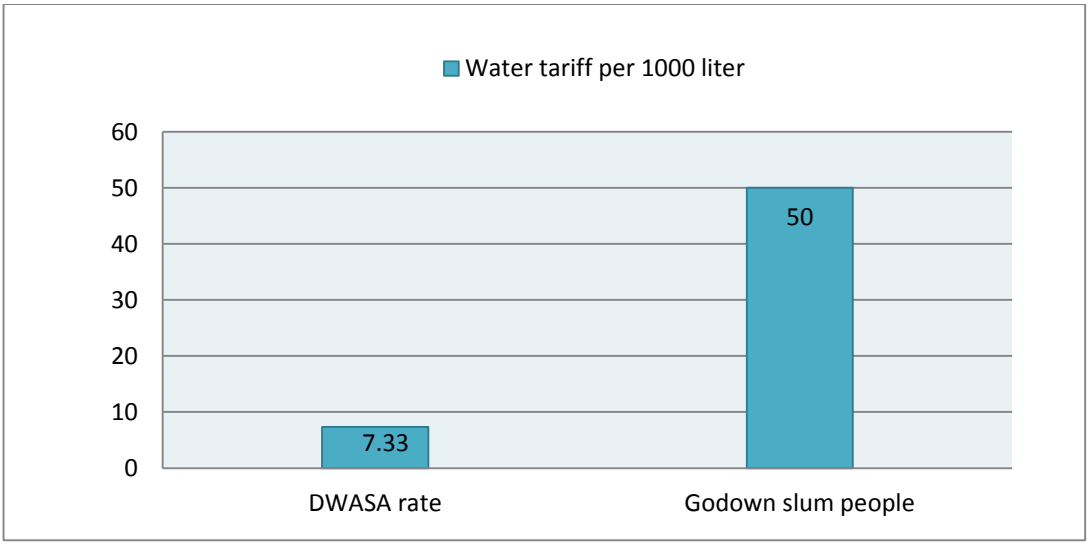

Figure 10 : Water tariff per 1000 liters in Godwan slum (in BDT)

4.2.6 Godown slum respondent's willingness to pay for DWASA:

Table 4.2.4 shows that all the respondents of Godown slum are willing to pay for DWASA. But the problem regarding illegal settlement deprived them from it.

Table 4.2.4: Willing to pay for DWASA services in Godown slum

Decision	Yes	No
Respondents numbers	50	0

4.3 TEJGAON SLUM:

Tejgaon slum is located in latitude 23° 45' 34.9848" N, longitude 90° 23' 29.6520" E. Water distribution process in Tejgoan Railway Slum is pretty unusual from other slums in Dhaka city. Tejgoan Railway Slum is situated at the heart of Dhaka city. The office of DWASA is not so far from this slum. Therefore a number of water pumps and sources are established nearby Karwan Bazar. But there is no water pump or sources directly linked with slum dwellers household. The middle-men who control the slum established 10-12 reserves tank, few toilets and shower rooms in a specific place for slum people. They collect water from these reserves tank on the basis of daily needs and pay specific amount of charges on daily or monthly basis. For the shower and the use of toilet each person has to pay separately on per use basis. It is also observed that an adjacent mosque, which is privileged by government subsidized free water are also selling water to the slum dwellers. Almost 100% respondents (total 50 respondents) are not happy with the distribution process, as they have to spend huge money for water each day (Field Survey, 2014). Figure 11 shows the location of Tejgaon Slum.

Figure 11: Location of Tejgaon Slum, Dhaka, Bangladesh

Source: Google Map, 2015

In this slum, this study covered over 36 households and interviewed 50 people. Four group discussions were also arranged for better understanding of the situation. Table 4.3.1 below shows an overview on water supply scenario of Tejgaon slum.

Table 4.3.1: Overview on Tejgaon slum

Water collection point	2
Distance from household	CLOSE TO HOUSE
Frequency of water supply	2 Times a day
Distribution process	From LEGAL and Subsidies DWASA Connection IN MOSQUE
Role of NGO	Yes
Role OF DWASA	NO
Distribution through pipe	No
Tube well	1
Alternative water source	Water house run by NGO

Source: Field Survey, 2014

4.3.1 Average family size in the Tejgaon slum:

It is observed that 54% respondent of Tejgaon slum have 3 to 5 members in their family. 26% have 2 to 3 members and 20% have 5 to 8.

