

# LOCAL BUSINESS DEVELOPMENT SUPPORT FOR INTRODUCING PRIVATIZED EMPTYING SERVICES TO THE CHITTAGONG MARKET



**WSUP**  
Water & Sanitation  
for the Urban Poor

 **LightCastle Partners**  
Inspiring Business | Boosting Economy

*At **LightCastle** – we work to democratize data in Bangladesh and across the world. We aim towards a world where the businesses are connected to the voice of the consumers and work together to build a more affluent community.*

## AT A GLANCE

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The consumer survey includes three broad economic categories of *high income residential*, *low income residential* and *business organizations*. The high income group is further segmented into *large residential* and *small residential*. Geographical distribution of consumer segments as well as their current sanitation status quo including behaviors regarding sludge tank emptying and willingness to pay is given.

The **high income residential** is segmented into 2 consumer profiles of **early adopters** and **late adopters**. **34%** agreed with the proposed **1000taka per m<sup>3</sup>** price for the proposed WSUP service. They are termed as **Early Adopter**. **51%** of early adopters reside in **Ward no. 10, 15, 25, 35, 38**. A map showing the targeted wards is included in the later part of the report (page 12). If price is decreased to **500 taka per m<sup>3</sup>** then an **additional 19%** are interested in the service. They are categorized as **Late Adopter**. The high income segment is again categorized into **Large residential** and **small residential** based on the number of households.

**Large residential** contain more than 10 household units. They contain 30 toilets, and about 70 users per day on an average. About one-third of them were unsatisfied with current sweeper services citing bad smell and environmental pollution as main reasons. Professional safe service and certification by City Corporation are most important for them.

**Small residential** contain less than 10 household units and are most prevalent throughout Chittagong. Almost half of them have 4-10 toilets and about 28 users per day on an average. Affordability, professional safe service and certification by City Corporation are the most important factors for them.

A higher rate for availing annual exhaustion service is seen for the early adopter group compared to the late adopter group (for large residential 9% versus 7% and for small residential 3.27% versus 2.6%) which correlates with the higher interest of the early adopter group to avail the WSUP exhaustion service. The large residential high income group should be targeted first for marketing efforts.

The **low income residential group** of consumers is characterized by monthly income below 25,000 BDT/month, a family of 3-5 people and households having 1-2 toilets. Their toilets are either pit latrines or connected to a septic tank linked to a drain. About one-third of them are found to be unsatisfied with the current service of sweepers. Timeliness and Certification by City Corporation were found to be the most important attributes whereas affordability was found to be the least important factor.

About **31%** of the **low income segment** respondents were found to be unsatisfied with the current service of sweepers. 47% of the respondents had pit latrines and 1 to 2 toilets with a household of 3-5 family members. About **55%** of the respondents had monthly expenditure below BDT 20,000. About 9% of respondents agreed to the proposed **1000tk per m<sup>3</sup>** price and terms as **early adopters** of the service. If price is decreased to **300 taka per m<sup>3</sup>** then additional 39% are interested. They are termed as **late adopters** of the service.

**Business Organizations** vary by different types. They can contain between 150-450 daily users with as low as 30 toilets and as high as 150 toilets. They rated professional safe service and certification by City Corporation as important. They also rated affordability as least important among the groups. They are also divided into the

early adopter and late adopter group based on their willingness to pay for the upcoming WSUP exhaustion service. Business organizations that are interested to pay **1000 taka per m<sup>3</sup>** for the WSUP service are termed as **early adopter** and those interested to pay **500 taka per m<sup>3</sup>** are termed as **late adopter**.

**Sweeper** do variety of jobs from Insect/mosquito spraying, cleaning the drain to emptying septic tanks. The charge for these services vary by type and distance. A typical crew for a distant job can require 8-12 sweepers whereas for an easier job it can be a team of 3-4 sweepers. Average jobs per year can be as high as 60 jobs per year (in Madarbari and Jhautola) or as low as 10 jobs per year (e.g. in Bandar). For a 10 or 12ft septic tank and depending on the distance of throwing the waste, the sweepers charge from 12,000-15,000 BDT to 50,000-60,000 BDT. For pit latrines, cost can range from 150-500 BDT per ring. But, depending on the distance, it can be 500-1000 BDT per ring.

The **roughly calculated market** for sweepers in Chittagong is estimated to be **2,426,585 USD**. The value of the **early adopter group market** is **327,483 USD**. Therefore the early adopter group market is **almost 17.7%** of the total sweeper market. This is the target market for the WSUP Vacutug service.

A combined summary of the different consumer segments are as follows

Economic segment	High Income Residential Group		Low Income Group		Business Organization	
	Early Adopter	Late Adopter	Early Adopter	Late Adopter	Early Adopter	Late Adopter
According to willingness to pay						
Average no. of toilets	18	16	2-3	1-2	24	38
Average users per day	45	38	n/a	n/a	151	168
Average volume of septic tank(Liter) or, average no. of rings in pit latrine	16,710	15,902	9 rings	7 rings	24,829	24,839
Average amount paid last time(BDT)	3,830	3,321	1,150	1,100	10,286	8,450
Yearly frequency of septic tank/pit latrine cleaning	5%	3.92%	10% every 3 months	4.7% every 3 months	6%	5%
Dissatisfaction level with sweepers	24% of total	26% of total	40% of total	24% of total	52% of total	n/a
Willingness to pay	1000tk/m <sup>3</sup>	500tk/m <sup>3</sup>	1000tk/m <sup>3</sup>	300tk/m <sup>3</sup>	1000tk/m <sup>3</sup>	500tk/m <sup>3</sup>
Annual Market	USD 281,028	USD 193,674	USD 29,264	USD 53,379	USD 119,148	USD 25,841
Total Annual Market	474,702		82,643		144,989	

The total annual market for the **combined early adopter** groups 2,426,585 USD. And the **total market** for early and late adapter group for all the segments equals to 702,334 US

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# 1. Introduction

## a. Background of the study

WSUP's (Water and Sanitation for the Urban Poor) project of "introducing privatized emptying services in Chittagong" is a scale-up of their previous project of public-private partnership for septic tank emptying services that began operations in Dhaka almost a year ago. The scale-up in Chittagong is targeting the procurement and implementation of two exhausting trucks via a sustainable business model. The current study is targeted at understanding if the Chittagong market can support an exhausting business, identifying potential business partners to run the business, and vetting the potential business models to identify key factors in reaching financial sustainability.

## b. Objectives

*The first phase of the study includes a market analysis with the following goals*

- Demonstrated understanding of the market for exhaustion services that provides WSUP with enough information to make a "Go/ No Go" decision regarding the implementation of exhaustion services based on demonstrated demand
- A list of contacts of potential early adopters organized into a consumer database

*In line with the objectives, this report provides the following outputs*

- Economic segmentation (low income and high income consumers) and geographical segmentation (by ward number) of the overall market
- Identification of target market and customer profiles
- Customer willingness to pay including market elasticity
- Customer behaviors regarding septic tank emptying
- Current situation and existing services regarding sludge tank emptying
- Snapshot of potential customers (e.g. time when last emptied, size of septic tanks vs. people using toilets per day etc.)

## c. Methodology

Both qualitative and quantitative research tools were used for data collection. Primary data collection included consumer survey of both high and low income households, business organizations and interview of sweepers.

*For the market study, the following consumer assessment methods are used*

Method	Target group	Tool
Survey	High income group (includes residential and business organizations)	High income group survey questionnaire
Survey	Low income group	Low income group survey questionnaire
KII	Sweepers	KII Checklist

After the data collection is completed, analysis like consumer and market analysis, technical analysis using tools like Business Model Canvas (BMC) and financial modelling is done to transform the raw data into meaningful insights. Summary of the type of analysis done is given below

<b>Consumer Analysis</b>	To identify who the target customers (key demographics and consumer profiling), what are the key needs of the customers and consumers are. Data gathered directly from the customers using the questionnaire survey is used to understand the current status quo and the profile of the consumers.
<b>Market Analysis</b>	To understand the Market Fundamentals (key market trends), Size, Prospects (no. of potential customers), future trends, price elasticity as well as the overall industry outlook.

Based on the data and analysis, 6 broad consumer segments are categorized and the findings of the study are presented by these segments. The definition for the terms are presented below

Term	Definition
High Income Consumer(HIC)	Living in apartment building or residential complex higher than 3-storied building
Low Income Consumer(LIC)	People residing in tin-shed homes, small building (lower than 3-storied)
Early Adopter	Willing to pay 1000tk/ m <sup>3</sup> for cleaning service
Late Adopter	Willing to pay 500tk/ m <sup>3</sup> (high income and business) or 300tk/ m <sup>3</sup> (low income) for cleaning service

A summary of the 6 broad consumer segments are given below

Segment	Differentiating Characteristics
HIC Residential Early Adopter	High income; willing to pay 1000tk/m <sup>3</sup> for cleaning service
HIC Residential Late Adopter	High income; willing pay 500tk/ m <sup>3</sup> for cleaning service
LIC Residential Early Adopter	Low income; willing pay 1000tk/m <sup>3</sup> for cleaning service
LIC Residential Late Adopter	Low income; willing pay 300tk/ m <sup>3</sup> for cleaning service
Business Early Adopter	High income; willing pay 1000tk/ m <sup>3</sup> for cleaning service
Business Late Adopter	High income; willing pay 500tk/ m <sup>3</sup> for cleaning service

The findings of the survey are presented sequentially by the consumer segment in the following sections

*Section 2.0 Findings from the High Income Segment*

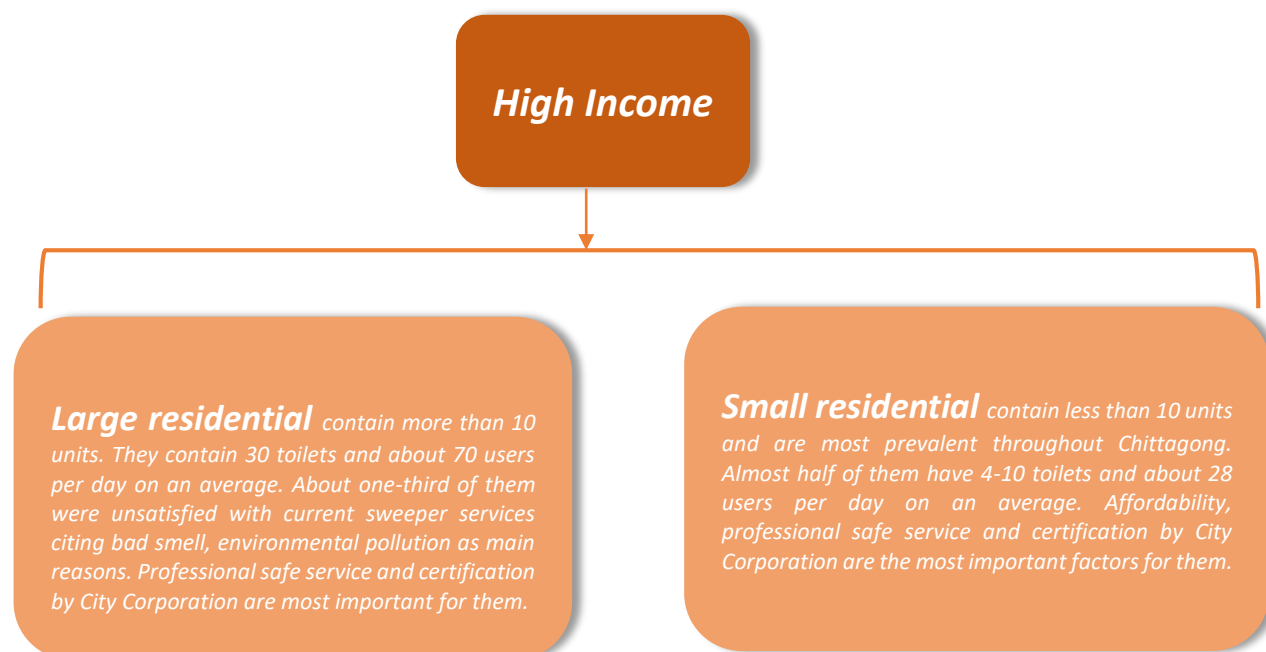
*Section 3.0 Findings from the Low Income Segment*

