

Sanitation Demand and Supply in Rural Bangladesh

Rapid assessment to identify supply chain challenges



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This report presents the preliminary findings of IRC and BRAC's research on sanitation demand and supply in Bangladesh. As part of the research, a rapid assessment to identify supply chain challenges was carried out. The study is produced as part of the BRAC WASH II Programme.

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Contents

1	INTRODUCTION.....	5
2	SANITATION SUPPLY CHAINS.....	5
3	RESEARCH PURPOSE AND METHODOLOGY	7
	3.1 Research purpose.....	7
	3.2 Research methodology.....	7
	3.3 Sampling design and size.....	9
4	DATA COLLECTION AND ANALYSIS	11
	4.1 Data collection.....	11
	4.2 Data analysis.....	12
5	PRELIMINARY RESEARCH FINDINGS	13
	5.1 Defecation practices	13
	5.2 Access to sanitation facilities	15
	5.3 Appropriateness of sanitation technologies.....	20
	5.4 Location of sanitation facilities	20
	5.5 Location and accessibility of sanitation supply chain actors	21
	5.6 Capacity of toilet part producers	21
	5.7 Sustainability of toilet part producers.....	22
	5.8 Quality of production	25
	5.9 Costs of toilet construction.....	25
	5.10 Knowledge about sanitation technologies	28
	5.11 Demand and supply for pit-emptying services.....	28
6	CONCLUSIONS AND RECOMMENDATIONS.....	32
	6.1 Conclusions.....	32
	6.2 Recommendations and possible supply chain interventions.....	34
	REFERENCES.....	36
	LIST OF ANNEXES.....	37

Tables

Table 1: Key research questions	8
Table 2: Defecation practices of households that do not own a toilet.....	13
Table 3: Reasons behind dissatisfaction with not having a toilet	14
Table 4: Satisfaction with existing toilets	14
Table 5: Reasons behind dissatisfaction with existing toilet	15
Table 6: Types of existing toilets	16
Table 7: Toilet and bathing facilities	16
Table 8: Types of toilet sub-structures.....	16
Table 9: Details of toilet sub-structures	17
Table 10: Number of concrete rings used for toilet sub-structures	17
Table 11: Storage capacity of toilet pits.....	17
Table 12: Types of superstructures	17

Table 13: Money spent on toilet construction in past two years.....	18
Table 14: Average amount spent on toilet construction	18
Table 15: Judgement on quality of toilet construction	19
Table 16: Judgement on hygienic conditions of toilets.....	19
Table 17: Union Parishads that face water scarcity or are at risk of toilet flooding	20
Table 18: Supply versus demand for toilet parts	21
Table 19: Details of business diversification.....	23
Table 20: Business constraints faced by toilet producers	24
Table 21: Ability to pay for toilets.....	26
Table 22: Willingness to pay for toilets	27
Table 23: Overall scores on (access to) knowledge.....	28
Table 24: Pit-emptying occurrences	29
Table 25: Pit emptied by whom	29
Table 26: Correlation between pit emptying and risk of toilet flooding.....	29
Table 27: Pit-emptying frequency and volumes per provider.....	30
Table 28: Timing of pit emptying.....	30
Table 29: Average cost in Taka for pit emptying paid by HH	31
Table 30: Cost for pit emptying in Taka quoted by pit emptiers	31
Table 31: Most common disposal and reuse options	31
Table 32: Business constraints faced by manual pit emptiers	32

Figures

Figure 1: Sanitation supply chain development elements.....	6
Figure 2: Main research steps	7
Figure 3: The marketing mix (the four Ps)	8
Figure 4: Location of research Upazilas	9
Figure 5: Rural sanitation supply chain actors map	10
Figure 6: Research respondents	11
Figure 7: Defecation practices of sample households.....	13
Figure 8: Satisfaction with existing toilets per Union Parishad.....	14
Figure 9: Sanitation coverage in sample Union Parishads.....	15
Figure 10: Average amounts spent on toilet construction per Union Parishad.....	18
Figure 11: General business portfolio of toilet producers.....	23

1 Introduction

In May 2006, BRAC launched the WASH I project across 150 Upazilas (sub-districts) in Bangladesh; an area with a population of almost 39 million people. The WASH I project, supported by the Government of the Kingdom of The Netherlands, aimed to improve the health status of poor rural communities to enhance equitable development. By the end of the project (April 2011), 25.6 million people benefitted from improved hygienic latrines, 1.78 million people gained access to new or improved water services, and hygiene promotion activities became more widespread, reaching entire area populations.

The WASH II project (October 2011-April 2015) builds on the achievements of WASH I and focuses specifically on strengthening sustainability. It targets the ultra-poor in the original 150 Upazilas, and expands activities to hard-to-reach areas in a further 25 Upazilas.

IRC has been collaborating with BRAC since the WASH BRAC programme was launched in 2006. IRC brings state of the art knowledge and experience from other programmes, provides advice on ways forward, and contributes to various learning processes.

2 Sanitation supply chains

The primary purpose of any **supply chain** is to satisfy customer needs, while generating profits.

A supply chain is a system that comprises of organisations, people, technology, activities, information and resources that together, facilitate the movement of a product or service from supplier to customer. A supply chain covers all functions involved in receiving and processing a customer request, which entails, but is not limited to, new product development, procurement of inputs, production, marketing, distribution, finance, and customer services. Most supply chains work within networks: a producer may receive materials from several suppliers, and then deliver final product to several distributors or retailers.

Why work on sanitation supply chain development?

Many people, including the poor, are willing to pay for good sanitation that will satisfy their needs and desires, provided that the products and services are affordable, packaged and marketed appropriately, and that these are easily accessible.

Sanitation supply chain development is about making sanitation products (hardware) and services available and accessible to consumers based on their specific needs and preferences.

- Supply is concerned with the availability and accessibility of sanitation products (goods) and services that the market (or producers) can deliver, based on a set value (price).
- Demand for products (goods) and services is influenced by the needs and preferences of consumers, based on a set value (price) that they are willing to pay.

The BRAC WASH programme's aim is to develop strategies that improve the supply of products and services and give equal attention to demand creation; to motivate consumers to consider alternative and more suitable sanitation options. In turn, BRAC WASH's aim is to transform stated demand to actual acquisition to help increase sanitation coverage in the country.

Initially, the sanitation supply chain component of the programme was designed to focus on three elements:

1. Develop and conduct a sanitation market research to investigate the demand for and supply of sanitation products and services. Research findings were expected to clarify consumer demands, needs and aspirations, and give a better understanding of sanitation supply chains, including existing market constraints.
2. Produce a sanitation market research report that outlines:
 - Current and potential future consumer demand, with its motivating factors and constraints, and
 - Current supply of sanitation products and services, including a mapping of relevant supply chain actors and an overview of market constraints.
3. Develop a sanitation supply chain intervention strategy to guide the implementation of the supply chain strengthening activities in the field.

The three elements are depicted in the Figure 1 (focusing on the first two elements).