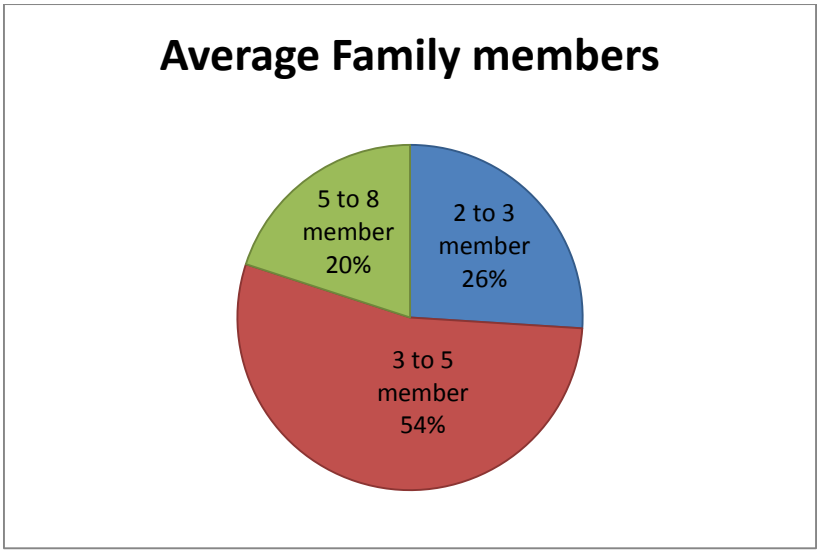

Figure 12: Average family members in Tejgaon slum

4.3.2 Residency of the Tejgaon slum:

It is observed that 13% of people have been residing in this slum for 0-1 year, 25% people have been residing for 1-3 years, 51% people have been residing for 3-5 years and only 11% people have been residing for more than 5 years. It is observed that people don't stay longer period of time in this slum because of the government's eviction attempts & hazardous life in slum.

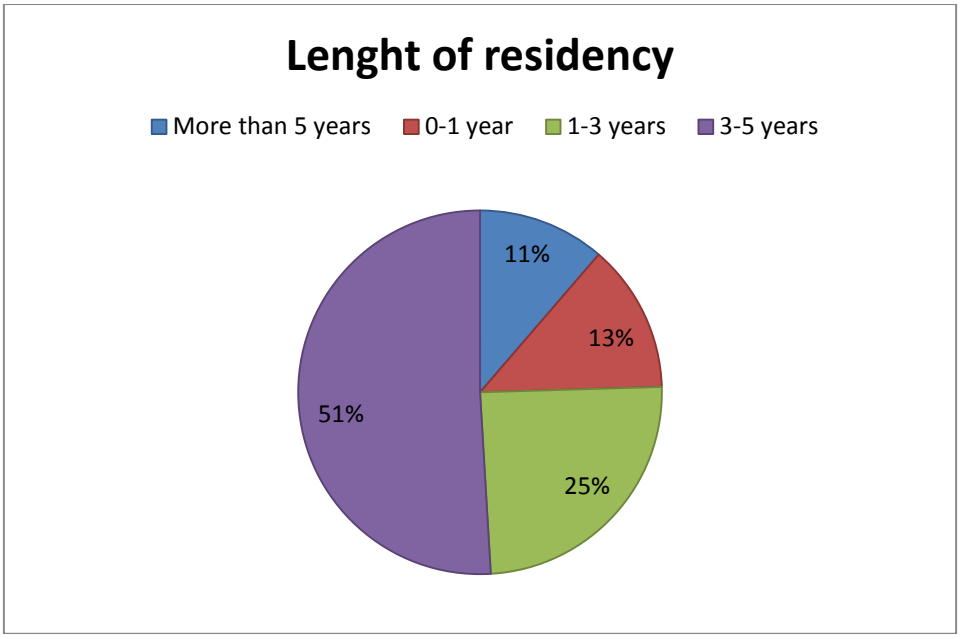

Figure 13: Legth of residency of the respondents in Tejgaon slum

4.3.3 Monthly income of the respondent of Tejgaon slum:

In this slum we observed that the financial condition was pretty much better than other 2 slums. About 52% of total respondent earns5000-7000 taka, 24% earns 7000-10000 taka and 6% earns more than 10000 taka. Only 18% earns below taka 5000.