*Section 4.0 Findings from the Business Segment*

## 2. Findings of High Income Segment

### a. Executive Summary/ Key Take-away from the High income group survey

- Out of the total **1039 high-income segment** surveys, about 34% of respondents are unsatisfied with the current service of septic tank cleaning by sweepers. They could be potential customers.
- Out of the total 1039 surveys, **33% of total** agreed with the **1000tk/m<sup>3</sup> service**. They are the **early adopter** segment for this. If **price is decreased to 500tk/m<sup>3</sup>** about **19%** additional are interested. They are categorized as the **late adopter** group.
- **The late adopter group or respondents saying 'no'** to 1000tk/m<sup>3</sup> recommended 500tk/m<sup>3</sup> or 2000-5000tk flat fee package as being affordable. However, **Sweeper Interviews** from the WSUP Chittagong team show sweepers currently are charging much more than 500tk/m<sup>3</sup>, suggesting that respondents are looking to bargain with their suggested price.
- Where to target? **Highest respondent concentration is in Ward no. 10, 15, 25, 35, 38**. These are wards in the central-west and southwest of the city, near key industrial sites such as the Chittagong Export Processing Zone and Haliashahar Industrial Estate. Priority should be set on **early adopter group** and Ward areas near the dumping site. The potential client database (attached in the annex of the report) can be the target index for early adopters.
- The early adopter group comprises of 71% of small residential and 29% of large residential. Estimated annual market for the **early adopter** group is about **281,000 USD**.
- This Serviceable Obtainable Market (SOM) has 2 parts, **SOM-1** for the **dissatisfied with sweeper service** and **SOM-2** for the **satisfied and indifferent with the sweeper service**. The SOM-2 shows a higher annual market value than the SOM-1. This can be explained because the SOM-2 consists of both the **satisfied** and **indifferent group** which has a higher value than the **dissatisfied group**. (calculation in page 15)
- The high income group is segmented into 2 consumer groups of *Large residential* and *Small residential* as illustrated below



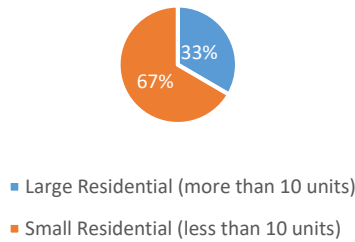


## b. Survey Demographics & Location

Total **1039 high-income residential surveys** were taken. These residential households are divided into 2 types- Large and small based on the number of units.

- Large residential – containing more than 10 units
- Small residential- containing less than 10 units

### High Income Residential Survey Distribution



### Ward-wise survey distribution

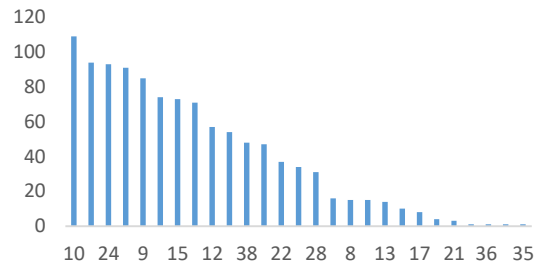


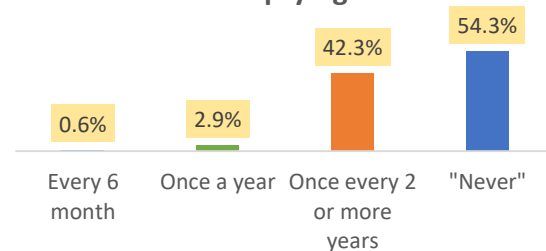
Figure: High income residential survey distribution by type and ward number

The owner, manager or caretaker were interviewed while conducting the survey. Usually large residential have management committee responsible for taking care of the exhaustion service for the whole building. Survey showed that large residential have management committee between 3-5 members. Therefore no occupational data was taken.

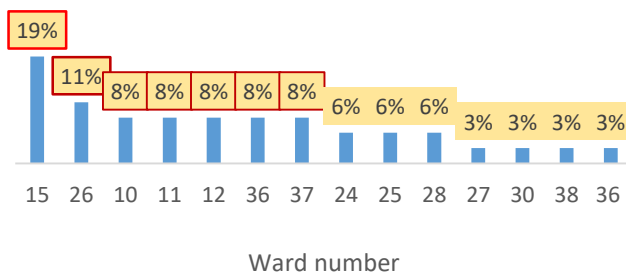
## c. Current Emptying Status Quo – High Income Residential

According to the survey, **95% respondents hired sweepers** for cleaning the septic tank. Sweepers were predominantly **hired locally** (90%) and a minor segment hired through the City Corporation (2%). The frequency of septic tank emptying was found to be low. About **3%** said they clean the septic tank **once a year** and **53%** said they **'never' cleaned the septic tank**. About **75% of the respondents** in the survey said, the last time they cleaned the septic tank was **more than one year ago**.

### Frequency of sludge tank emptying



### Wards with highest amount of annual septic tank emptying



Among the wards, ward number 15, 26 showed highest frequency of septic tank emptying and ward 10, 11, 12, 36 and 37 showed moderate frequency for availing annual septic tank emptying services.

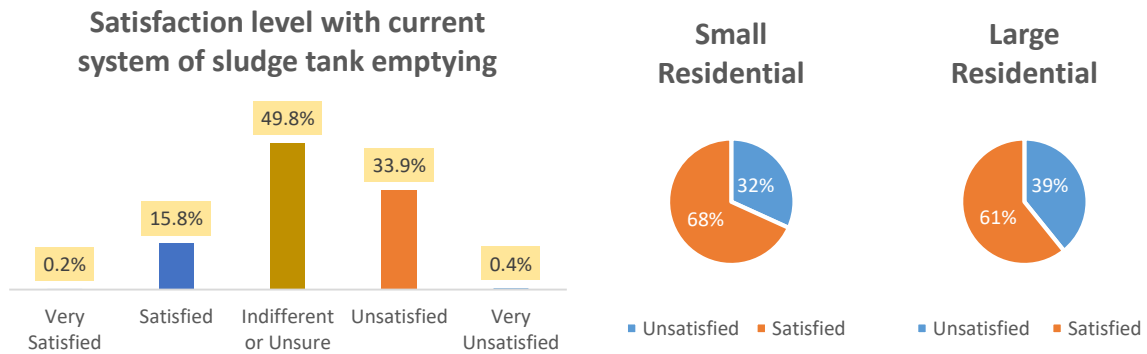
Out of the 1039 surveys, about **34% were unsatisfied** with the current process of sludge tank cleaning through sweepers. They pointed out **bad smell, environment pollution, noisy process** etc. as the reasons for their low levels of satisfaction. Another aspect of dissatisfaction of the consumers was the lack of all-time

availability of sweepers and their messy method of operation. Consumers interviewed said that sweepers take

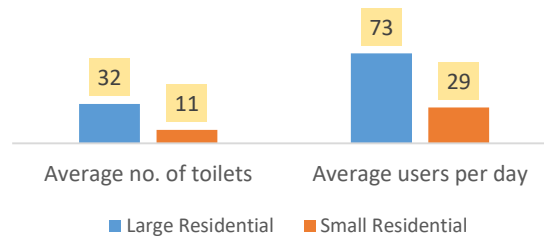
much time and the manual cleaning process is also not environment friendly. Since sweepers dump the waste into the nearby drains, sometimes the waste gets spilled during carrying and making a bad odorous smell.

Between large and small residential, the **level of satisfaction** is found to be a little **lower** in **small residential** group.

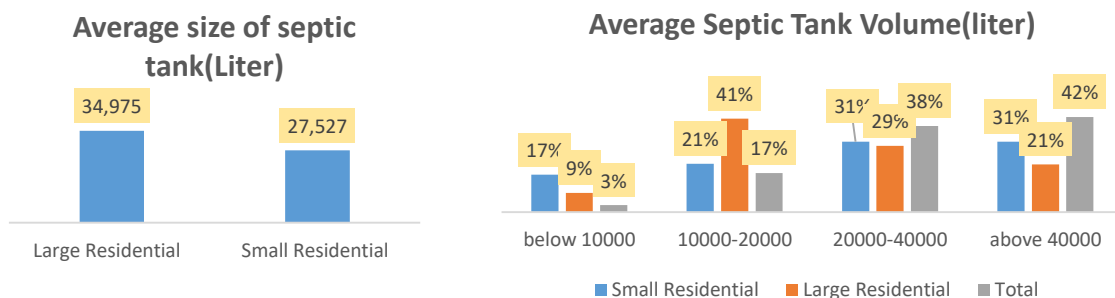
49.8% of respondents were indifferent or unsure with the level of satisfaction. This can be explained by the fact that there is no standard benchmark for this service among the consumers, making them unsure about their expectations. Also, exhaustion services are infrequent and there is not enough regular usage to come to a satisfaction level.



### Consumer Insight- High Income Residential

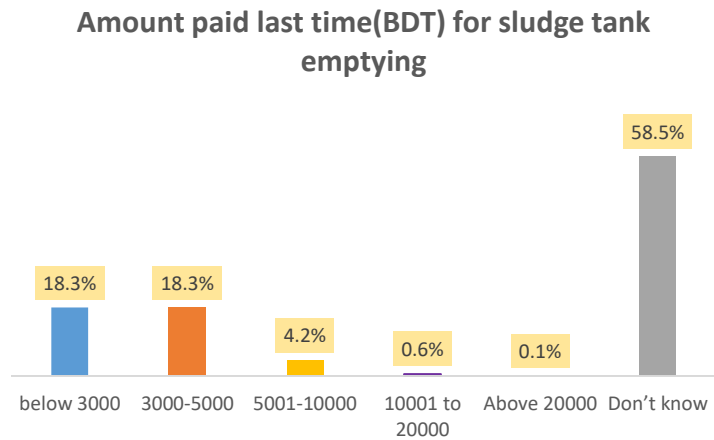


- **Large Residential** have on an average 32 toilets and 73 users per day, with average septic tank volume of about 35,000 Litre (1235 cubic feet).
- **Small Residential** (contain less than 10 units) have on an average 11 toilets with 29 users per day and average septic tank volume of about 27,500 Litre (970 cubic feet).



The volume of the septic tank for a residential varies with the amount of residents as well as the size of the building. In general, 38% of the septic tanks have volume between 20,000 to 40,000 litres and another 42% are above 40,000 litres in volume.

58.5% respondents could not recall the amount paid last time to sweepers. This can be explained by the fact that exhaustion service is an irregular activity occurring once every 1-2 years. The amount given by the respondents contradicts with the amount expressed by sweepers in the KII interview (discussed in *section 5.0 Findings from Sweepers*).



### Service Attributes from Consumer Survey



- According to the survey, the most important service attribute for large residential is **Professional safe service** and **certification by city corporation**. The least important attribute is found to be affordable cost. This can be explained by the fact that large residential consists of more than 10 residential units and collective high income households are less sensitive to price if a professional service is offered.
- The most important service attribute for small residential is found to be **Professional safe service, affordability and certification by city corporation**. Comparing between large residential, it is seen that small residential are more price sensitive.

## d. The Early Adopter Story

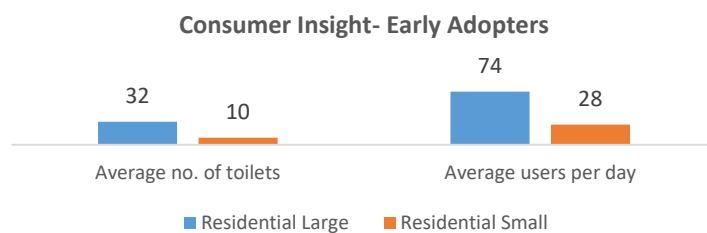
The overall pool of survey respondents are further segmented into two broad categories of **early adopters** and **late adopters** for better targeting. Between both the dissatisfied and satisfied with current sweeper service groups, respondents that agreed with the 1000tk/m<sup>3</sup> service are termed as “**early adopters**”.