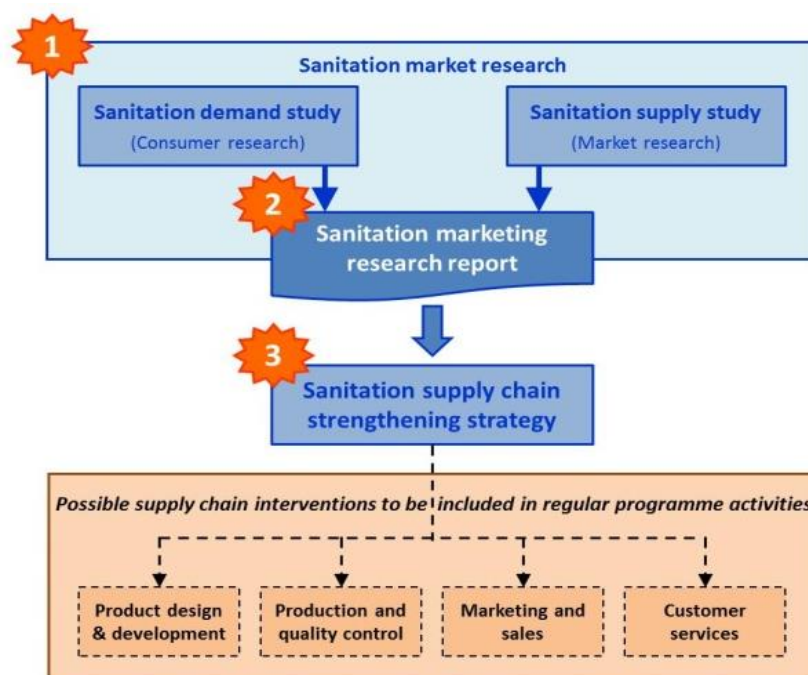


Figure 1: Sanitation supply chain development elements

3 Research purpose and methodology

3.1 Research purpose

The purpose of the sanitation market research was twofold:

- To assess consumer demands, needs and aspirations based on an understanding of current practices and the factors that influence these practices — this type of assessment is essential to discern the products and services desired by a target population, as well as the prices they are willing to pay for them; and
- To assess the current supply of sanitation related products and services.

The research was designed to help BRAC obtain a better understanding of existing and potential future levels of demand for sanitation, and to offer an overview of current supply chain actors and existing market constraints.

The research findings are intended to feed in BRAC’s strategic plan for its sanitation supply chain-related development activities. In particular the identification of sanitation market development opportunities and possible business models is expected to help scale up the availability of demand-responsive and affordable sanitation products and services. However, considering the broad scope of the research findings, results are also expected to influence other non-supply chain related programme activities.

3.2 Research methodology

The figure below summarises the steps that were taken to design and conduct the research.



Figure 2: Main research steps

Data collection tools were developed over a period of some nine months. During this period, the tools were tested in the field three times. The testing revealed a number of complications in particular those relating to difficulties in collecting reliable data. Initial findings in tool testing resulted in the conclusion that data collection activities should be kept to the bare minimum, to enhance the quality of data collection and keep the work manageable. It was

decided that consumer and market research activities should be limited to a rapid assessment research activity of both demand and supply, based on the marketing mix.¹



Figure 3: The marketing mix (the four Ps)

Source: Kerr, 2014.

The following table presents the minimum set of key questions that informed data collection.

Table 1: Key research questions

Demand questions	Supply questions
Who are the potential customers/consumers?	Who are the supply side actors?
PLACE: Where are the customers?	PLACE: Where are the supply side actors?
PRODUCTS: What products and services are needed?	PRODUCTS: What products and services are made available?
	PROMOTION: Do they promote their products?
PRICE: How much can they afford?	PRICE: How much does it cost?

Notes:

Place refers to the point of sale, and in particular whether a business is conveniently located and easily accessible to its customers.

Product refers to the final item sold to customers (rural households), whether it be a physical product (for example, latrine components) or a service (for example, pit emptying).

Price refers to the value that is assigned to a product. For customers, price covers all financial costs from installation to the maintenance of a toilet (such as repairs, pit emptying, etc.).

Promotion refers to all activities undertaken to create awareness on a particular product or service, point of sale, or brand to the consumers.

¹ The marketing mix is a business concept proposed by E. Jerome McCarthy in 1960 and is used by companies to plan for the promotion of a brand or product in the market. It is often synonymous with the four Ps: Price, Product, Promotion, and Place.

3.3 Sampling design and size

Step 1: Select research clusters

The selection of research clusters within Bangladesh was carried out in several steps.

Firstly, given the size of the BRAC WASH programme,² a total of eight Upazilas were selected to represent the different geographical areas of Bangladesh (Figure 4). A wide range of characteristics were used to assign a cluster to each Upazila, including among others: WASH I and WASH II areas, flood-prone areas, water scarcity, high water tables, coastal areas, poverty levels, remoteness and hilly areas.

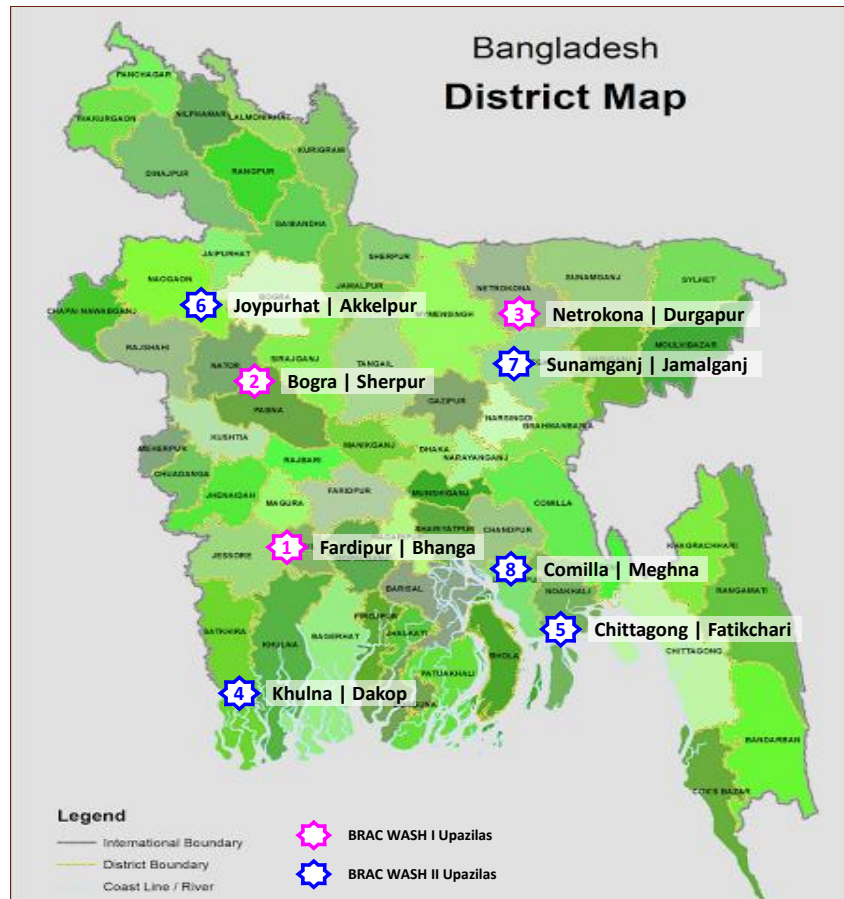


Figure 4: Location of research Upazilas

Secondly, within each Upazila, two Union Parishads were selected in each of the eight Upazilas mentioned above, using the same selection criteria applied in the first step. This resulted in the formation of 16 Union Parishads (the main research clusters).

Thirdly, to make the research process more manageable, a maximum of six villages were selected from each Union Parishad, depending on the total number of villages in each. Similar to the second step, an attempt was made to mirror the characteristics of the Upazila. The third step resulted in the selection of 92 villages.

² BRAC WASH programme size: 150 Upazilas in WASH I; 25 Upazilas in WASH II; and a further 77 Upazilas in WASH III.

Step 2: Determine sample sizes

A sample size³ of 5% of the total number of households in each selected Union Parishad was considered an acceptable and manageable number. A simple Microsoft Excel Sample Size Calculator was developed to provide a fast, but accurate calculation of the sample sizes in the selected 16 Union Parishads and 92 villages. An example of the Sample Size Calculator used for Sherpur Upazila is found in Annex 1.

While calculating the sample sizes of each village an attempt was made to mirror the socio-economic groups as well as the proportion of households with and without a toilet. Irrespective of the total number of households in a village, a minimum of at least 25 households were included in the sample size. This meant that due to a number of relatively small villages, the total sample size was slightly bigger than the determined 5%.