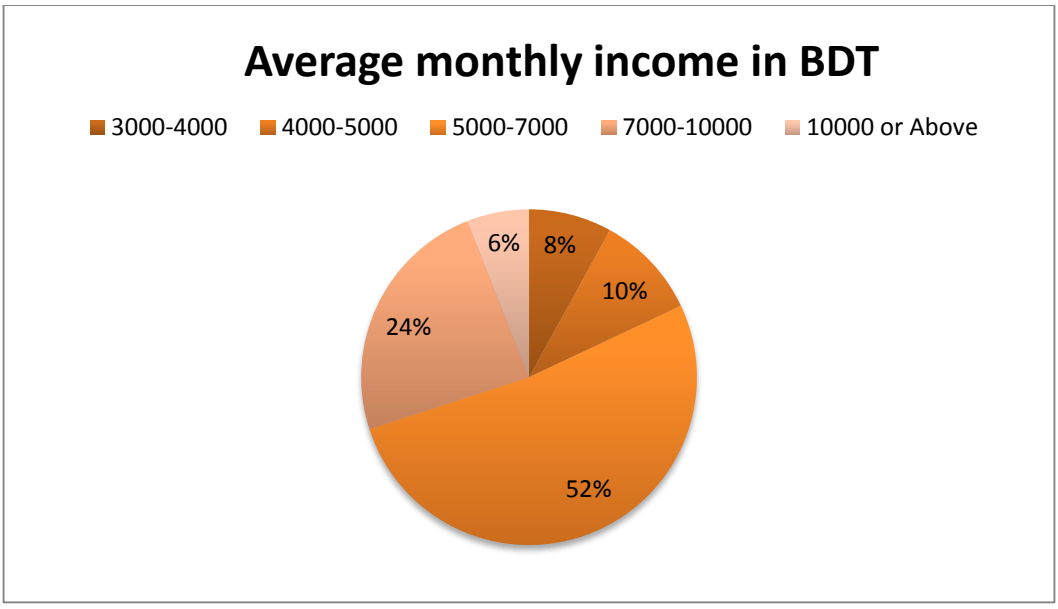

Figure 14: Monthly income of the respondents of Tejgaon slum in BDT

4.3.4 Water pricing in Tejgaon slum:

Table 4.3.2 shows comparative scenario of water pricing between DWASA and Tejgaon slum.

Table 4.3.2:Water Pricing in Tejgaon slum

Existing Water price in Tejgaon slum per 1000 liter	DWASA Price Per 1000 liter	Tejgaon slum dwellers expected price per 1000 liters	Water Demand (liter per capital per day)	Charge for bathing purpose
50 taka	7.33 taka	25 taka	20 liter average	5 taka

4.3.5 Comparative scenario of water pricing

Table 4.3.3 shows comparison between DWASA rate and slum dwellers rate of Tejgaon slum.

Table 4.3.3: Comparative scenario of water pricing in DWASA and Tejgaon slum.

Water price per 1000 liters in Tejgaon slum	Water price per 1000 liters of DWASA	Water price they are willing to pay for per 1000 liters	How many times than DWASA Slum dwellers currently pay	How many times than DWASA they want to pay
50 taka	7.33 taka	25	5 times	2.5 times