Criteria	Answer	Segmented Group
Question 19. How much would you be interested if the service costs 1,000tk/ m3 of sludge?	Very affordable	Early Adopters (33% of total)
	Affordable	
	Acceptable	
	Expensive	Customers agreeing to 500tk/m <sup>3</sup> in this group are the ‘Late Adopter’ (19% of total)
	Very Expensive	

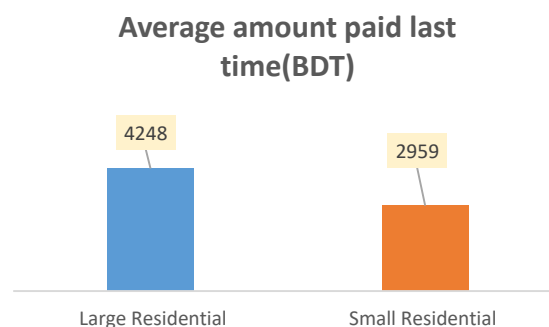
### High Income Group Consumer insights for Early Adopters

The early adopter group comprises of **71% of small residential** and **29% of large residential**. Early adopter large residential are more frequent in annual sludge tank emptying than small residential (8% versus 3%). This means large residential are more frequent in availing sludge tank emptying services yearly than the small residential.

The higher sludge tank emptying rate per year for large residential compared to small residential can logically be explained by the average number of toilets and average daily users. Both the numbers for large residential are more than double for large residential compared to small residential. This explains the need for the large residential to be much higher than that for small residential.



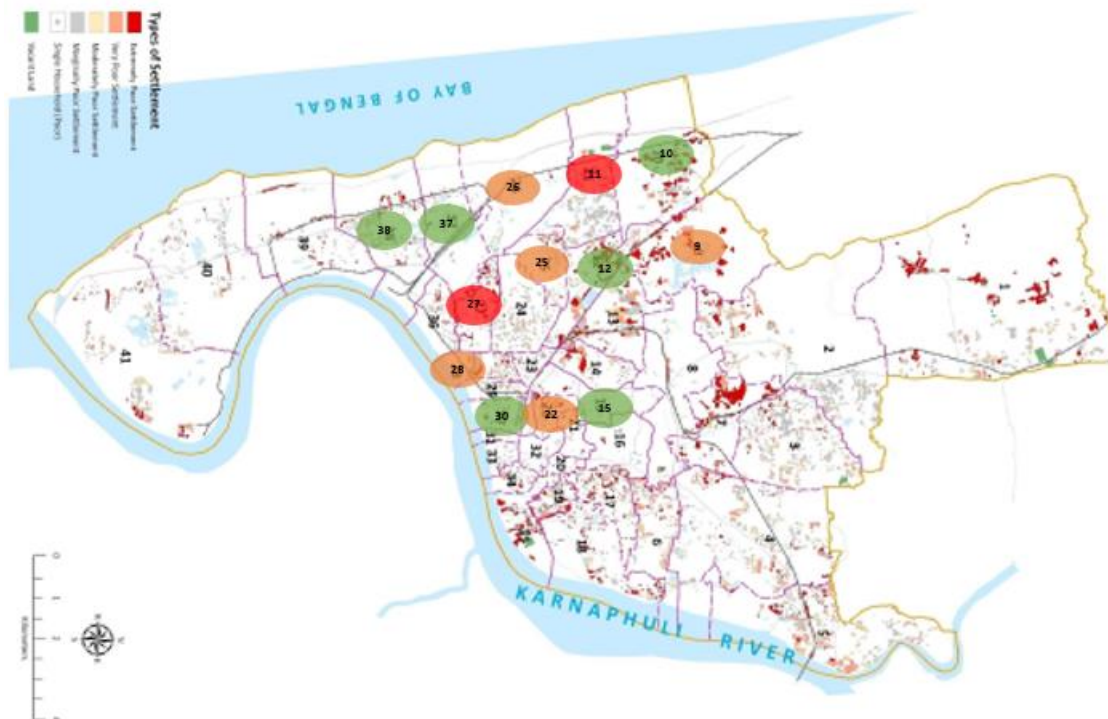
The average amount paid is BDT 4248 for large residential and BDT 2959 for small residential. Interestingly, this amount was found to be higher from the sweeper interviews. This is discussed in more detail in *section 5 findings from sweepers*.



**MAP-1: For Early Adopter (willing to pay BDT 1000/m<sup>3</sup>)**

The selected wards had at least 30 samples in them. The percentage of respondents are color coded as below.

- A At least 40% and above
- B Between 20 to 39%
- C Less than 20%

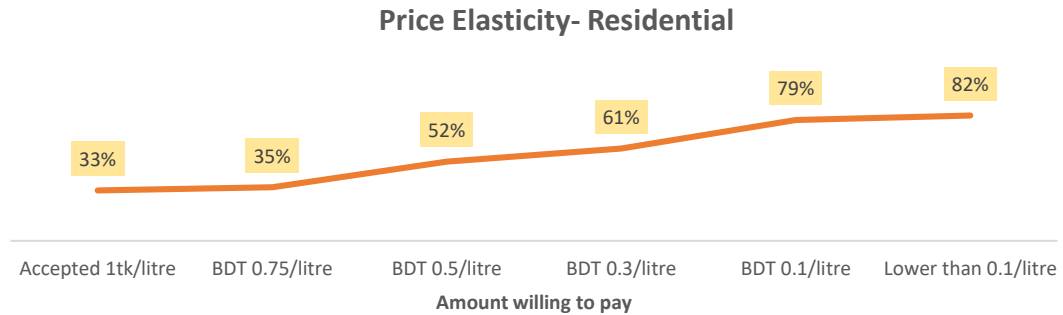


**Figure: Geographical segmentation and targeting for high income group consumers by ward location**

Category	Color	Ward no.
A		10; 12; 15; 30; 32; 38
B		9; 22; 28; 25 ;26
C		11; 27

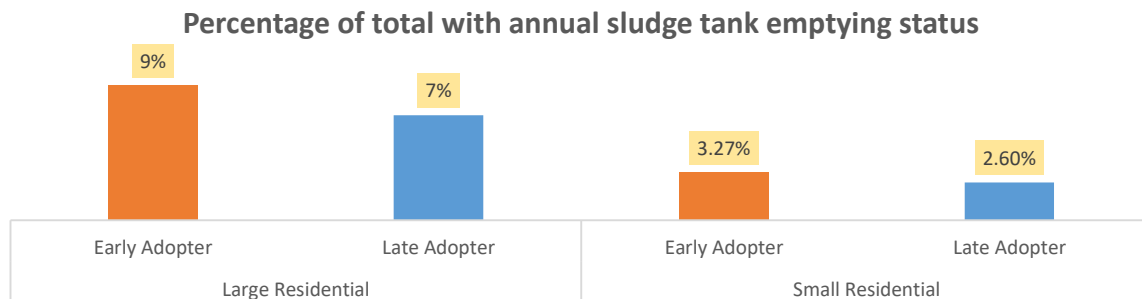
## e. The Late Adopter Story

Data shows that 52% of residential customers were interested in the service if the price is 0.5 taka per litre (500 taka per m<sup>3</sup>). This additional 19% of respondents are categorized as the “Late Adopter”.



### High Income Group Consumer insights for *Late Adopters*

The early adopter and late adopter group are almost similar in demographic factors. One differentiating factor between them is the yearly sludge tank emptying rate for the early adopter group. A higher rate is seen for the early adopter group compared to the late adopter group (for large residential 9% versus 7% and for small residential 3.27% versus 2.6%) which correlates with the higher interest of the early adopter group to avail the WSUP exhaustion service. Other factors such as the level of satisfaction with current emptying service by sweepers, the amount paid last time, the number of average toilets etc. are similar between both the early adopter and late adopter group.



**MAP 2: for Late Adopter group (willing to pay BDT 500/m<sup>3</sup>)**

The selected wards had at least 30 samples in them. The percentage of respondents are color coded as below.

- A At least 60% and above
- B Between 40 to 59%
- C Less than 40%



**Figure: Geographical segmentation and targeting for high income group consumers by ward location**

Category	Color	Ward no.
A		15; 38; 12; 37
B		30; 25; 9; 10; 36; 11; 26
C		24

## f. Total Addressable Market

Total Addressable Market for High Income Segment in Chittagong were calculated as follows

Assumption List for calculation

- A top-down approach is used to calculate the Total Addressable market for high income segment in Chittagong city.
- Data from the 2011 Census is extrapolated at 2% annual growth rate to estimate the total households at 885,345
- 15% of total households in Chittagong is assumed to be of high income segment.
- According to the survey done, about 34% of respondents in the survey were interested in the service.

Factor	Parameter	Percentage (%)	No. of Household
TAM (Total Addressable Market)	High income household	15% of total household <sup>1</sup>	132,802
	No. of septic tanks	98.6% of High income household <sup>2</sup>	130,943
SAM (Served Available Market)	Septic tanks with non-drain connection	45% of High income household <sup>2</sup>	58,924
SOM-1 (Serviceable Obtainable Market)	People unsatisfied with sweepers	34% of respondents <sup>2</sup>	20,034
SOM-2 (Serviceable Obtainable Market)	People satisfied or indifferent with sweepers	64% of respondents <sup>2</sup>	37,711