Given the relatively small number of supply chain actors all relevant sanitation entrepreneurs that could be located within the selected Unions Parishads were included in the sample.⁴

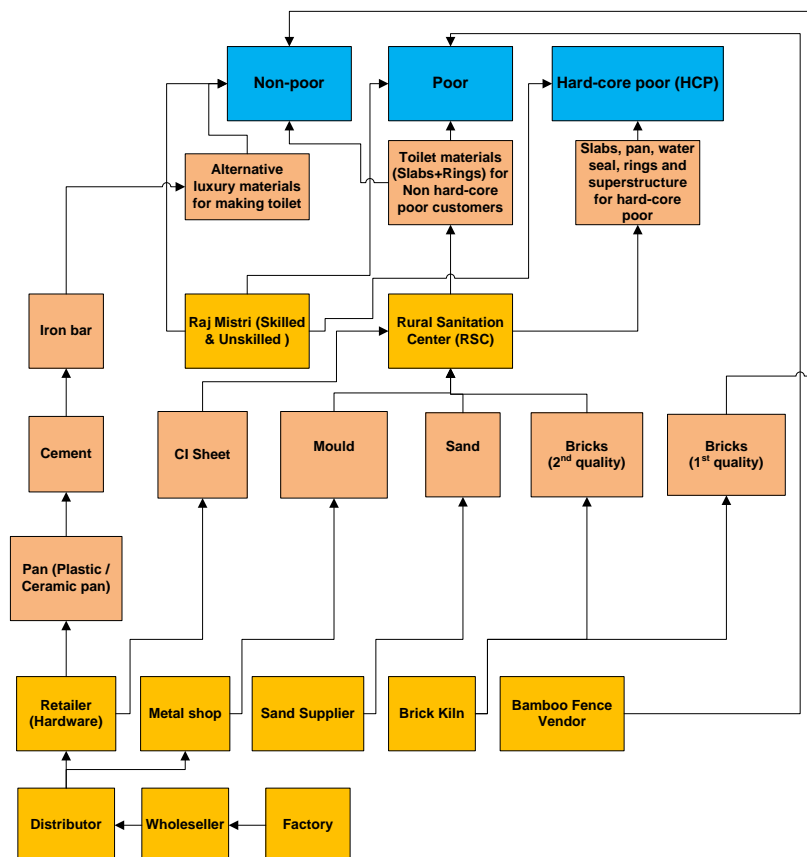


Figure 5: Rural sanitation supply chain actors map

³ The sample size is the number of observations included in a statistical sample. The sample size is an important feature of any empirical study in which the goal is to make inferences about a population from a sample. The larger a sample size, the more certain will it reflect the actual situation of the population.

⁴ Early on it was decided to exclude local artisans (masons, also known as *raj mistris*). Although *raj mistris* do play an important role, their involvement is limited to the installation of toilets for the non-poor, whilst the programme's main target groups are the ultra-poor and poor.

4 Data collection and analysis

4.1 Data collection

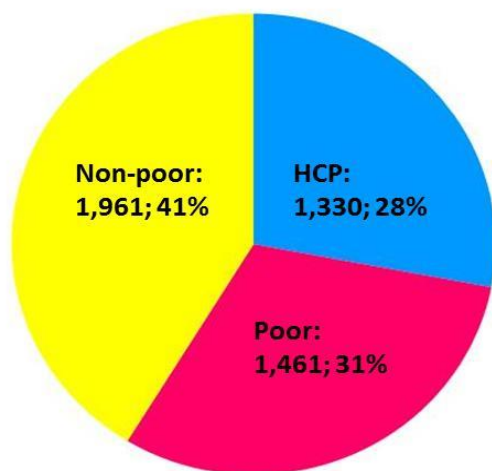
In the months of May and June 2013, data was collected by BRAC WASH programme staff in the 16 Unions Parishads. The rapid assessment consisted primarily of quantitative research methods; data was collected mainly through structured interviews and direct observations. The rapid assessment focused on:

Consumer research covered 4,752 households in 92 villages, representing 5.2% of the total population in the 16 Union Parishads. Mirroring the total population, 28% represented ultra-poor households, 31% for poor households, and 41% for non-poor households.

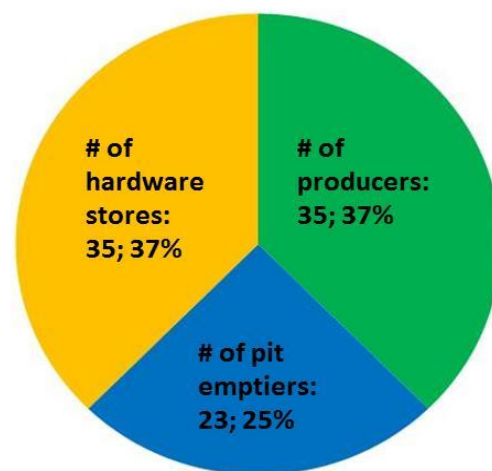
Households with a toilet were found to be 60%, while 40% were without a toilet. The sanitation coverage of 60% observed in the sampled households is an almost true reflection of the combined sanitation coverage of 62% in the 16 selected Unions.

Household respondents consisted of 67% females and 33% males. All respondents were above the age of 18, with an average age of 38 years. Of the respondents, 33% were heads of their own households; 6% represented female-headed households.

Market research covered a total of 93 supply chain actors in the 16 Union Parishads. Supply chain actor respondents consisted of all available 35 rural sanitation centres that produce concrete toilet parts, 23 informal pit emptiers (sweepers) and 35 hardware stores.



Consumer research: households



Market research: supply chain actors

Figure 6: Research respondents

4.2 Data analysis

A simple-to-use tool was developed to analyse and compare demand- and supply-related data. The tool includes an overview that shows whether there is a match between supply and demand, with the help of a traffic light system. The traffic light dashboard provides insight into the main issues that require attention, without having to go into much detail.⁵

DEMAND SIDE		SUPPLY SIDE
WHO are the potential customers?		WHO are the supply side actors ?
→ Type and quantity of potential customers / consumers		→ Type and quantity of supply side actors
▶ Hard-core poor, poor and non-poor households		▶ Producers, hardware stores and pit emptying services
▶ Households with and without toilets		→ Background and experience of key supply side actors
PLACE: Where are the customers?		PLACE: Where are the supply side actors?
→ Location		→ Location
▶ Distance and accessibility		▶ Distance and accessibility
▶ Appropriateness of BRAC sanitation technology		
PRODUCTS: What do they need now and in future?		PRODUCTS: What products and services are made available?
→ Type and volume of products and services		→ Type and volume of products and services
▶ Demand for new toilets		▶ Demand for new toilets
▶ Combined demand for new toilets and upgrades		▶ Combined demand for new toilets and upgrades
▶ Pit emptying services current demand		▶ Pit emptying services current demand
▶ Pit emptying services future demand		▶ Pit emptying services future demand
		→ Quality of available products and services
PRICE: How much can they afford?		PRICE: How much does it cost?
→ Ability and willingness to pay		→ Costs of products and services
▶ Ability to pay for new toilets		▶ Costs of a BRAC toilet
▶ Ability to pay for improving existing toilets		▶ Costs of a new pit and slab
▶ Ability to pay for pit emptying services		▶ Costs of pit emptying
▶ Amount willing to pay for new toilets		
▶ Amount willing to pay for improving existing toilets		
		PROMOTION: Do they promote their products?
		→ Promotion by key supply chain actors
		▶ Intensity of promotion activities
Do they have KNOWLEDGE to make an informed decision?		Do they have KNOWLEDGE on sanitation technology options?
→ Knowledge about sanitation technologies		→ Technical experience
▶ Overall judgement on customers' knowledge		
		▶ Suppliers' production and technical knowhow

Illustration 1: Dashboard of Algi Union in Bhanga Upazila

⁵ The same dashboard is found in Annex 1 of this paper, as well as an explanation on how traffic lights are interpreted by the study.