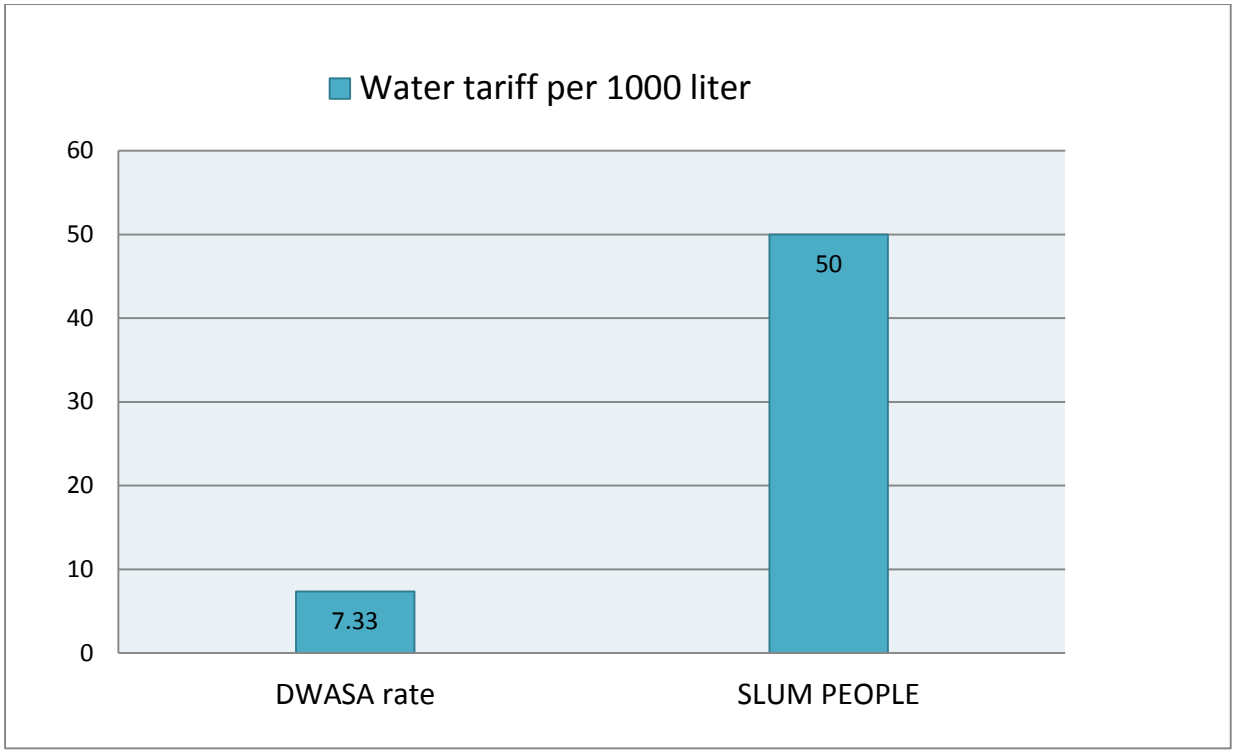

Figure 15: Water tariff per 1000 liters in DWASA covered area and Tejgaon Slum

4.3.6 Tejgaon slum respondent's willingness to pay for DWASA:

Table 13 shows that all the respondents of Tejgaon slum are willing to pay for DWASA services. But the problem regarding illegal settlement deprived them from it.