1. LightCastle Partner Data

2. Chittagong WSUP Survey 2016

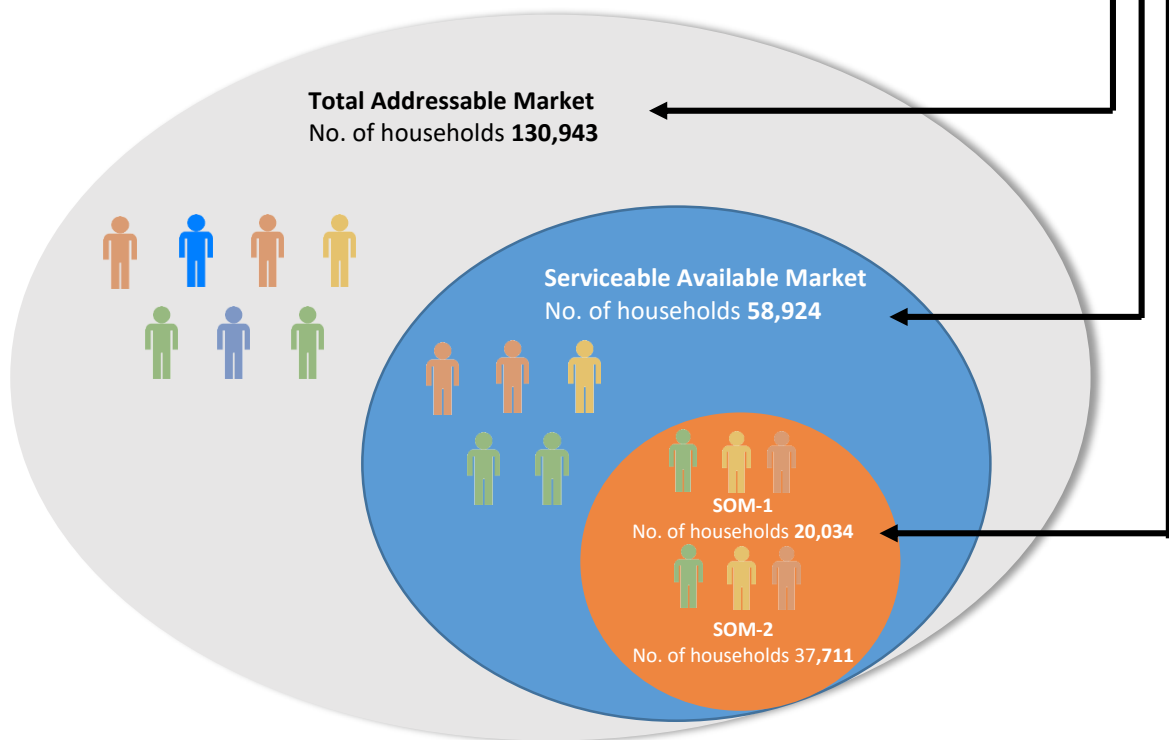


Figure: Total Addressable Market for High Income Consumers

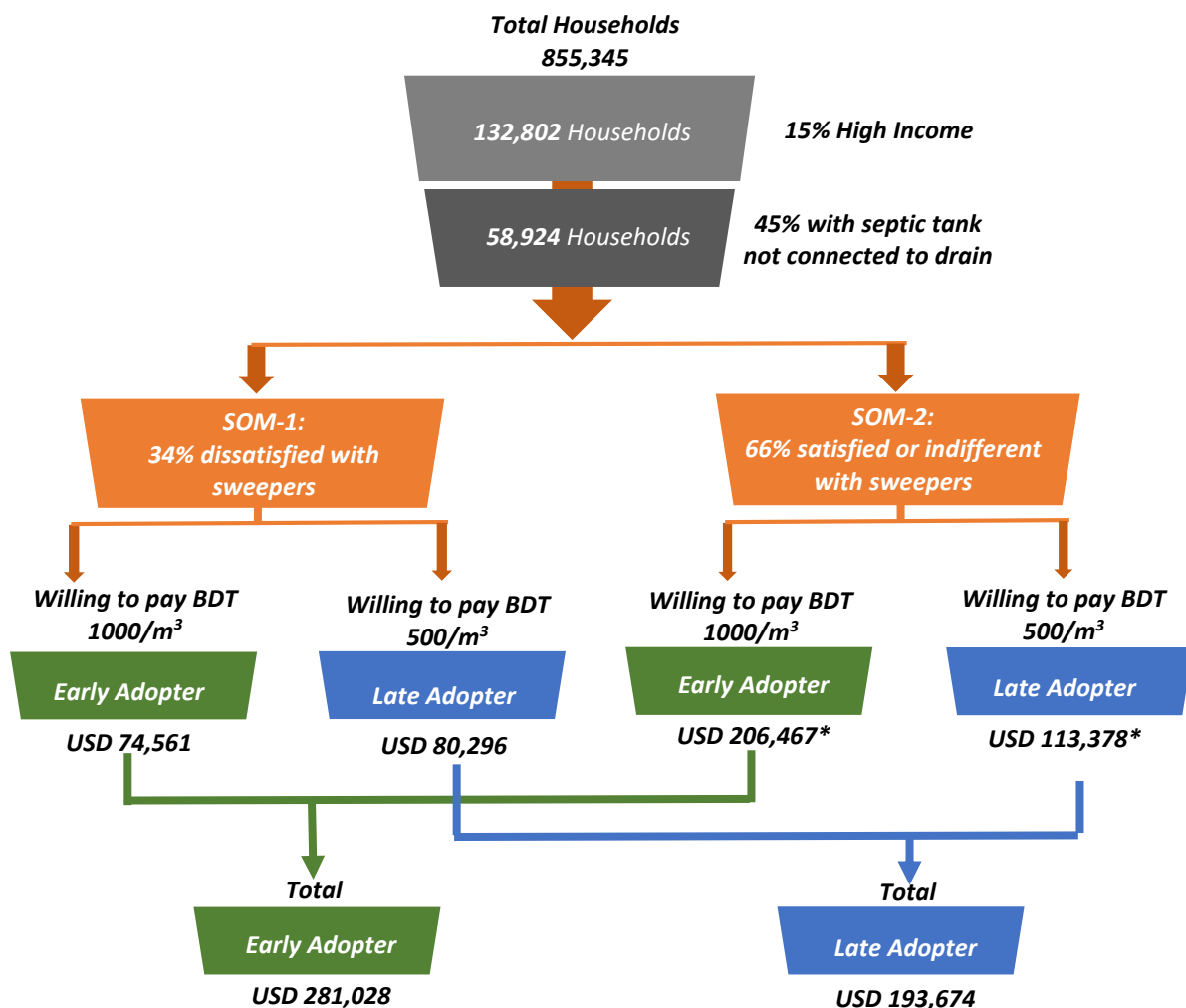


### Calculation for target market

Market size is determined by multiplying the size of the target market with the average volume of septic tank (in liter) and estimated percentage of annual users of exhaustion service found in the WSUP Chittagong survey 2016.

Factor	Parameter/Unit	Amount		
		SOM-1 (Dissatisfied group)	SOM-2 (Satisfied or indifferent group)	Total
Serviceable Obtainable Market (SOM)	Household	20,034	37,711	57,745
Average volume of septic tank(Liter) <sup>1</sup>	Liter	38,950	38,950	-
Estimated Annual market <sup>2</sup>	Percentage	5.88%	3.25%	-
Estimated market for Early Adopter Segment	% of target population	13%	35%	-
	BDT	5,964,863	16,517,348	22,482,211
	USD <sup>3</sup>	74,561	206,467	281,028
Estimated market for Late Adopter Segment	% of target population	14%	19%	-
	BDT	6,423,699	9,070,220	15,493,919
	USD <sup>3</sup>	80,296	113,378	193,674

1. Data from the WSUP Chittagong survey-2016 is used to calculate a weighted average volume for the septic tanks
2. Percentage emptying once a year is taken from the WSUP Chittagong Survey-2016
3. 1 USD = 80 BDT



\*the value for SOM-2 is higher than SOM-1 because, SOM-2 includes both the satisfied and indifferent with sweeper segments (66% of total respondents) and SOM-1 is only of the dissatisfied segment (34% of total respondents) which has a lower number.

### Willingness to Pay – High Income

### 3. Findings of Low Income Segment

#### a. Executive Summary/ Key Take-away from the Low Income Group survey

- Out of the total **115 low-income segment** surveys, **about 31%** of respondents were found to be **unsatisfied** with the current service of sweepers.
- 62% respondents had monthly income below 25000 BDT with 70% having monthly expenditure below 25,000 BDT. There is **income surplus** in the BDT 20,000-25,000 segment. This can be the potential segment for targeting.
- 47% of the respondents had pit latrines and almost 100% hired local sweepers for cleaning their pit latrines or septic tanks. 15.6% of the households had tenants.
- About **9%** were interested at proposed price of 1000tk/m<sup>3</sup>. They are termed as 'early adopter' group. If price is 300tk/m<sup>3</sup> then additional **39%** are interested. They are termed as 'late adopter' group.
- The market for the **low income early adopters** is **USD 29,264** (calculation shown in page 22).
- Highest amount of low income group early adopters are found to be house-owners(40%) having income between 15,000 to 25,000 BDT per month. 50% had pit latrines and the rest 50% had septic tanks. **Environment pollution (33%), air pollution (22%) and bad smell (11%)** are found as the main causes of their dissatisfaction with the sweeper service.

#### Consumer Profile: Low Income Segment

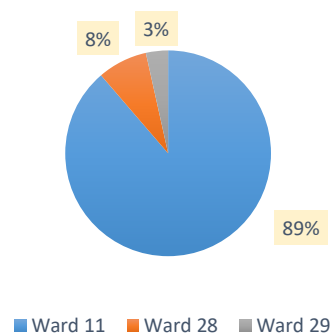
*The low income group of consumers is characterized by monthly income below 25,000 BDT/month, a family of 3-5 people and households having 1-2 toilets. Their toilets are either pit latrines or connected to a septic tank linked to a drain. About one-third of them are found to be unsatisfied with the current service of sweepers. Timeliness and Certification by City Corporation were found to be the most important attributes whereas affordability was found to be the least important.*

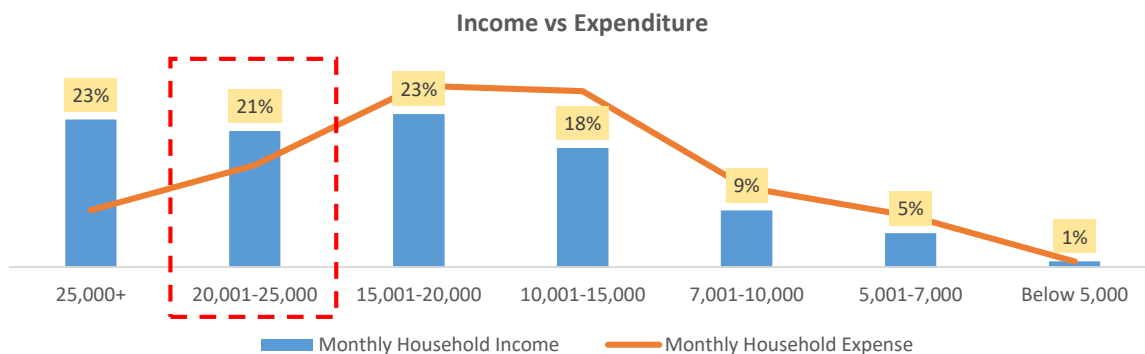
#### b. Survey Demographics & Location

Total 125 survey of low income consumer group were taken by the WSUP team at Chittagong. Most of the surveys were from Ward 11. Areas where most respondents resided were Sagorika, Nalpara, Jelepara etc. in Ward 11. The percentage of male-female ratio is almost 2:1. About three-fourth of them had received education up to higher secondary level.

All the respondents are home-owners or family member of the home-owner since the surveys were directed towards the main decision-maker of the household. 15.6% of the households had tenants. Average number of tenants using the same toilet is 14 people.

#### Survey Distribution





62% respondents had monthly income below 25000 BDT with 70% having monthly expenditure below 25,000 BDT. Comparing between the monthly income and expenditure data shows that there is **income surplus** in the BDT 20,000-25,000 segment. This can be the potential target segment.

### c. Current Emptying Status Quo-Low Income Segment

Most respondents had one (44%) or, two (25%) toilets in their home. 47% toilets were connected to a pit latrine and 51% toilets were connected to a septic tank. All the respondents were landlords since the data collectors were instructed to find the main decision maker of the household. **15.6%** of the households had tenants. Average number of tenants using the same toilet is 14 people. The amount of septic tank or pit latrine sludge emptying was very low (57% didn't clean their sludge in the past 2 years). The average volume of septic tank is 495 Cubic feet. The average no. of rings in pit latrine are almost 9 with most latrines having between 8-12 rings. If average dimension for 1 ring in pit latrine is 7.06 cubic feet, then the **average volume of sludge in pit latrines** would be almost **1800 Liters** for 9 rings.

**About 31%** of respondents were unhappy with the current method of sludge tank emptying or pit latrine clean-up through sweepers. They could be the potential clients. Most respondents pointed to **environment pollution (33%)**, **air pollution (22%)** and **bad smell (11%)** as the main causes of their dissatisfaction as clients.

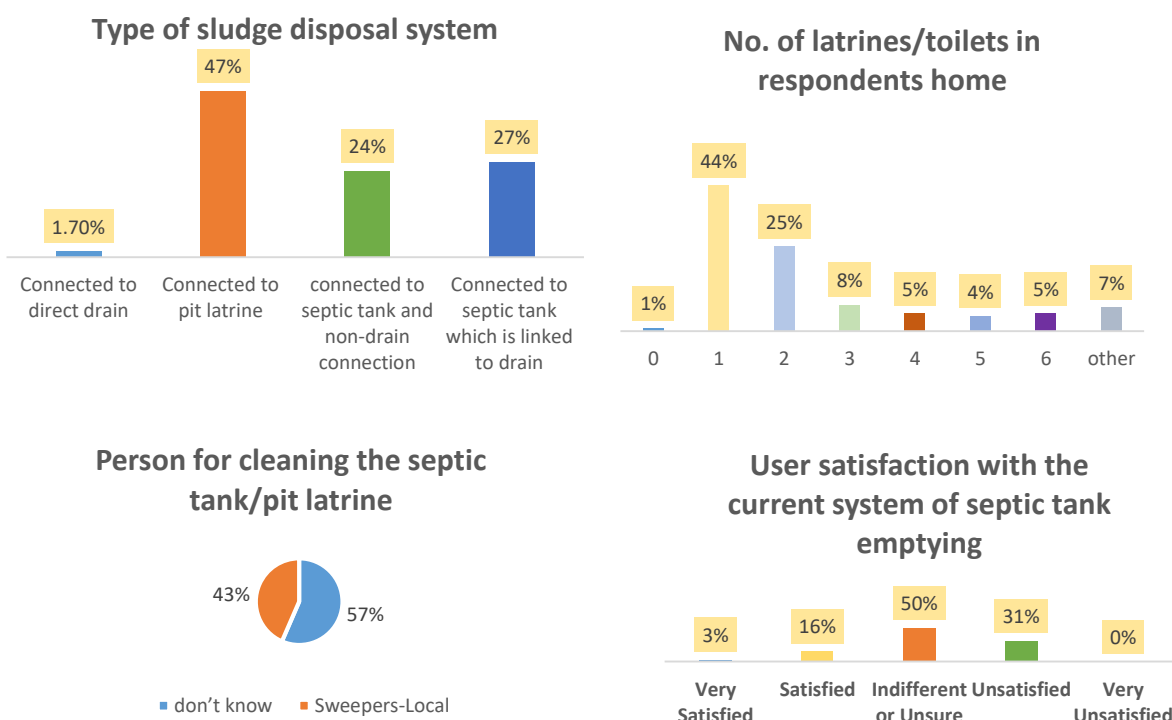
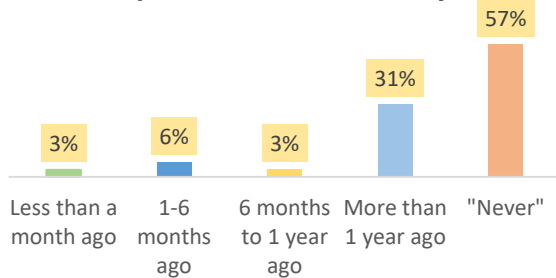


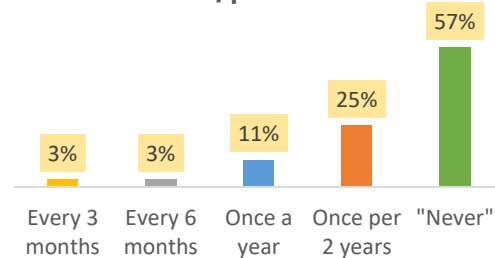
Figure: Snap view of sanitation status Quo

From the survey data, it was seen that **10% respondents** had emptied their septic tank/ pit latrine in the past one year and 17% of respondents clean their septic tank annually. 57% said they 'never' cleaned their septic tanks. The 'never' group can be explained by the fact that the care-taker or respondent simply forgot when the septic tank was emptied last time since this is an infrequent service.