5 Preliminary research findings

5.1 Defecation practices

Of the total 4,752 households (HH) studied, 2,848 (60%) owned a toilet whereas 1,904 (40%) did not own a toilet. Among the 1,904 HH without a toilet, 41% used a toilet of a relative or neighbour, 39% did not use any toilet and defecated out in the open, and 20% intermittently used the toilet of others, or did not use a toilet at all. Combined 76% of all households (HH that own and do not own a toilet) have access to a toilet, 16% do not have access to a toilet, and the remaining 8% used a toilet sometimes (and openly defecated).

Table 2: Defecation practices of households that do not own a toilet

	Ultra-Poor	Poor	Non-Poor	Totals
Use toilet of others	37%	45%	47%	41%
Use public toilet	0%	1%	0%	0%
Do not use toilet	42%	35%	31%	39%
Here and there ⁶	21%	19%	21%	20%
	100%	100%	100%	100%

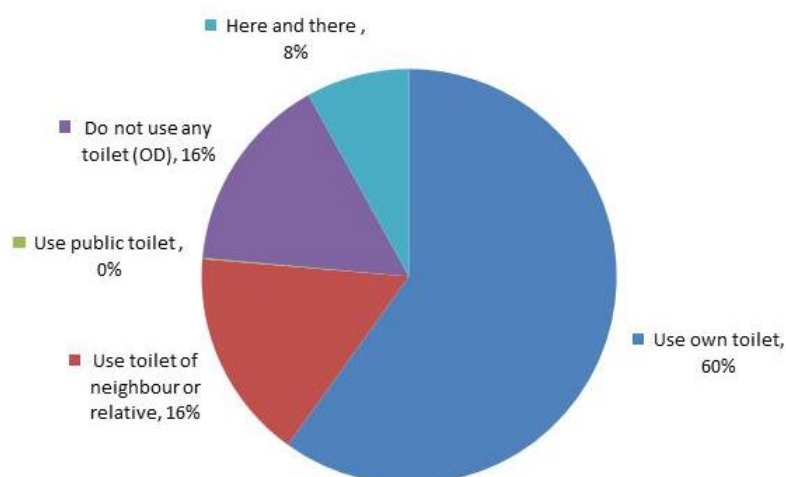


Figure 7: Defecation practices of sample households

Satisfaction with existing situations

Among the 1,904 households without a toilet, 99% were not satisfied with their existing situation of not having a toilet. Reasons behind dissatisfaction are many, but low status and inconvenience came out the strongest. No remarkable differences were found between the different socio-economic groups.

⁶ 'Here and there' refers to the multiple defecation practices of individuals, which may vary based on seasonal changes (e.g., defecating in the open during the dry season and using someone else's toilet during the rainy season), preference (e.g., women using someone else's toilet, whereas men defecate in the open), etc.

Table 3: Reasons behind dissatisfaction with not having a toilet

	Totals
It is embarrassing not to have a toilet	19.6%
It is inconvenient to use toilet of others	14.0%
It is inconvenient during the night	11.7%
It is inconvenient when it rains	10.8%
Every house should have a toilet	10.9%
Other villagers do not respect us	10.3%
Open defecation creates dirty surroundings	10.3%
Open defecation creates unhealthy conditions	7.8%
It is dangerous (women, girls, kids)	4.6%
	100%

Of the 2,848 HH that owned a toilet, 56% were not (fully) satisfied with their existing facility.

Table 4: Satisfaction with existing toilets

	Ultra-Poor	Poor	Non-Poor	Totals
Don't know	0%	0%	0%	0%
YES satisfied	30%	31%	53%	44%
NO not (fully) satisfied	70%	69%	47%	56%
	100%	100%	100%	100%

Average satisfaction rates with existing toilets differ vastly between the 16 Union Parishads, from a high 65% in Raikhali Union in Akkelpur Upazila, to a low of 14% in Pankhali Union in Dakop Upazila.

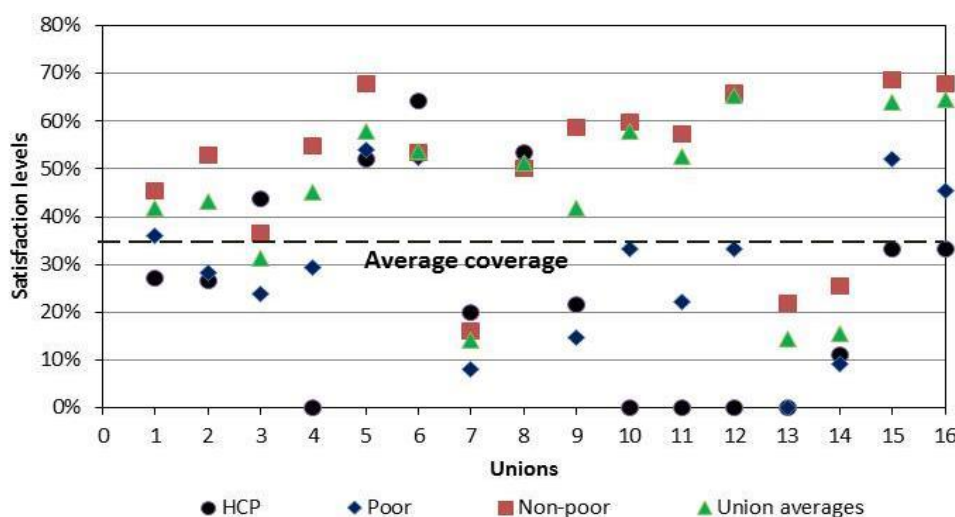


Figure 8: Satisfaction with existing toilets per Union Parishad

Whereas only some 30% of ultra-poor and poor HH were satisfied with their existing toilets, a small majority of the non-poor responded that they were satisfied. The highest satisfaction rate (69%) was found amongst the non-poor HH in the Borokanda Union in Meghna Upazila and the lowest rate (8%) was found amongst the poor HH in Pankhali Union in Dakop

Upazila. Reasons behind dissatisfaction on existing toilets are presented in the table below. Design (“toilet fills up too quickly”), quality of construction and or maintenance (superstructure, simple looks and unpleasant smells) were the main reasons behind respondent dissatisfaction.

Table 5: Reasons behind dissatisfaction with existing toilet

	Totals
Superstructure is not durable	21%
Looks too simple/ too cheap	17%
Fills up too quickly	13%
Smells unpleasant and/ or attracts many flies	12%
Difficult to access during the night and/ or when it rains	10%
Used by too many people	6%
Located too far from or too close to house	6%
Does not provide sufficient privacy	4%
Difficult to clean/ maintain	4%
Makes the surroundings dirty/ unhealthy	4%
Not convenient for children, elderly, disabled	3%
	100%

Dissatisfaction of majority of all HH with their existing toilets implies that there are opportunities for local sanitation supply chain actors to supply goods and services for the improvement and/ or upgrade of existing toilets.

5.2 Access to sanitation facilities

Average access to toilets within the sample Union Parishads is 60%, with an average sanitation coverage of 73% in WASH I areas and 52% in WASH II areas. Of this, 615 toilets, equal to roughly one fourth of the total number of existing toilets, were constructed in the past two years: this proportion is basically the same for WASH I and WASH II areas.