Table 4.3.4: Willing to pay for DWASA services in Tejgaon Slum

Decision	Yes	No
Respondents numbers	50	**0**

4.4 Combined pricing scenario of the study area:

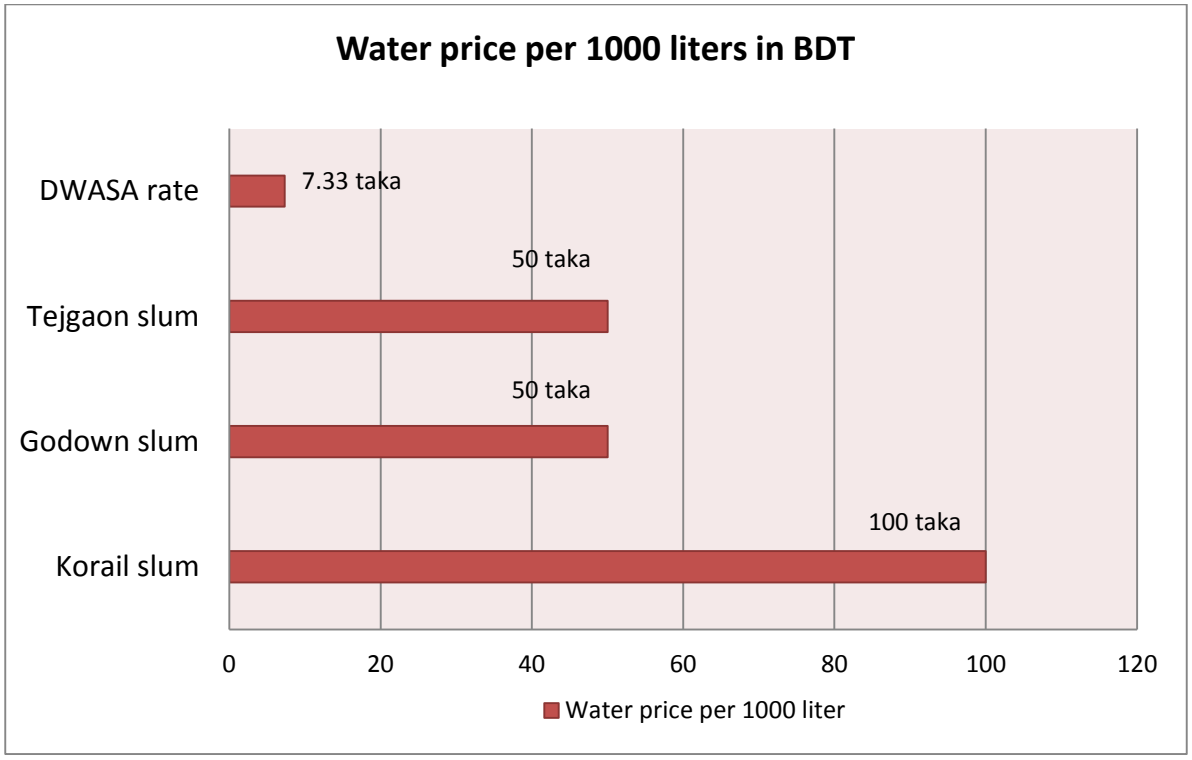

Figure 16: Water price in selected slums and DWASA covered area

Source: Field Survey, 2014

Figure 16 shows that respondents of Tejgaon and Godown slums are paying about 7 times higher than DWASA rate and respondents of Korail slum are paying 14 times higher than DWASA rate.

4.4.1 Water pricing comparison with other cities:

From the table 4.4.1, it is observed that slum dwellers of our study area are paying higher than most of the countries. But it is astonishing that slum dwellers are not getting same or even closer to it though they are paying the same price. It is also observed that paying such a big amount for water they are not getting it according to their requirement. Figure 17 shows variation of water pricing in different countries and in the Korail, Tejgaon and Godown Slums in DMA.

Table 4.4.1: Water Tariff Comparison in different countries

Name of Country	Name of city	Water price per 1000 liter in USD[i]	Water price per 1000 liter in BDT
AUSTRIA	Linz	1.54	120.48
AUSTRIA	Vienna	1.80	140.47
BANGLADESH	DWASA	0.09	7.0281
BELGIUM	Brussels	2.11	165.15
BELGIUM	Liege	3.40	265.7
DENMARK	Esbjerg	2.80	219
DENMARK	Copenhagen	3.83	298.75
FINLAND	Helsinki	1.07	83.334
FINLAND	Turku	1.96	152.96
FRANCE	Paris	1.66	129.46
FRANCE	Bordeaux	2.33	182.16
GERMANY	Country Average	2.55	199.13
GREAT BRITAIN	London	2.03	158.86
GREAT BRITAIN	Cardiff	2.46	192.34
HUNGARY	Budapest	1.23	95.965
HUNGARY	Pécs	2.04	159.52
ITALY	Rome	0.59	46.034
ITALY	Bologna	1.08	84.689
JAPAN	Osaka	1.03	80.46
JAPAN	Tokyo	1.37665	107.5
KOREA	Seoul	0.4413	34.461
KOREA	Busan	0.5485	42.832
NEDERLAND	Amsterdam	2.10105	164.07
NEDERLAND	Den Haag	2.06715	161.42
NORWAY	Oslo	1.36765	106.8
NORWAY	Bergen	2.03085	158.59
POLAND	Radom	0.8846	69.078
POLAND	Bydgoszcz	1.24475	97.203
PORTUGAL	Lisbon	1.0008	78.152
PORTUGAL	Porto	2.37355	185.35
SLOVAKIA	Bratislava	1.1857	92.591
SLOVAKIA	Kosice	1.67145	130.52
SPAIN	Madrid	1.14	89.374
SPAIN	Barcelona	1.65	128.47
SWEDEN	Stockholm	1.38825	108.41
SWEDEN	Linkoping	2.0866	162.94
SWITZERLAND	Geneva	2.41	188.32
SWITZERLAND	Zurich	2.66	207.99
USA	Chicago	0.5297	41.364
USA	New York	1.56045	121.86
BANGLADESH	KORAIL	1.282	100.11
	TEJGAON	0.641	50.056
	GODOWN	0.641	50.056