**Frequency of cleaning septic tank/pit latrine in the last 2 years**

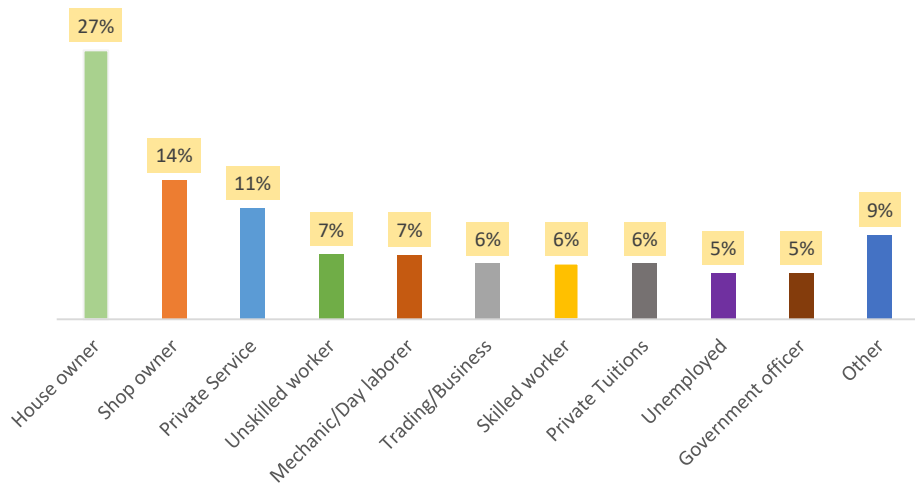


**Frequency of emptying septic tank/pit latrine**



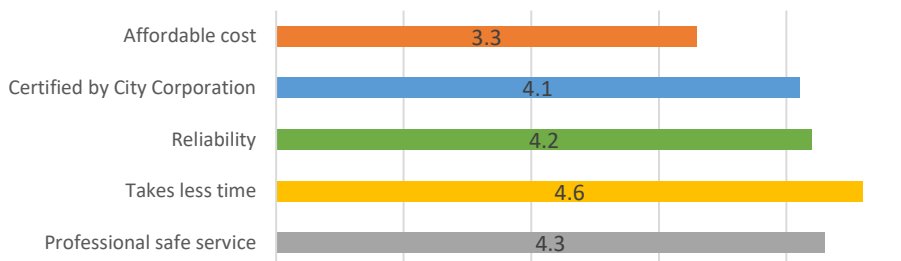
**Major Occupations of Respondents**

In terms of source of income, highest number of respondents are found to be house-owners (27%), shop-owners (14%) and private sector job holders (11%). The type of occupation ranged from private sector jobs to small traders to public jobs.



Survey data shows that **taking less time** and **professional safe service** are the **most desired attributes** for the low income consumer segment whereas affordable cost was found to have scored lowest among the attributes.

**Service Attributes**



## d. The Early Adopter Story

Just like the high-income consumer segment, the overall pool of low income segment was also further segmented into two broad categories of **early adopter** and **late adopter** for better targeting.

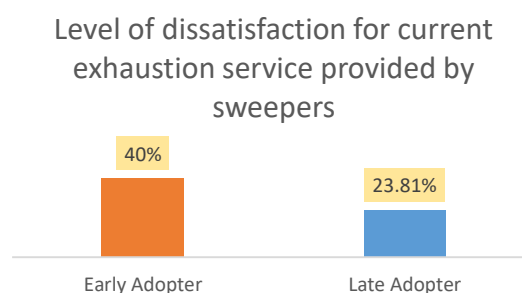
Criteria	Answer	Segmented Group
Question 19. How much would you be interested if the service costs 1,000tk/ m <sup>3</sup> of sludge?	Very affordable	Early Adopters
	Affordable	
	Acceptable	
	Expensive	Customers agreeing to 500tk/m <sup>3</sup> in this group are the 'Late Adopter'
	Too expensive	

### Low Income Group Consumer insights for Early Adopters

Highest amount of low income group early adopters were found to be house-owners(40%) having income between 15,000 to 25,000 BDT per month. 50% had pit latrines and the rest 50% had septic tanks.

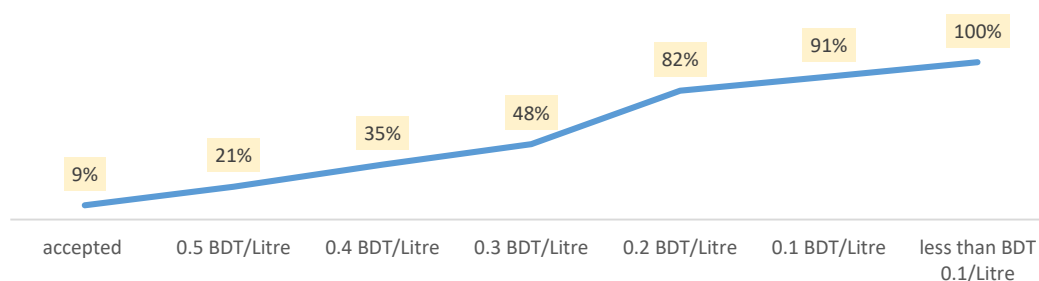
The current sanitation status quo between the early and late adopter group is almost similar. Average amount paid last time to sweeper for exhaustion service by the early adopter group is BDT 1150. The amount paid for cleaning a pit latrine varied with respondents with some paying BDT 1200-1500 for 8 ring pit-latrines and some paying BDT 800 for 12 ring pit-latrines.

One differentiating factor between the early adopter and late adopter group is the level of dissatisfaction with the current service rendered by sweepers. 40% of early adopters were found to be dissatisfied with service provided by sweepers compared to about 24% of late adopters who were dissatisfied. This is one of the underlying factors for the early adopter group showing more interest to avail the WSUP exhaustion service. Providing a professional service can make this group as long term customers.



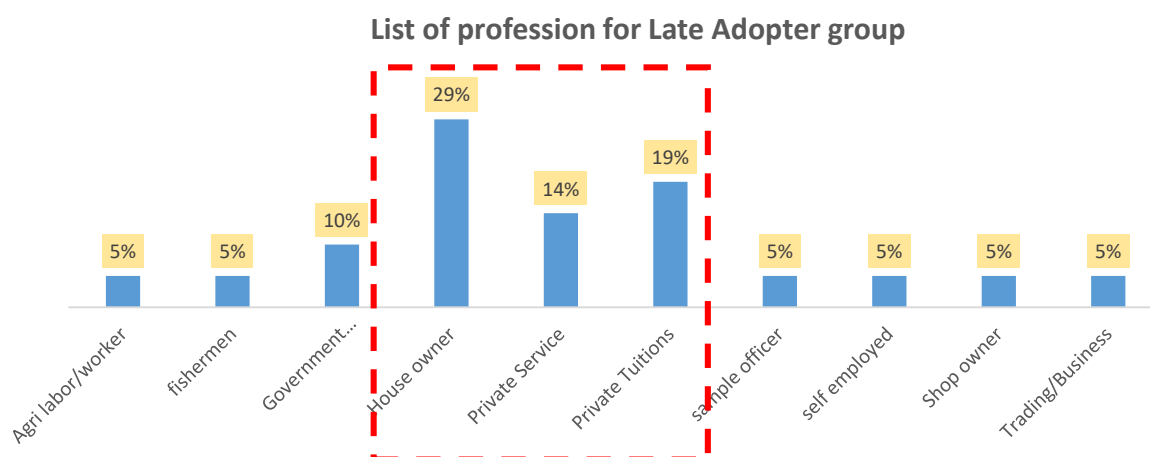
## e. The Late Adopter Story

### Price Elasticity for Low income Segment



Decreasing the price to 0.3 BDT per liter would make 48% of the respondents interested in the service and decreasing price to 0.2 BDT/ liter would make 82% of the respondents interested in the service. The 48% of respondents who agree to the 0.3BDT per liter or 300tk per m<sup>3</sup> price are termed as **"Late Adopter"** group.

### Low Income Group Consumer insights for Late Adopters



Most of the late adopters are houseowners(29%), private tutors(19%) and private sector job-holders (14%). About 60% of them have between 4-6 family members and 24% having tenants living with them.

23.81% of late adopters are dissatisfied with the current service provided by sweepers. This amount is much lower compared to the level of dissatisfaction in early adopter group. This can explain the lower willingness of the late adopter group compared to the early adopter group.

In terms of sanitation status quo, the late adopter group is similar to the early adopter group. 52% had pit latrines and the rest had toilets connected to spetic tanks. 50% of the pit latrines had 7 to 8 rings. Average amount paid last time to sweepers was found to be BDT 1100, a little lower than the average amount paid by the early adopter group.

## f. Total Addressable Market

### Assumption List for calculation

- A top-down approach is used to calculate the TAM (Total Addressable market) in Chittagong city.
- Data from the 2011 Census is extrapolated at 2% annual growth rate to estimate the total households.
- 48% of total households in Chittagong is assumed to be low income, according to UNDP funded "Chittagong Atlas", a report done in 2011 which estimated the number of low income households in Chittagong.
- According to the survey done, about 47% of respondents had pit latrines and 24% had septic tanks with non-drain connection. This combined 71% percentage is used as the indicator in all low income households to narrow down the potential SAM (service available market).
- About 9% of respondents in the survey were interested and this is used as the benchmark for determining the total interested respondents.