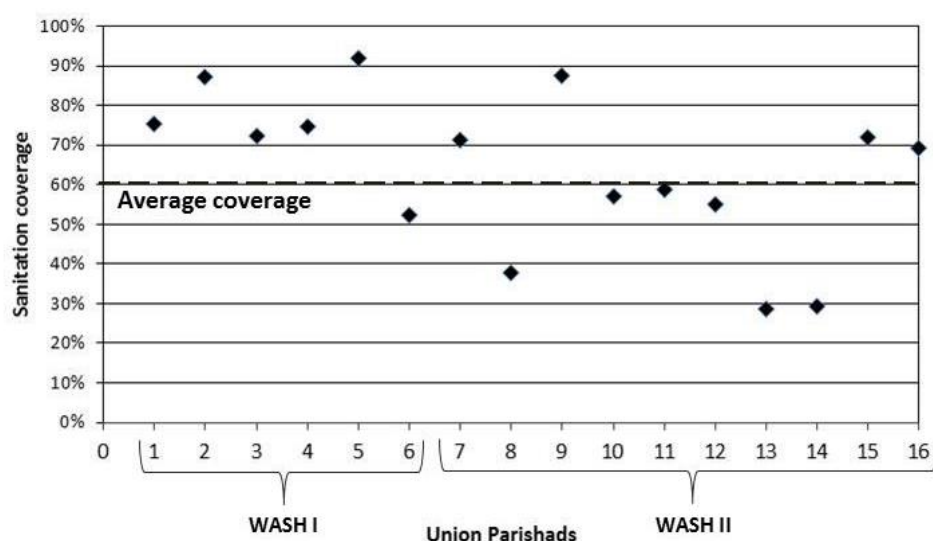


Figure 9: Sanitation coverage in sample Union Parishads

Type of toilets

Out of the total of 2,848 toilets, 2,769 (97%) were pour-flush toilets, 53 (2%) were non-flush toilets, and 26 (1%) were flush toilets. No other types of toilets were found during the research. The proportion of pour-flush toilets to other types was 95% for the ultra-poor, and 98% for poor HH. Flush toilets found during the research were owned by non-poor HH.

Table 6: Types of existing toilets

	Ultra-poor	Poor	Non-Poor	Totals
Non-flush toilet	5%	1%	2%	2%
Pour-flush toilet	95%	98%	97%	97%
Flush toilet	0%	0%	1%	1%
Other types	0%	0%	0%	0%
	100%	100%	100%	100%

746 HH (26%) had a toilet that was combined with some type of bathing facility. Of all HH with a combined toilet and bathing facility, incidence was highest amongst the non-poor.

Table 7: Toilet and bathing facilities

	Ultra-poor	Poor	Non-Poor	Totals
Toilet only	96%	89%	62%	74%
Toilet with bathing facility	4%	11%	38%	26%
	100%	100%	100%	100%

The majority of toilet sub-structures either had a direct single pit (41%) or a single off-set pit (30%). Some 3% of the toilets were sub-standard as they did not have a safely closed and covered sub-structure. These toilets disposed human waste either in an open or uncovered pit, or directly to the open environment. Since end 2011 the BRAC WASH programme has been encouraging and supporting people to construct a pour-flush toilet with double alternating off-set pits; 118 (4%) of these type of toilets were found during the research.

Table 8: Types of toilet sub-structures

	Ultra-poor	Poor	Non-Poor	Totals
Open environment	4%	1%	0%	1%
Open/ uncovered pits	2%	2%	2%	2%
Single direct pit	63%	56%	30%	41%
Single direct pit with extra alternative pit	15%	3%	5%	5%
Single off-set pit	9%	33%	32%	30%
Double off-set pits	7%	1%	5%	4%
Rectangular pit	0%	4%	26%	17%
	100%	100%	100%	100%

Concrete rings are the preferred option for constructing sub-structures. A total of 87% of the toilet sub-structures used concrete rings to line the pit. The remaining 13% of the toilet sub-structures consisted of some sort of rectangular tank; and these were all owned by non-poor HH.

Table 9: Details of toilet sub-structures

	Ultra-poor	Poor	Non-Poor	Totals
Pits with concrete rings	100%	100%	74%	87%
Rectangular tanks	0%	0%	26%	13%
	100%	100%	100%	100%

On average, those toilet sub-structures with concrete rings for pit lining purposes used more than five rings. Differences across socio-economic groups were rather limited with non-poor HH using, on average, one ring more than ultra-poor HH.

Table 10: Number of concrete rings used for toilet sub-structures

	Ultra-poor	Poor	Non-Poor	Totals
Up to 3 rings	28%	11%	8%	11%
4 to 6 rings	40%	20%	30%	27%
7 and more rings	4%	11%	35%	22%
Don't know	28%	58%	1%	27%
	100%	100%	100%	100%
Average number of rings	4.6	4.8	5.7	5.3

The calculated average storage capacity of a sub-structure pit with concrete rings is some 0.65 m³ or 650 litres. The actual average storage capacity of a pit is reduced to some 0.53 m³ if the top ring — roughly equal to the height required to fit the toilet pan and syphon — is excluded. The storage capacity of one single pit of the BRAC WASH standard pour-flush toilet with twin off-set pits is only 0.30 m³ (or 300 litres) — too small in size, with short retention time for faecal sludge compared to the average.

Table 11: Storage capacity of toilet pits

	Ultra-poor	Poor	Non-Poor	Totals
Average volume in m ³	0.56	0.59	0.70	0.65
Average storage capacity in m ³	0.44	0.46	0.58	0.53

Only 2% of the toilets did not have any kind of superstructure, whereas the majority of superstructures (61%) made use of durable materials. There were however noticeable differences across socio-economic groups. Whereas 78% of the non-poor HH did have a superstructure made of durable materials, the corresponding figure for the ultra-poor and poor were only 24% and 39% respectively.

Table 12: Types of superstructures

	Ultra-poor	Poor	Non-Poor	Totals
No superstructure	3%	2%	1%	2%
Durable material	24%	39%	78%	61%
Non-durable material	62%	50%	14%	30%
Mix of durable and non-durable materials	11%	9%	6%	7%
	100%	100%	100%	100%

Money spent on toilets

Out of the 615 HH that constructed a toilet in the past two years, 559 HH (91%) spent money on their own toilets, with some only paying partially for the total costs; 35 HH (6%) had their toilet paid by others, and 21 HH (3%) had no recollection of how much they had spent on their toilets. Only one of the four ultra-poor HH did not spend for their toilets.

Table 13: Money spent on toilet construction in past two years

	Ultra-poor	Poor	Non-Poor	Totals
HH that constructed toilet in the past 2 years	87	189	339	615
Money spent on toilet				
<i>Don't know</i>	2%	2%	4%	3%
<i>Paid by others</i>	24%	4%	2%	6%
HH that spent money	74%	94%	94%	91%

On average, an equivalent of Taka 6,850 per toilet was spent by households. Across the social groups, the non-poor was found to be the biggest spenders (averaging Tk 9,900), and the ultra-poor spent the least (averaging Tk 1,500). It is highly likely that the average amount of Tk 1,500 spent by the ultra-poor represents own resources to top up subsidy received from either BRAC or the Union Parishad.

Table 14: Average amount spent on toilet construction

	Ultra-poor	Poor	Non-Poor	Total
Average amount spent in Tk.	1,500	3,850	9,900	6,850

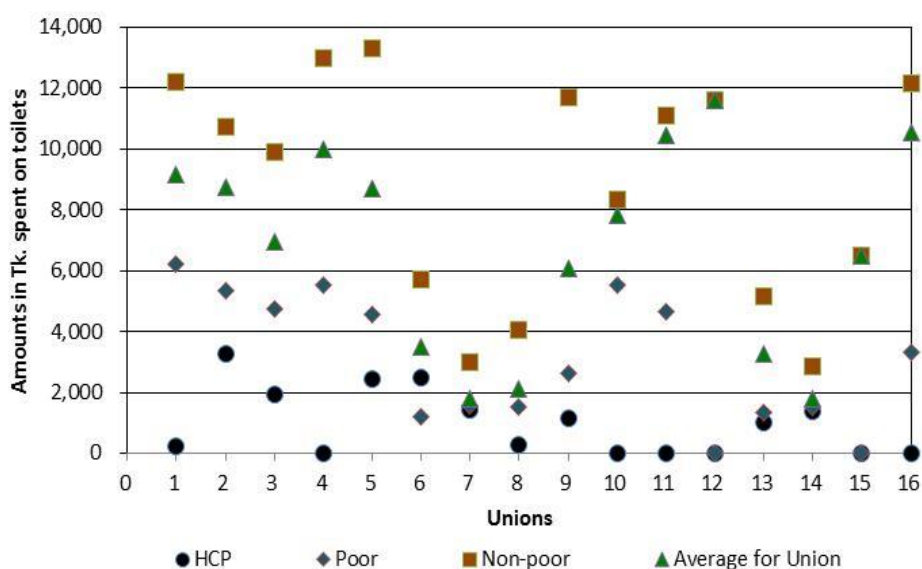


Figure 10: Average amounts spent on toilet construction per Union Parishad⁷

⁷ HCP ('hard core poor') refers to the ultra-poor. At the time of data gathering, the term HCP was still in use.