Sources: OECED, 2013; Field Survey, 2014

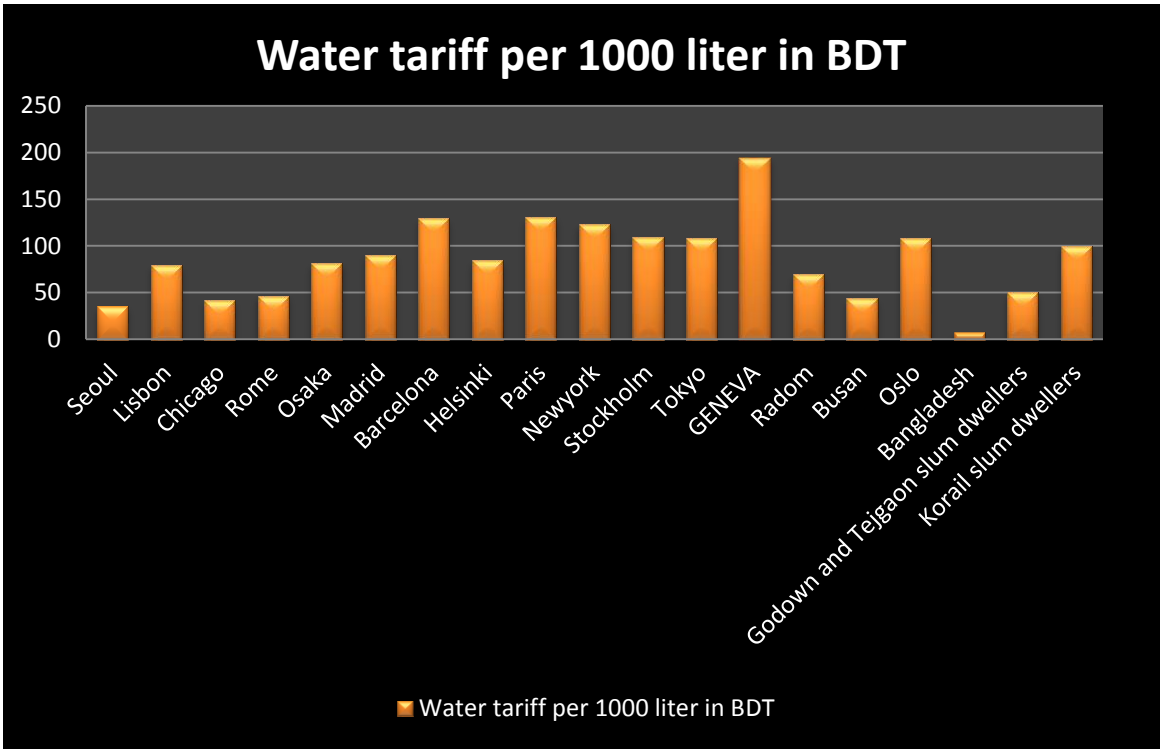

Figure 17: Water tariff comparison in between different countries

Source: OECED, 2013

4.4.2 Income versus expense for water

Table 4.4.2: Total water bill as % of total income in selected countries

Country	Water price (total water cost/water consumption in $/1000 ltr)	Average water bill ($/year)	Average income ($/year)	Total water bill as % of total income
Australia	.957	336.74	54453	0.62
Canada	1.3112	494.68	67081	0.74