Factor	Parameter	Percentage (%)	No. of Household
TAM (Total Addressable Market)	Low income household	54% of total household <sup>1</sup>	3,35,365
	Low income Land Owner	48% of total low income household <sup>1</sup>	160,975
SAM (Served Available Market)	Landowners with pit latrines and non-drain septic tanks	71% of all landowner <sup>2</sup>	114,292
SOM-1 (Serviceable Obtainable Market)	Dissatisfied landowners with pit latrine and non-drain septic tanks	31% of respondents <sup>2</sup>	35,431
SOM-2 (Serviceable Obtainable Market)	Satisfied/indifferent landowners with pit latrine and non-drain septic tanks	69% of respondents	78,862

1. Data from the WSUP Chittagong survey-2016 is used to calculate a weighted average volume for the septic tanks

2. Percentage emptying once a year is taken from the WSUP Chittagong Survey-2016

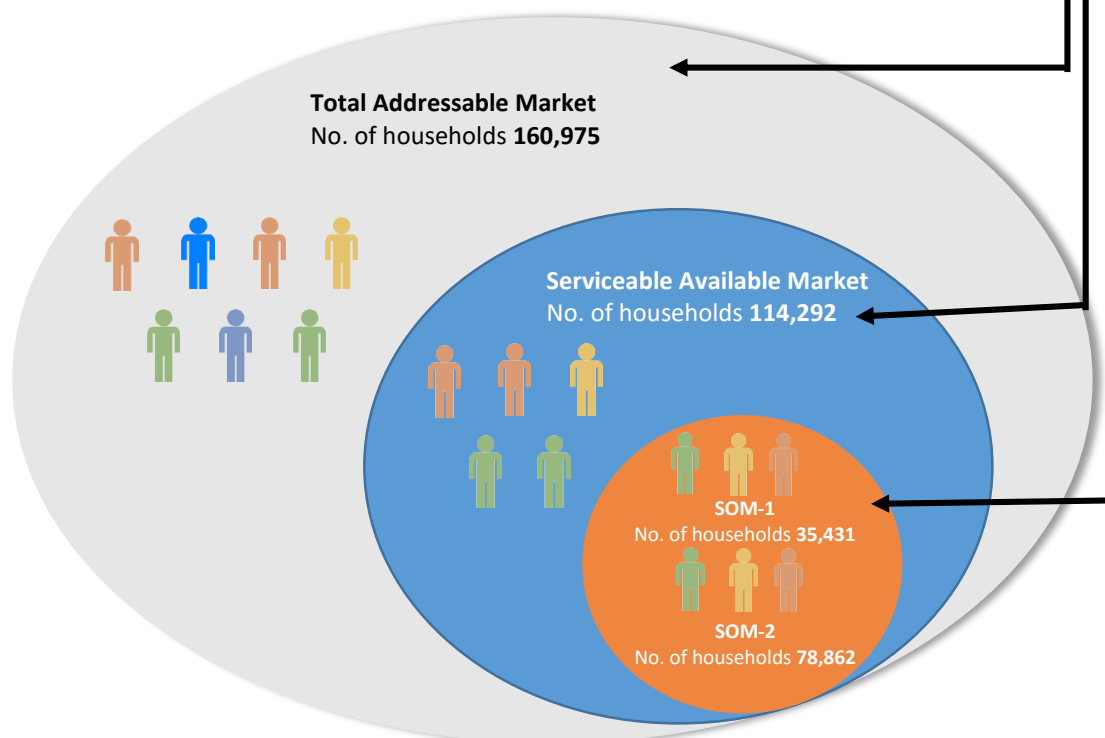


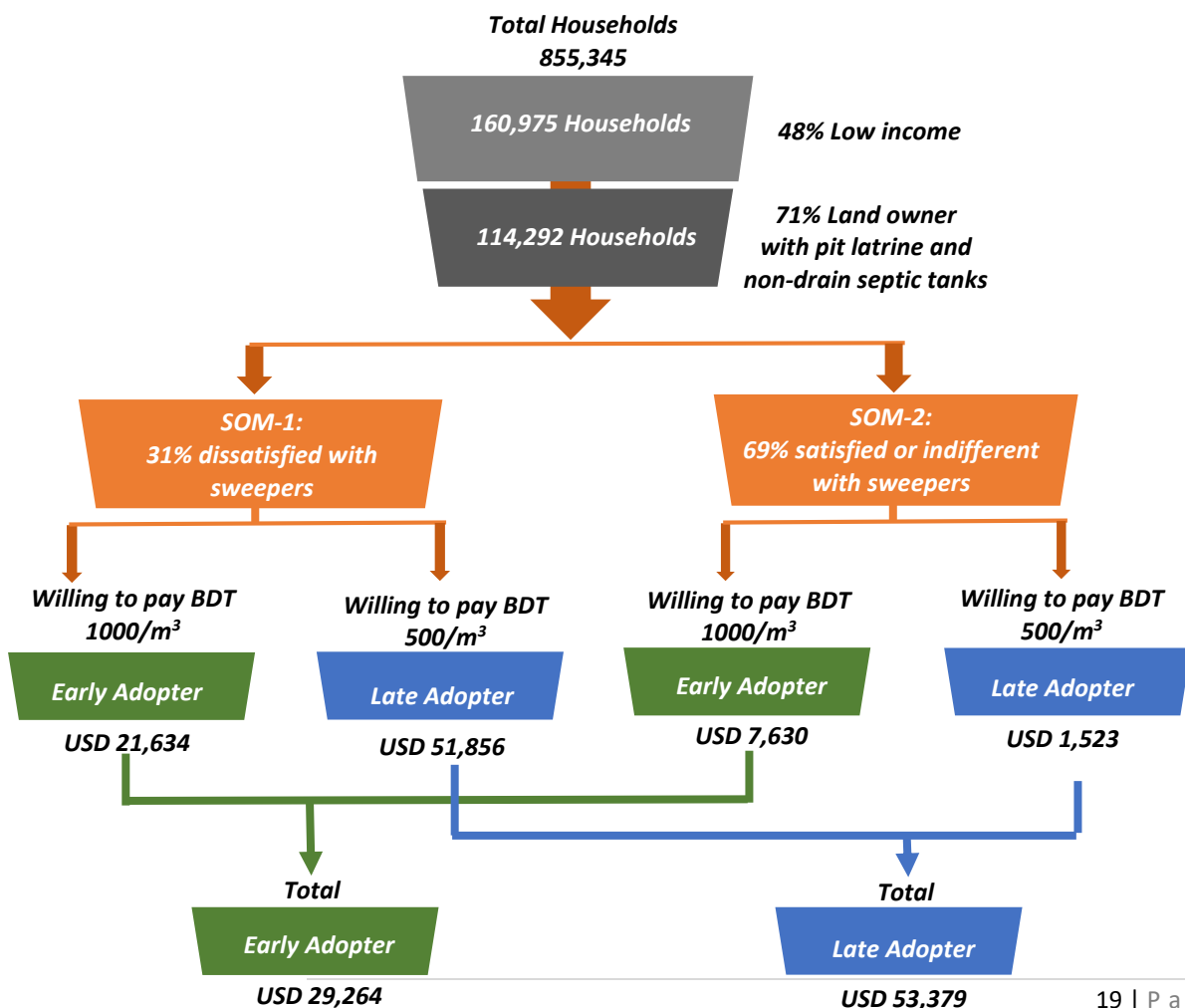
Figure: Total Addressable Market for Low Income Consumers

### Calculation for target market

The amount of pit latrine and septic tanks are divided proportionally for the SOM into 13:12 ratio as per the WSUP Chittagong Survey-2016.

Factor	Parameter/ Unit	Amount				Total
		SOM-1 (Dissatisfied group)		SOM-2 (Satisfied or indifferent group)		
		Pit Latrine	Septic tank	Pit Latrine	Septic Tank	
Serviceable Obtainable Market (SOM)	Household	18,499	16,932	41,176	37,686	114,292
Average volume of septic tank(Liter) <sup>1</sup>	Liter	1800	14000	1800	14000	
Estimated Annual market <sup>2</sup>	Percentage	16.5%		1.74%		
Estimated market for Early Adopter Segment	% of target population	3.88%		5.83%		
	BDT	213,175	1,517,581	75,186	535,212	2,341,154
	USD <sup>3</sup>	2,665	18,970	940	6,690	29,264
Estimated market for Late Adopter Segment	% of target population	31%		3.88%		
	BDT	510,961	3,637,502	15,011	106,859	4,270,333
	USD <sup>3</sup>	6,387	45,469	188	1,336	53,379

1. A pit latrine with average of 9 rings has 1800 liter capacity of sludge storage and weighted average volume of average volume of septic tank is 14,000 Liter
2. Percentage emptying once a year is taken from the WSUP Chittagong Survey-2016
3. 1 USD = 80 BDT





## 4. Findings of Business organizations

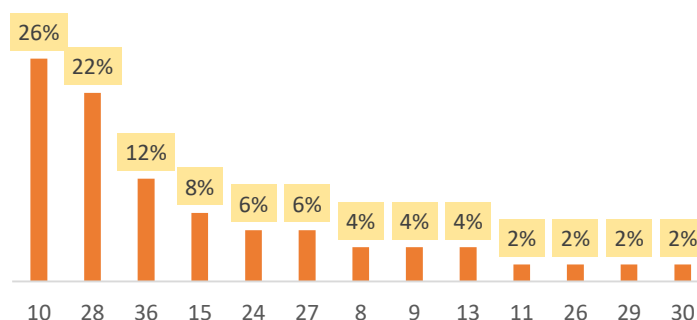
### a. Executive Summary/ Key Take-away from the survey

- Average number of toilets are **34** and average daily users are 197. This is the **highest** among all three groups (high income residential, low income residential and business organizations).
- All the business organizations had septic tanks and **74%** have only one septic tank and on-site. The average volume of septic tank is **62644 Liter**.
- In terms of service attribute, **professional safe service** and **timeliness** ranked as the most important attribute whereas affordable cost ranked as the least important attribute.
- 22% of business organizations are interested to pay BDT 1000taka per liter for the exhaustion service. They are termed as the **'early adopter'** group. If price is decreased to 500taka per liter then, additional 11% is interested who are termed as the **'late adopter'** group.
- The average amount paid to sweepers is higher for the early adopter group compared to the late adopter group (BDT 10,286 and BDT 8650 respectively) indicating that the early adopter group has higher affordability.
- The total market for the **business organization early adopters** is **USD 119,148** (calculation shown in page 28).

### b. Survey Demographics & location

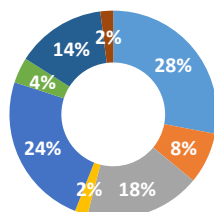
Highest amount of surveys are from ward no. 10 and 28. Different type of business organizations that were surveyed with corporate office and residential plus commercial complex being the most prevalent type respectively making up about 28% and 24% of the total business organization survey.

Ward no. and survey percentage



Type of Business

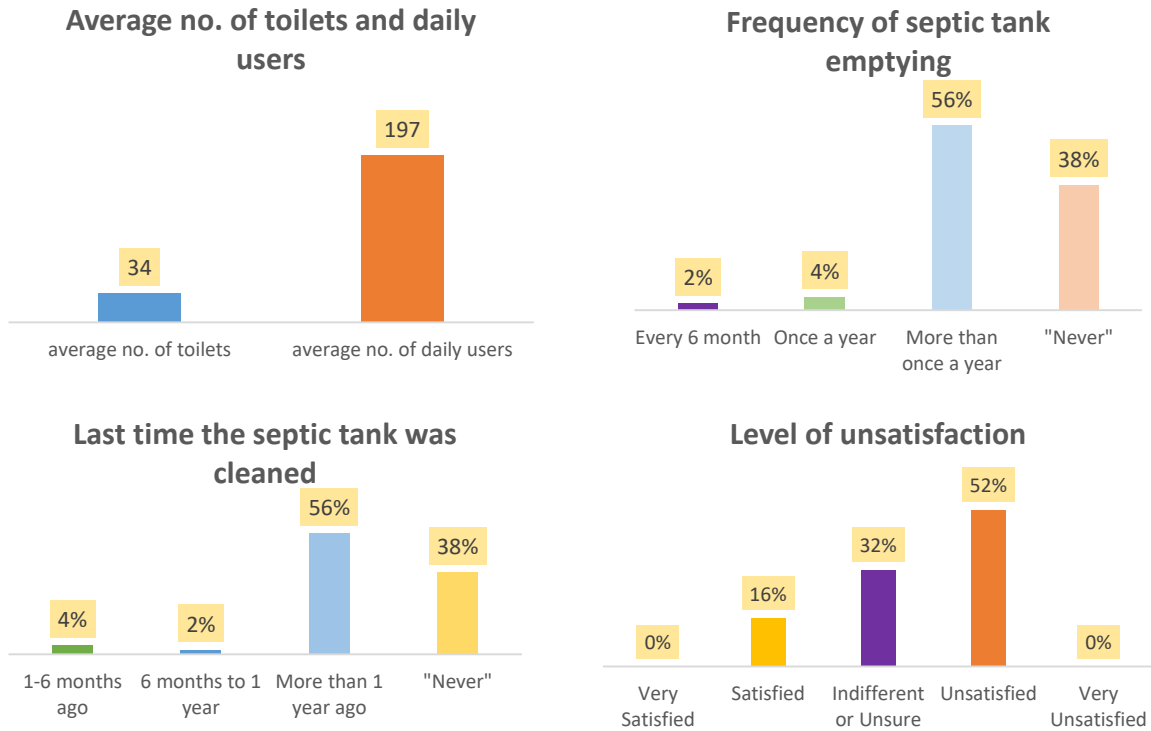
- Corporate
- Mosque
- School/University
- Hotel Large (more than 20 rooms)
- Residential plus Commercial Complex
- Thana education office
- Manufacturing
- Restaurant



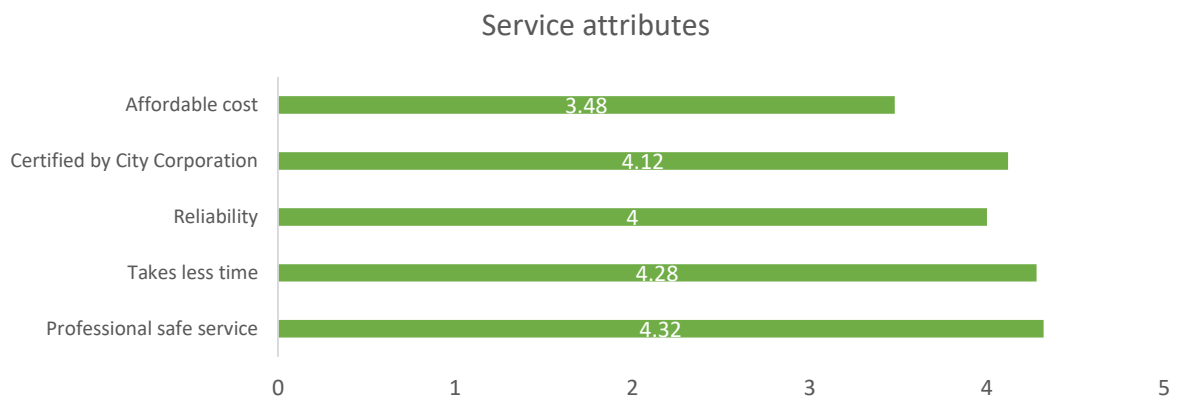
The highest amount of business organization are of corporate (28%), residential plus commercial complex (24%) and manufacturing (18%) category.