Quality of construction and hygienic status

The quality of construction requires ongoing attention. On average only 23% of all toilets were found to meet the following construction quality standards: 1) toilet has a fully closed pit or substructure so that human beings or animals do not get in contact with human excreta; 2) toilet has a functioning syphon with an intact water seal so that flies do not enter and emerge from the pit, and no odour wafts from the pit's contents; and 3) toilet is safely located away from a drinking water source.

Most of the toilets scored unsatisfactory with regard to their distance to drinking water sources. Only 34% of the toilets were found to be safely located away from drinking water sources. This issue is covered in more detail in section 4 'location of toilets'.

Table 15: Judgement on quality of toilet construction

	Ultra-poor	Poor	Non-Poor	Totals
Fully-closed pit	94%	97%	97%	97%
Functioning water seal	68%	77%	84%	80%
Safely located	57%	44%	25%	34%
Overall judgement	38%	31%	17%	23%

Although the figures appear to indicate that most pour-flush toilets had a functioning water seal — frequent travels to the field by the researchers and findings from the market research focused on toilet part producers provide a different picture. Most syphons available in the local market do not provide an adequate water seal.

Furthermore, most of the respondents (producers, hardware store proprietors and programme staff) appear to have no sound understanding of the purpose and function of a syphon.

Three out of four toilets (72%) met the following hygienic quality standards: 1) no human excreta is visible on either the slab (pan) or walls; 2) no flies are visible inside the toilet; and 3) no bad smell or odour inside the toilet.

The hygienic conditions of toilets were generally better in WASH I areas, with 91% of the toilets meeting the three hygienic quality standards, whereas only 55% of the toilets met these standards in WASH II areas.

The research findings indicate that ultra-poor HH find it more difficult to keep their toilet up to acceptable hygienic standard.

Table 16: Judgement on hygienic conditions of toilets

	Ultra-poor	Poor	Non-Poor	Totals
No faeces visible	96%	68%	81%	75%
No flies inside toilet	95%	65%	72%	67%
No bad smell in toilet	68%	78%	56%	64%
Overall judgement	52%	64%	78%	72%

5.3 Appropriateness of sanitation technologies

Owing to variation in geographic conditions, the appropriateness of the standard BRAC toilet design — a pour-flush toilet with two off-set pits — was found to not be all-encompassing.

On average 7% of the interviewed HH indicated that they face water shortages either due to long distances for fetching water or periodic seasonal shortages. In two sample villages, more than one-fifth of the HH faced regular water shortages.

Table 17: Union Parishads that face water scarcity or are at risk of toilet flooding

	Upazila	Union Parishad	% of HH facing water scarcity	% of HH at risk of toilet flooding
6	Durgapur	Gaokandi	10%	31%
8	Dakop	Sutarkhali	0%	33%
9	Fatikchori	Sundarpur	1%	69%
10	Fatikchori	Dantmara	24%	0%
13	Jamalgonj	Fenarbak	0%	25%
14	Jamalgonj	Jamalgonj	24%	23%
	Average	All unions	7%	14%

Of those interviewed, 14% of all HH with a toilet mentioned that their toilet faced periodic flooding as a consequence of flash floods or water logging. Five sample villages faced toilet flooding on a more regular basis: anywhere between 23% and 69%.

Preliminary findings point out to the need for alternative sanitation technologies to address these conditions, but also taking care that the market does not ‘flood’ areas with too many different technologies. Although consumers demand for alternative options to meet their needs, too many options will overwhelm consumers and may take decision-making and supplier training to unmanageable levels (Devine and Kullman, 2011).

In response to the above, BRAC is conducting research and testing a range of alternative sanitation technology options to meet HH needs. So far, the two most promising options are the following: 1) the SaTo toilet pan for water-scarce areas developed by American Standard; and a 2) simple-raised toilet for flood prone areas or water logging sites.

5.4 Location of sanitation facilities

Out of the total of 2,848 toilets observed, 955 (34%) were located at least 12 metres (or more) away from a tubewell or other types of drinking water source. This implies that two thirds of all toilets are not located at a safe distance from a drinking water source.

Toilet location is likely to have been influenced by a desire to situate the toilet next to a tubewell and bathroom for reasons of convenience. It may also have been influenced by the programme: after the introduction of the pour-flush toilet, HH were advised to locate the toilet in a close proximity to the home as this was considered convenient and safe for small children, adolescent girls and women, particularly at night.

Since opinions vary regarding the areas through which infiltration takes place, it cannot be said with certainty that HH in the sampled areas are at risk of consuming water

contaminated with faecal matter. However, considering the series consequences linked to consuming contaminated water, further research in the near future is necessary.

5.5 Location and accessibility of sanitation supply chain actors

Distance to and accessibility of supply chain actors do not appear to be problematic in 11 out of the 16 Union Parishads. In two Union Parishads, no toilet part producers could be found, at the time of the research. On average it takes some two hours to make a round trip to a toilet part producer, with a maximum average of seven hours in Fenarbak Union Parishad. This is because none of the sample villages in the Fenarbak Union Parishad is accessible by road. In total 76% of the 92 sample villages were found to be accessible by rickshaw or any other types of small vehicle.

It was found to be more difficult to obtain a realistic picture of the number of pit emptiers working in the sample Union Parishads. In six Union Parishads, no pit-emptying services were found, even where HH claimed to have used these services. This issue will require further attention as part of the ongoing faecal sludge management research activities.

Hardware stores were found in 14 out of the 16 Union Parishads, and appear to be a growing business with, on average, more than four hardware stores located in each Union Parishad.

5.6 Capacity of toilet part producers

When supply and demand are equal, the economy is said to have reached equilibrium. With equilibrium, the allocation of goods is at its most “efficient:” the amount of goods supplied is exactly the same as the amount of goods demanded (Heakal, n.d.). This is not the case for the majority of the sampled Union Parishads.

Table 18: Supply versus demand for toilet parts

	Upazila	Union Parishad	Current supply as % of demand	Potential supply as % of demand
2	Bhanga	Hamirdi	40%	160%
3	Sherpur	Khanpur	55%	87%
5	Durgapur	Birishiri	63%	84%
6	Durgapur	Goakandi	58%	93%
9	Fatikchori	Sundarpur	74%	168%
14	Jamalgonj	Fenarbak	15%	24%
	Average	All Unions	152%	224%

In comparing the supply of toilet parts with HH demand, some remarkable differences were found. Although it is important to note that toilet part producers are not boundary restricted — thus, a comparison between supply and demand in one Union Parishad is not straightforward — six Union Parishads were found to have a shortage in supply, and the remaining nine, with excessive supply.

In areas where there is shortage in supply, rapid uptake of toilets is foreseen because of high unmet demand. For those areas with an excess in supply, the viability of businesses, i.e., producers, are put at risk.

5.7 Sustainability of toilet part producers

Long-term viability of sanitation-related businesses features as a main research undertaking of the programme. This section focuses on toilet part producers as the most critical supply chain actor to facilitate uptake in rural sanitation improvements.

Experience and expertise

On average, the 35 sampled producers were found to be in business for 9.5 years: minimum of a few months to a maximum of 30 years. Eighteen producers were affiliated with the BRAC WASH programme. At the time of the research no BRAC-affiliated producers were found in 5 out of the 16 Union Parishads. This is likely to be explained by the absence of BRAC orders for the new Union Parishads. Average number of years of producer affiliation with BRAC is some two years, with a maximum of six years (BRAC WASH I Union Parishads) and a minimum of a few months (BRAC WASH II Union Parishads).