Czech Republic	2.1456	341.2	17891	1.91
France	4.2912	511.07	50682	1.01
Italy	1.3857	402.3	44722	.90
Korea	.536	172.84	37944	.46
Mexico	.4619	154.96	10973	1.42
Netherland	2.8757	342.7	45799	0.75
Norway	2.5628	473.82	95075	0.50
Sweden	3.5015	587.06	59693	0.98
Bangladesh	0.093	45.685	957.8	4.7[ii]

Source: Quentin, Kompas, Ho, Ward (2009: 46)

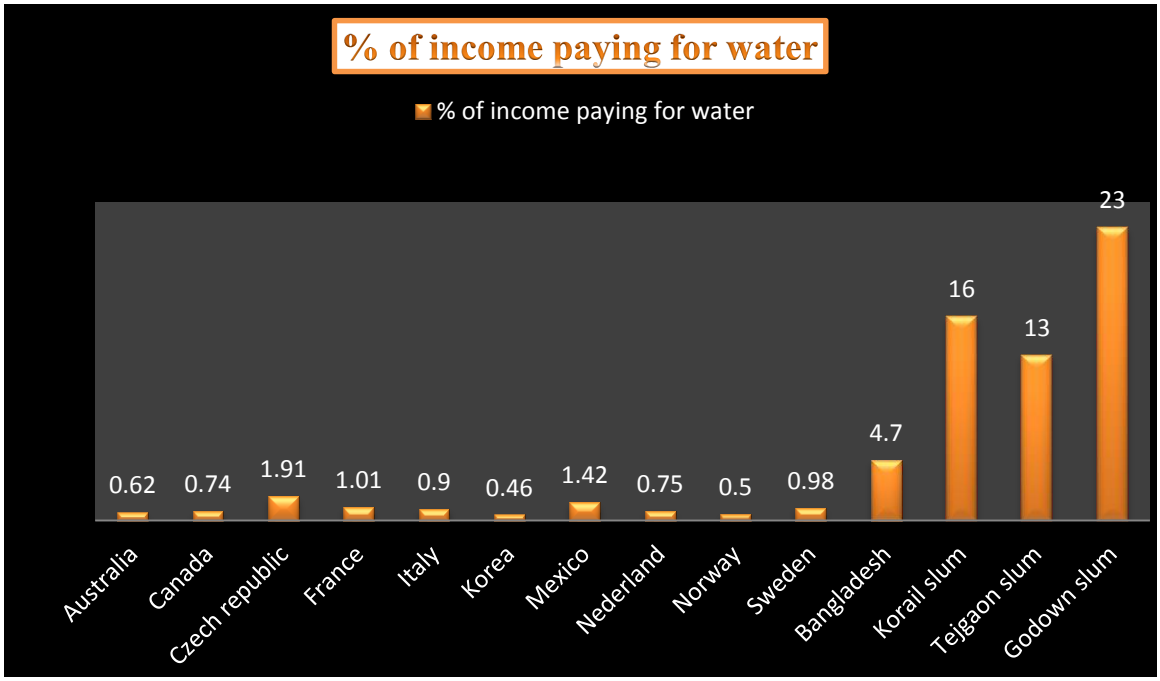

Figure 18: Total water tariff as % of total income

Source: Quentin, Kompas, Ho, Ward (2009: 46)