### c. Current Emptying Status Quo – Business organizations

Among high income, low income and business organization, the business organizations had the highest number of average toilets, average daily users and the highest volume of septic tank due to their relatively large size. The average amount paid to the sweepers last time is also highest for them. Average number of toilets are 34 and average daily users are 197. All the business organizations had septic tanks and 74% have only one on-site septic tank. The average volume of septic tank is 62,644 Liter.



From survey data, professional safe service and timeliness (taking 2-3 hours) ranked as the most important attributes for the business organizations and affordable cost ranked as the lowest important attribute.



### d. The Early Adopter Story

Just like the high-income and low-income consumer segments, the business organization segment is also divided into two broad categories of **early adopter** and **late adopter** group for better targeting.

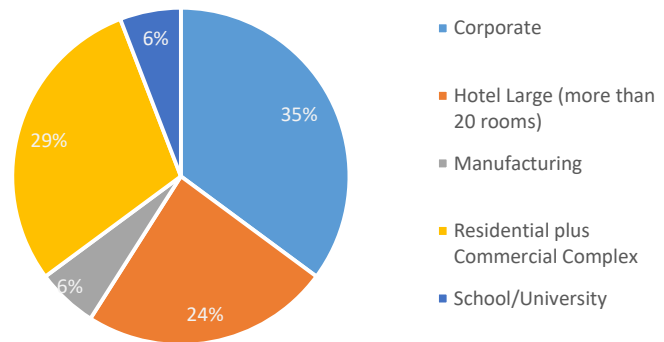
Criteria	Answer	Segmented Group
Question 19. How much would you be interested if the service costs 1,000tk/ m <sup>3</sup> of sludge?	Very affordable	Early Adopters
	Affordable	
	Acceptable	
	Expensive	Customers agreeing to 500tk/m <sup>3</sup> in this group are the 'Late Adopter'
	Too expensive	

About 22% of business organizations are interested in the BDT 1 taka per liter price. They are termed as the **“early adopter”** group.

The highest type of business organization comprising of the early adapter group are the Corporate (35%) and residential plus commercial complex group (29%).

About 52% of early adopter group business organizations are dissatisfied with the service provided by sweepers. They have on an average 24 toilets and 151 daily users.

Type of Business Organization in Early Adapter

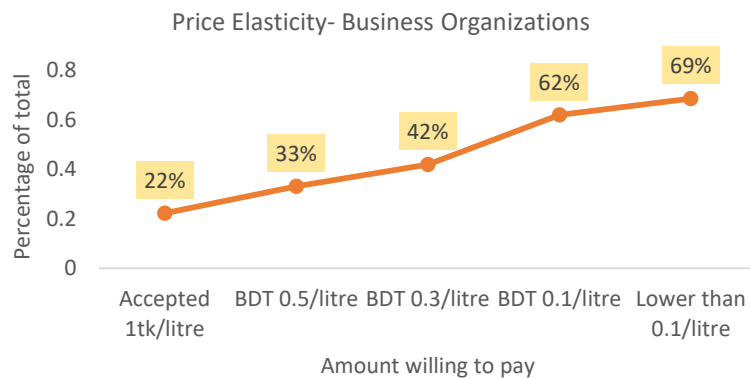


### e. The Late Adopter Story

If price is dropped to 0.5 taka per liter from 1 taka per liter then additional 11% are interested in availing the WSUP exhaustion service. They are termed as the **late adopter** group.

In terms of difference between the **early adopter** and **late adopter** group, both are similar in terms of average number of toilets and average number of daily user. The average amount

paid to sweepers is higher for the early adopter group compared to the late adopter group (BDT 10,286 and BDT 8650 respectively) indicating that the early adopter group has higher affordability.



## f. Total Addressable Market

### Assumption List for calculation

- A top-down approach is used to calculate the TAM (Total Addressable market) in Chittagong city.
- The 2011 census population is extrapolated at 2% annual growth rate to estimate the total population in 2016 as 2,625,594.
- Population below the poverty line is 11.4% (according to 2011 data) and the rest is assumed as high and middle income population.
- Dividing the total high and middle income population by 197 (the average number of daily toiler users per formal commercial establishment from the *WSUP Ctg Survey-2016*) per business organization, the TAM is calculated to be 11,300.

Factor	Parameter	Percentage (%)	No. of Business
TAM (Total Addressable Market)	Total Business organizations with septic tanks	N/A	11,300
SAM (Served Available Market)	Business Organizations with septic tanks and non-drain connection	98% of total <sup>1</sup>	11,074
SOM-1 (Serviceable Obtainable Market)	Business organizations who are unsatisfied with sweeper service	20% of respondents <sup>1</sup>	2,215
SOM-2 (Serviceable Obtainable Market)	Business organizations satisfied or indifferent with sweeper service	80% of respondents <sup>1</sup>	8,859

1. WSUP Chittagong Survey-2016

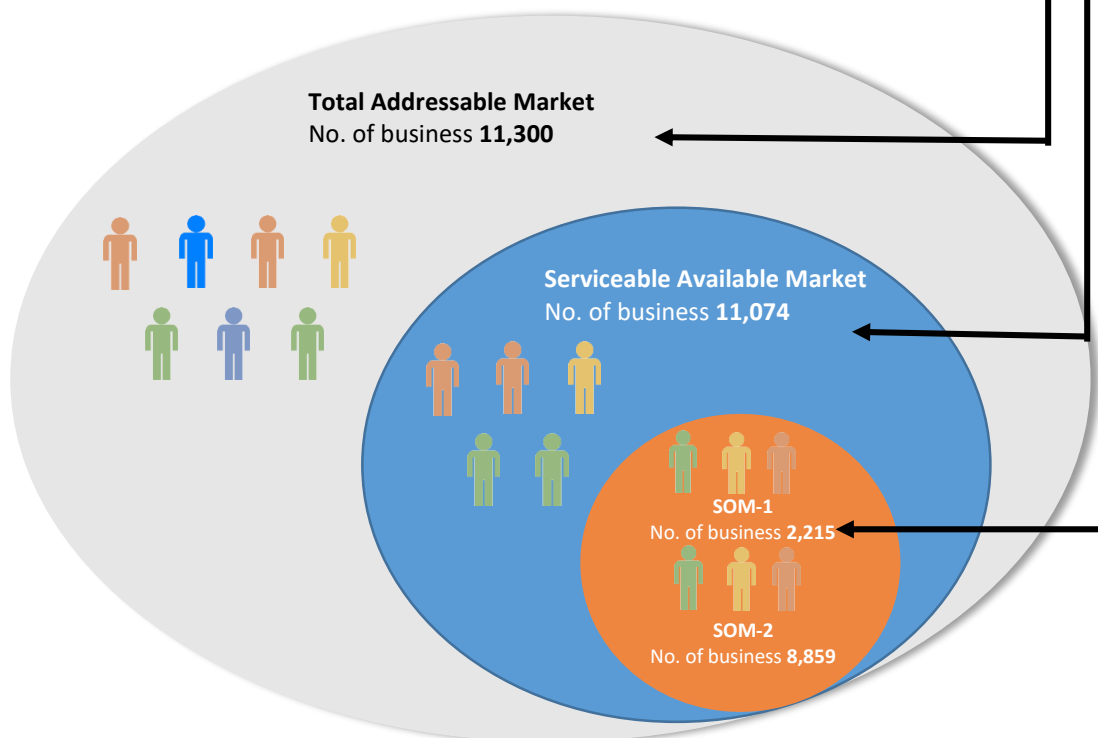


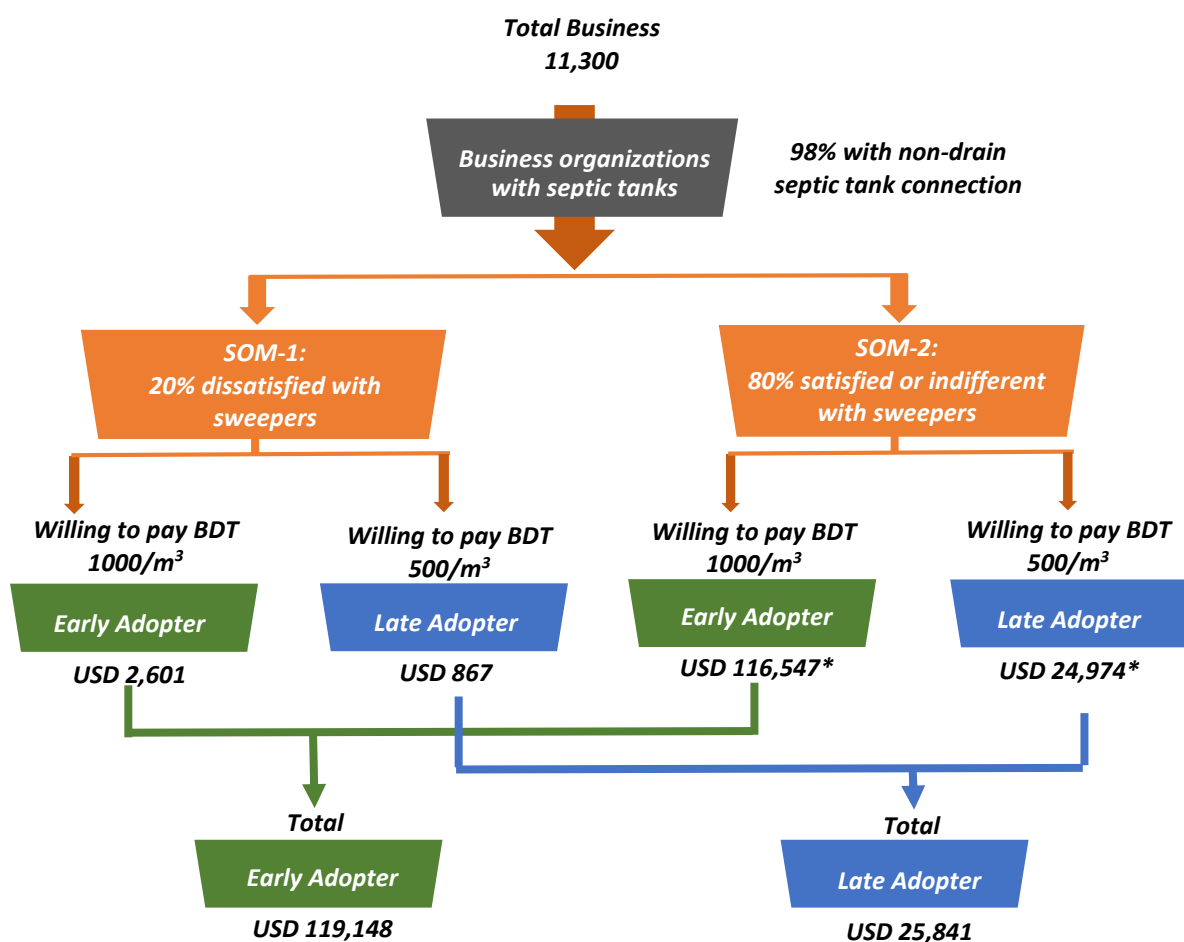
Figure: Total Addressable Market for Business Organizations