Based on the above, it can be assumed that long-term affiliation with BRAC influences performance of producers. Affiliation with BRAC affords producers with training activities, extra working capital in the form of loans to increase production, and system requirements that guide and control the quality of production.

Location

Preliminary findings of the research revealed that location and accessibility of business premises (point-of-sale) is critical for producers. It is clear that the number of potential customers and their purchasing power has an influence on the demand for toilet parts. It was also found, albeit unsurprisingly, that producers with operations at strategic locations (e.g., Upazila headquarters) fared better than those located in hard-to-reach rural areas.

Four (11%) of the 35 producers were located in an Upazila headquarter; 13 (37%) in a Union Parishad headquarter; and the remaining 18 (52%) in a small bazaar or village.

Product and business diversification

No producer will survive indefinitely by only producing and selling toilet parts, especially when toilet coverage starts to reach a saturation point. The long-term viability of producers therefore depends on their ability to diversify their business portfolio. The following was found:

- **No diversification:** nine (26%) of the 35 businesses produced only toilet parts.
- **Product diversification:** five (14%) of the 35 businesses produced toilet parts and other concrete products.
- **Business diversification:** 12 (34%) of the 35 businesses produced toilet parts, but also had other types of businesses.
- **Product and business diversification:** nine (26%) of the 35 businesses produced toilet parts and other concrete products, but also had additional types of businesses.

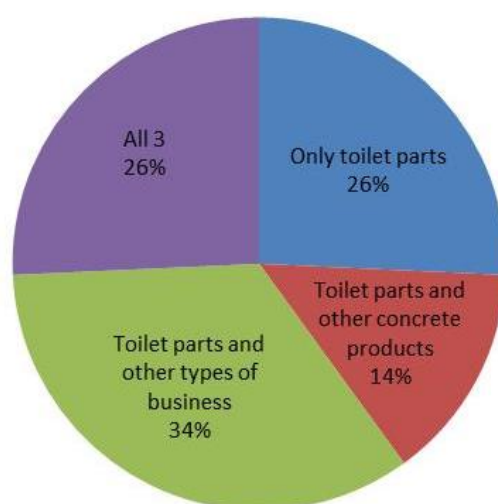


Figure 11: General business portfolio of toilet producers

In total 14 businesses (40%) were producing and selling other building-construction related concrete products, and a total of 21 businesses (60%) were involved in some type of 'other' business. A majority (62%) engaged in businesses related to their core business, others (38%) were not.

Table 19: Details of business diversification

Details of other types of business	#	%
Core business related		61.9%
<i>Supplying bricks, sand and or stone</i>	5	23.8%
<i>Construction-related businesses</i>	3	14.3%
<i>Hardware shop</i>	2	9.5%
<i>Raj mistri (mason)</i>	2	9.5%
<i>Furniture, iron bar business</i>	1	4.8%
Non-core business related		38.1%
<i>Agriculture oriented businesses</i>	3	14.3%
<i>Poultry and fisheries</i>	3	14.3%
<i>Other small businesses</i>	2	9.5%
	21	100%

Consumer segments

The research revealed that in BRAC-supported Union Parishads, ultra-poor HH constitute the biggest consumer segment of toilet part producers. This is because the ultra-poor are supported financially by BRAC through a grant (provided in kind) that covers the costs to obtain a complete set of toilet parts. Households categorised as poor receive financial support from BRAC in the form of an interest-free loan. But the provided loan does not cover the costs for a complete set of toilet parts. Consequently most of these HH opt for a single (direct) pit instead of a double off-set pit design that is made available to ultra-poor HH.

The research revealed that non-poor HH — the social grouping with the highest purchasing power — are more likely to construct a toilet without any involvement of toilet part producers. Often, non-poor HH directly contract local artisans (*raj mistris*). On average, 26% of the

interviewed non-poor HH opted to construct a toilet with one or more rectangular faecal sludge holding tank. In one Union Parishad, up to 56% of the non-poor HH installed rectangular tanks. In comparison, poor HH averaged at only 5%, and no rectangular tank was found in ultra-poor HH.

Promotion and marketing

Although promotion and marketing are considered important elements to raise awareness on the existence of products and producers (suppliers) to expand business opportunities, none of the producers sampled carried these out actively. However, since 97% of all households interviewed claim to know where toilet parts may be purchased, it is not certain whether such activities are still required — unless producers decide to diversify their products and/ or business portfolio.

Business constraints

Lack of access to financing (working capital) and challenges related to excessive competition were the top two constraints mentioned by those interviewed. The succeeding table presents an overview of business constraints mentioned by the producers sampled.

Table 20: Business constraints faced by toilet producers

Business constraints	% of sampled producers
Lack of access to financing	63%
Low-profit margin	54%
Low-sales volume	49%
High competition	37%
Difficulty in obtaining raw materials	17%
Lack of skilled workers	14%

Producers gone out of business

An overview of producers that had gone out of business after BRAC WASH I programme was also produced by the research.

Of the total of 1,794 producers, 480 producers (27%) had gone out of business in the last couple of years. Some of the main reasons behind this are:

- Low profit margins/ loss making;
- Less demand/ low-sales volume;
- Lack of access to financing;
- Migration to other parts of Bangladesh, or to another country; and
- Change of nature of business.

The first three reasons are identical to the main business constraints mentioned earlier. Findings suggest that the issue of long-term sustainability (viability) of toilet part producers will require further attention in the near future. It is critical to find ways to make sure that a sufficient number of producers remain in business to respond to current and future consumer demands.

For sanitation businesses to be viable, the answer lies in product and service diversification. It is very unlikely that sanitation businesses will survive by just meeting the demands of ultra-poor and poor HH. Producers will need to diversify their product and services to attract more affluent non-poor households. Where necessary, diversification in other viable business must also be considered.

5.8 Quality of production

The quality of production by toilet part producers was judged on a total of five quality indicators: 1) slab with pan is casted in one go; 2) the size and angle of the footrests is according to BRAC standards; 3) the size of the plastic pan is minimally 18"; 4) a functioning syphon is connected to the pan; and 5) the slab is able to withstand the weight.

Since assessment was based on the observation of completed products, certain aspects could not be judged (e.g. concrete mortar mixture, amount of reinforcement used, curing, etc.). Of the 35 producers, 13 were found to be producing below-standard products (receiving a quality score of less than 75%; with 11 scoring below 50%). Of the 18 producers affiliated with BRAC, 16 received a quality score of 75% or above.

The biggest problems in relation to BRAC quality standards are given below:

- Toilet pan meets BRAC standards: 17 producers (49%) did not comply.
- Size and angle of foot rest meets BRAC standards: 12 producers (34%) did not comply.
- A functioning syphon is connected to the toilet pan: 8 producers (24%) did not comply.

Within the BRAC programme, certain steps have been set in motion to enhance the quality of production. These steps establish clear quality standards and strengthen the capacity of programme staff to conduct quality control visits. A simple-to-use quality control tool has been designed for this purpose. This tool calculates producer compliance with BRAC quality standards through a scoring system (5 being the highest). Assigned stars to a business are intended to reflect on a business' quality and compliance with BRAC standards. Furthermore, BRAC intends to engage actively in the identification and shortlisting of a range of brands that produce quality toilet pans and syphons that provide functioning water seals.

There is also an urgent need to adjust the standard prices of toilet parts paid by BRAC. At the beginning of WASH II, prices of toilet parts were fixed and have remained unchanged throughout the years. General price increase in response to annual rates of inflation had not taken place. Furthermore, standard price setting failed to account for differences in production costs, in different parts of the country. On average the cost of toilet parts charged to non-BRAC customers is some 20% higher than what is being paid by BRAC.