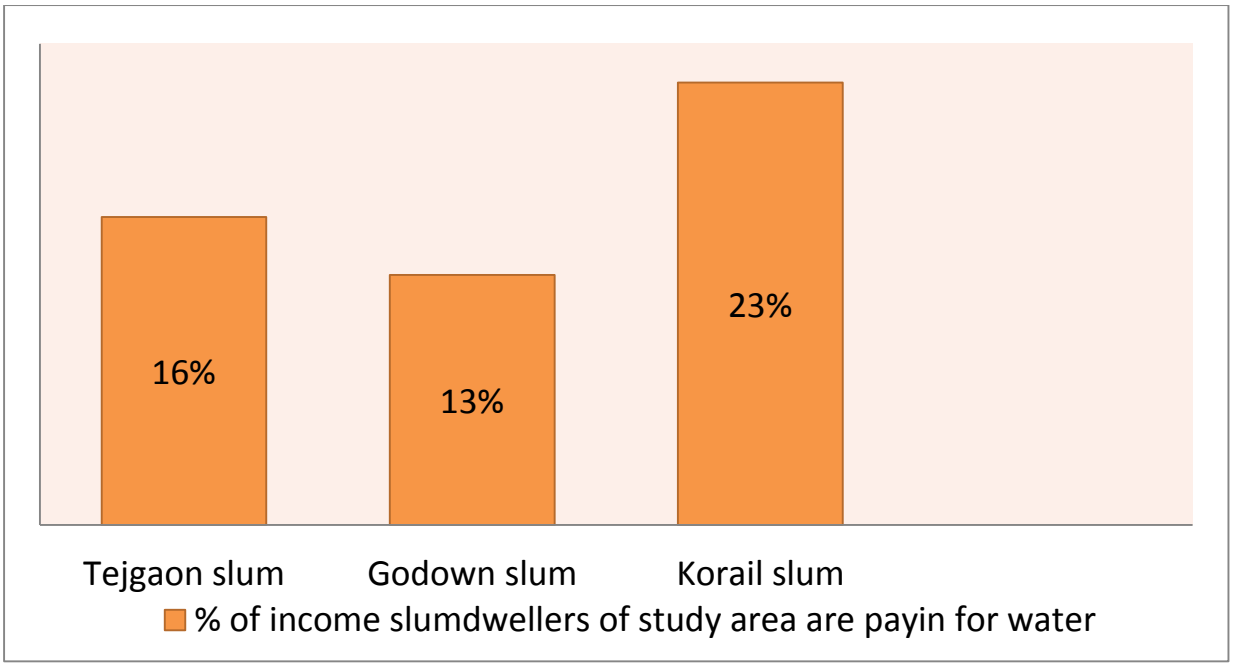

Figure 19: Percentage of income paid for water services in selected slums

Source: Field Survey, 2014

Figures 18 and 19 show that the slum dwellers in the selected slums are paying about 13% to 23% of their total income whereas DWASA's legal connection holders of respective

area are paying only 5% of their income for water. Still the slum dwellers do not get DWASA services. It is also observed that slum dwellers of Dhaka city are paying higher percentage of their income in comparison to that of Dhaka city dwellers and the even dwellers of Canada and Australia.

5. Conclusion:

This paper tries to grasp and analyze the ongoing multi-faceted problems, with main concentration on water pricing and its affordability. This study focused on three slums in Dhaka city namely Korail slum, Godown slum, Tejgaon slum to determine the current water price in selected slums and to compare it with water price of other cities of the world. A field study has been conducted during July and August 2014. It involves semi structured questionnaire survey and focus group discussions with slum dwellers and various stakeholders. For secondary data source, a wide range of books, peer-reviewed articles, researcher documents, related websites and databases have been reviewed.

Result shows that slum dwellers are paying about 7 to 14 times higher than legal connection holders covered by Dhaka Water Supply and Sewerage Authority (DWASA). Slum dwellers are spending about 13% to 23% of their average monthly income for domestic water supply, whereas in most of the countries, legal connection holders are spending less than 5% of their average monthly income for the same purpose (cf. Rahaman & Varis, 2005). It is also observed that laws to prevent environmental pollution are rarely enforced.

The aim of this thesis was to address the following question: "Are slum dwellers in Dhaka Metropolitan Area capable for paying for Dhaka Water Supply and Sewerage Authority (DWASA) services?". Based on the results, this research concludes that the slum dwellers in the Korail, Godown and Tejgaon slums in Dhaka Metropolitan Area are capable to pay for DWASA services.

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[i] All prices are excluding sewerage charge.

[ii] Average monthly water bill 3.807 USD (DWASA, 2015). Average income (USD/year) = 957.8 (world bank, 2014). Total water bill as % of total income=(45.985/957.8)= 4.7%