Factor	Parameter/Unit	Amount		
		SOM-1 (Dissatisfied group)	SOM-2 (Satisfied or indifferent group)	Total
Serviceable Obtainable Market (SOM)	Business	2,215	8,859	11,074
Average volume of septic tank(Liter) <sup>1</sup>	Liter	62,645	62,645	-
Estimated Annual market <sup>2</sup>	Percentage	2.5%	6.0%	-
Estimated market for Early Adopter Segment	% of target population	6%	28%	-
	BDT	208,119	9,323,741	9,531,860
	USD <sup>3</sup>	2,601	116,547	119,148
Estimated market for Late Adopter Segment	% of target population	2%	6%	-
	BDT	69,373	1,997,945	2,067,318
	USD <sup>3</sup>	867	24,974	25,841

1. Data from the WSUP Chittagong survey-2016 is used to calculate a weighted average volume for the septic tanks

2. Percentage emptying once a year is taken from the WSUP Chittagong Survey-2016

3. 1 USD = 80 BDT

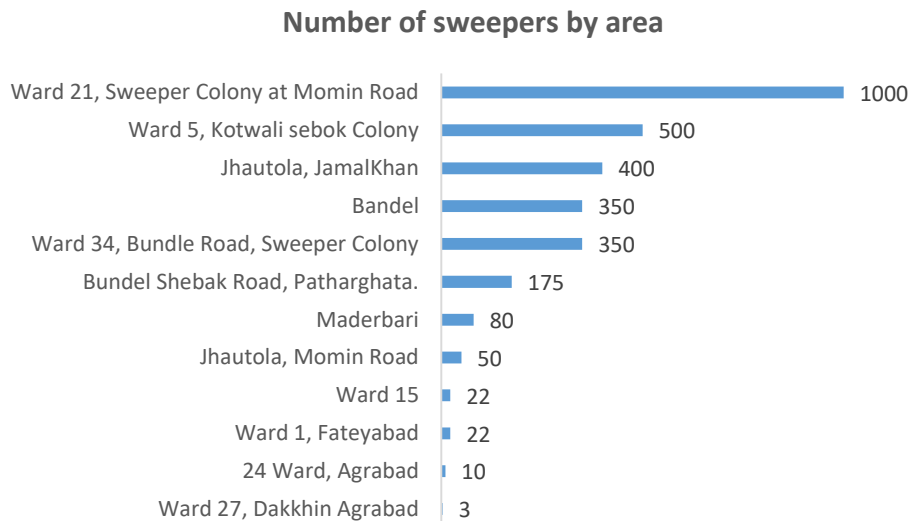


**Willingness to Pay – Business Organizations**

\*the value for SOM-2 is higher than SOM-1 because, SOM-2 includes both the **satisfied** and **indifferent** with sweeper segment (80% of total respondents) and SOM-1 is only of the **dissatisfied** segment (20% of total respondents) which has a lower number.

## 5. Findings from Sweepers

### a. Geographical Distribution



Highest amount of sweepers are from ward no. 21, ward no. 5, Jamal khan road of Jhautola. There is a sweeper colony in Bundle Road having 350 sweepers and another colony in ward no. 21 having about 1000 sweepers. Firingi bazar. Ward 17 and ward 22 have no sweepers in their locality and sweepers are hired from outside areas for their service. Jalalabaad, ward no. 2 has sweepers but, they all clean drains and not septic tanks.

### b. Work Process

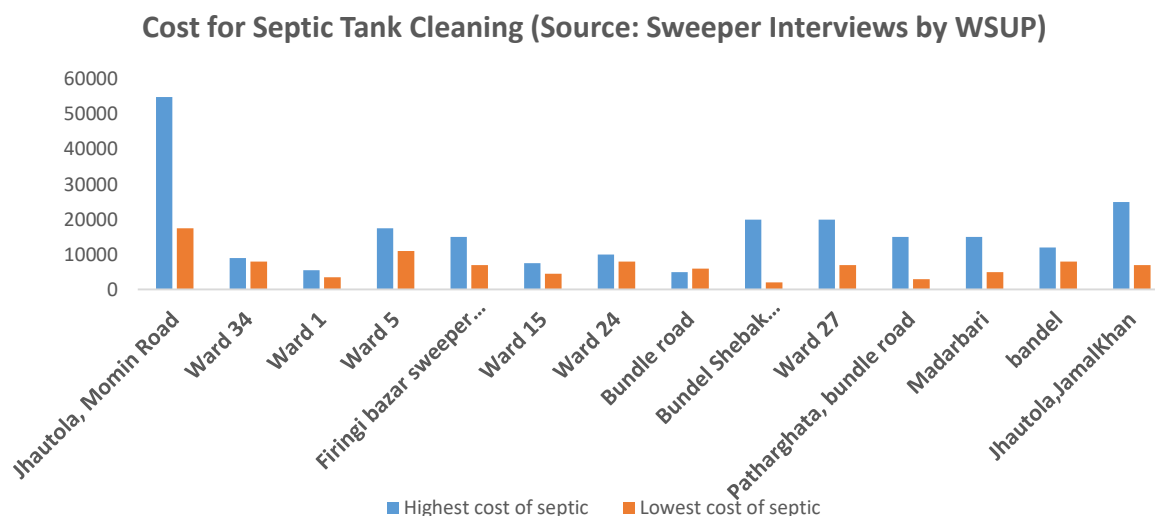
#### ***The KII interview found the following insights***

Sweeper do variety of jobs such as Insect/mosquito spraying, cleaning the drain, emptying septic tanks etc. The charge for these services vary by type and location. If the distance between the septic tank or pit latrine and drain is short, sweepers work in a 3-4 people team and if the distance is high, they have a team of 8-12 people. Typical tools used by sweepers include bucket, drum, bleaching powder, kerosene, rope etc. costing a total of 2000-3000 BDT.

Average jobs per year differ from area to area such as in Madarbari and Jhautola it is 60 jobs per year whereas in Bandar its 10 jobs per year. Frequency of septic tank cleaning is on an average 2-3 per year and max 6-8 per year.

For a 10 or 12ft septic tank and depending on the distance of throwing the waste, the sweepers charge from 12,000-15,000 BDT to 50,000-60,000 BDT. For pit latrines, cost can range from 150-500 BDT per ring. But, depending on the distance, it can be 500-1000 BDT per ring.

The amount paid to the sweepers varied by area and size of the septic tank. Interestingly, there was **difference in the amount of money** between **survey findings and sweeper interviews**. Sweeper interview by WSUP



Chittagong team found that the amount paid to sweepers is between **BDT 7000-14000** whereas the amount found by surveys is between **BDT 4000-7000**. The deviation can be explained in terms of the **respondent saying a lower price to get a more economic price** from the coming WSUP service.

#### Estimated yearly market for sweepers

Parameter	Unit	Amount
Average number of sweepers in Chittagong	People	7298 <sup>1</sup>
Average value of jobs done per year	BDT	26,600 <sup>2</sup>
Total Market	BDT	194,126,800
	USD	2,426,585

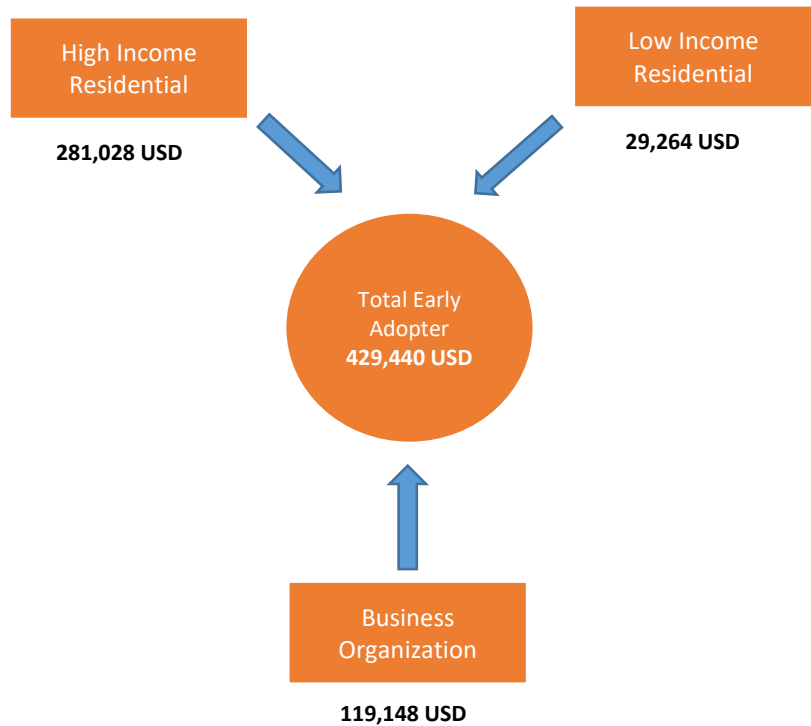
1. Estimated from the WSUP Chittagong Sweeper Interviews. Average number of sweepers per ward is calculated to be 178 and by multiplying with the total number of wards in Chittagong, it is estimated to be 7298 (this makes 1 sweeper per 592 people)
2. Average value of the jobs is estimated for both septic tank and pit latrine cleaning amounts done by sweepers annually

### c. Comparison with the total market for early adopters

The combined early adopter market for all the three segments of high income residential, low income residential and business organizations is 327,483 USD.

The roughly calculated market for sweepers in Chittagong is estimated to be 2,426,585 USD.

Therefore, the SOM value of 327,483 USD for the early adopter group is **17.7%** of the total sweeper market. This is the target market for the WSUP VacuTug service.



Schema: Diagram showing total market for early adopter segment



## 6. Marketing Recommendations

Consumer Segment	Research Findings	Marketing Strategy
<b>High Income Residential</b>	<p><b>Professional safe service, certification by city corporation</b> are the most important attributes for them.</p> <p><b>Bad smell, environment pollution, noisy process</b> etc. as the reasons for their low levels of satisfaction with sweepers.</p> <p>Another aspect is the <b>hassle for contacting the sweepers</b> and the <b>messy method of operation</b> the sweepers. Consumers interviewed said that sweepers take much time and the manual cleaning process is not environment friendly. Since sweepers dump the waste into the nearby drains, sometimes the waste gets spilled during carrying and making a bad odorous smell.</p>	<p>The following attributes should be incorporated in the marketing materials.</p> <p><b>Professional Outlook</b> Picture of the truck, equipment, operators in uniform with gloves and mask etc. This is an <b>environment-friendly process</b> that causes <b>no air pollution or bad smell</b> should be highlighted</p> <p><b>Credibility</b> Showing logo of affiliation organizations for example logo or a statement from the Chittagong city corporation to build trust</p> <p><b>Timeliness</b> The service is fast and efficient due to using modern equipment and safety gears</p> <p><b>Ease of use</b> How easily the service can be availed through a phone call</p>
<b>Low Income Residential</b>	<p><b>Timeliness</b> and <b>professional safe service</b> are the most important attributes for them.</p> <p>Highest amount of low income group early adopters were found to be house-owners (40%) having income between 15,000 to 25,000 BDT per month.</p> <p>Most respondents pointed to <b>environment pollution (33%), air pollution (22%) and bad smell (11%)</b> as the main causes of their dissatisfaction with clients</p>	
<b>Business Organizations</b>	<p><b>Professional safe service</b> and <b>timeliness</b> are the most important attributes for them.</p> <p>The highest segment of business type that showed interest is the <b>corporate</b> business organizations.</p>	

The initial type of advertisements are **Informative**. The **objective** is to create awareness and connect with the targeted 'early adopter' group of consumers.

The message will be about how the VacuTug SWEEP service solves the traditional septic tank cleaning problems faced by the people.



Schema: Diagram showing the contents for the marketing plan

The promotional materials used in Dhaka can be a good starting point for developing the marketing materials. The advertisement should begin with BTL focusing on the selected wards and using flyers or leaflets. Suggested ATL marketing would be using television advertisement to create mass awareness. **However, detailed marketing plan is subject to more in-depth research about the consumers and the guidelines given are broad level suggestions.**

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