Initial research findings suggest that BRAC encountered difficulties in striking a healthy balance between achieving maximum programme results at minimum costs, and supporting in the development of viable sanitation businesses. Future programmes should try to create a 'win-win' situation for organisational/ programme objectives (including their beneficiaries) and businesses.

5.9 Costs of toilet construction

During the research, an attempt was made to extract indicative information on HH ability and willingness to pay for a new toilet in the 16 Union Parishads studied. The ability to pay is

inferred from the actual amounts HH had spent in the construction of new toilets in the past two years. Willingness to pay is inferred from the amounts HH without a toilet indicated that they would spend for toilet construction.

This part of the research is limited to providing indicative data on what ultra-poor and poor HH in rural areas think how much a toilet costs, and how much they are able and willing to put into its construction.

Table 21 presents an overview of ultra-poor and poor HH ability to pay, with an 'own investment' amount of Tk. 1,500 and Tk. 2,500 needed, respectively, to complete toilet construction. In the table, red traffic lights indicate that 'own investment' amount required is higher than the amount HH are able to invest. If current investment levels become an indication for the near future then the table shows a large number of Union Parishads with foreseeable problems, particularly for ultra-poor HH.

Table 21: Ability to pay for toilets

	UPAZILA	UNION	HCP HH		POOR HH	
			AMOUNT SPENT ON EXISTING TOILET	AMOUNT SUFFICIENT?	AMOUNT SUFFICIENT?	AMOUNT WILLING TO PAY FOR NEW TOILET
				1,500	2,500	
1	BHANGA	ALGI	250	Red	Green	6,200
4	SHERPUR	MIRZAPUR	0	Red	Green	5,550
7	DAKOP	PANKHALI	1,450	Yellow	Red	1,550
8	DAKOP	SUTARKHALI	300	Red	Red	1,500
9	FATICKCHORI	SUNDORPUR	1,150	Red	Green	2,650
10	FATICKCHARI	DANT MARA	0	Red	Green	5,550
11	AKKELPUR	SONAMUKHI	0	Red	Green	4,650
12	AKKELPUR	RAIKHALI	0	Red	White	0
13	JAMALGONJ	FENARBAK	1,000	Red	Red	1,350
14	JAMALGONJ	JAMALGONJ	1,400	Yellow	Red	1,500
15	MEGHNA	BORO KANDA	0	Red	White	0
16	MEGHNA	MANIKAR CHOR	0	Red	Green	3,300

Legend:

- Green: no problem; amount paid for existing toilets or willing to pay for new toilets is above minimum amount required.
- Yellow: amount paid for existing toilets or willing to pay for new toilets is the same or very close to the minimum amount required.
- Red: problem: amount paid for existing toilets or willing to pay for new toilets is below the minimum amount required.

The succeeding table provides an overview of the willingness of ultra-poor and poor HH to pay for toilets. Considering the possible questions of reliability when HH are asked how much they are willing to invest, the information provided in this table is somewhat more difficult to judge and validate. Even so it shows that it is very likely that a substantial number of ultra-poor and poor HH will find it difficult to invest the additional amounts required to construct a new toilet.

Table 22: Willingness to pay for toilets

	UPAZILA	UNION	HCP HH		POOR HH	
			AMOUNT WILLING TO PAY FOR NEW TOILET	AMOUNT SUFFICIENT?	AMOUNT SUFFICIENT?	AMOUNT WILLING TO PAY FOR NEW TOILET
				1,500	2,500	
1	BHANGA	ALGI	450			900
6	DURGAPUR	GOAKANDI	950			2,100
7	DAKOP	PANKHALI	300			550
8	DAKOP	SUTARKHALI	1,100			600
9	FATICKCHORI	SUNDORPUR	1,200			0
10	FATICKCHARI	DANT MARA	950			1,000
12	AKKELPUR	RAIKHALI	1,950			2,450
13	JAMALGONJ	FENARBAK	50			200
14	JAMALGONJ	JAMALGONJ	450			1,300

In conclusion initial and rapid research on this topic revealed the following:

- Grants for ultra-poor HH and loans for poor HH are justified otherwise households within these social groups would not be able to construct hygienic toilets on their own.
- Grants and loans do not fully cover the actual costs of toilet production and household toilet installation.
- Amount of grants and loans are not informed realistically by ultra-poor and poor HH ability and willingness to pay.

Whereas grant and loan amounts are fixed, actual construction costs and the ability to pay vary across the Union Parishads studied. Although some 77% of ultra-poor HH and 94% of poor HH did spend some money for toilet construction, the same HH are not always able to pay for the extra costs needed to complete their toilet. BRAC grants and loans, in their current amounts, are insufficient to meet all the costs required to construct a toilet.

Ability-to-pay-related problems are foreseen in seven out of the 16 Union Parishads for both the ultra-poor and poor HH. It is expected that a majority of ultra-poor and poor HH in these Union Parishads will not be able to put in the money required to construct a hygienic toilet. It may also not be surprising that the same Union Parishads scored relatively low on a range of poverty indicators.

Initial findings suggest that reaching the 'last mile' in improved sanitation coverage will be unsuccessful in the absence of a change in strategy. Coverage of 100% is unlikely to be achieved, and it is expected that the quality of production and toilet construction will be compromised.

To date there already is a noticeable difference in quality and benefits afforded to ultra-poor and poor HH. The ultra-poor HH enjoy the benefits of a receiving a BRAC standard toilet: pour-flush with two alternative off-set pits, while the majority of poor HH that receive less support from BRAC, opt for the cheaper single-pit latrine as a financial consideration.

5.10 Knowledge about sanitation technologies

Lack of or limited access to adequate knowledge regarding different sanitation technologies — on the part of customers, as well as supply chain actors — are among the main challenges uncovered by the research. The tendency is to duplicate what relatives and neighbours would use. Of those HH found without a toilet, 99% indicated that they would like to construct a pour-flush toilet without understanding its cost implications and full requirements. In some areas, pour-flush toilets may be inappropriate when considering costs (including maintenance costs) and water availability.

Some 61% of all HH were of the impression that they themselves had enough knowledge to make an informed decision on the type of toilet technology, 33% thought that they had some knowledge, and the remaining 6% did not have an answer or indicated that they did not have any knowledge. In Table 23, producer-consumer response to the above set of questions reveals striking difference. On having sufficient (access) to knowledge, only one out of four HH (26%) have sufficient (access to) knowledge, whereas the corresponding figure for producers is 37%.

Table 23: Overall scores on (access to) knowledge

	Producers	Consumers (HH)
Sufficient (access to) knowledge	37%	26%
Some (access to) knowledge	43%	31%
Insufficient (access to) knowledge	20%	43%
Total	100%	100%

The above findings validate statements articulated in section 5.3: that, ‘quality of construction’ and ‘appropriateness of existing sanitation technologies’ are context and place-specific. There is a general lack of experience and knowledge to adopt alternative technologies or to modify existing technologies. This implies that the same technologies are applied all over Bangladesh, even if these may be unfit for certain areas.

As mentioned in section 5.3, BRAC is busy searching for alternative sanitation technologies. The introduction of alternative sanitation technologies and the subsequent dissemination of knowledge related to alternatives is something that requires attention in the coming period. Toilet part producers, for example, are considered instrumental in knowledge dissemination to potential customers.

5.11 Demand and supply for pit-emptying services

As part of the research a total of 2,848 HH with a toilet and 25 pit emptying service providers were interviewed on current pit emptying practices.

Demand for pit-emptying services

1,189 (42%) of all HH with a toilet had the pit of their toilet emptied at least once. Of this number, almost all (99%) had their pit emptied in the past two years.

Table 24: Pit-emptying occurrences

	Ultra-poor	Poor	Non-Poor	Totals
# of HH with toilet	280	854	1,714	2,848
# of HH with pit emptied	111	433	645	1,189
% of HH with pit emptied	40%	51%	38%	42%
Average time it takes to fill up pits in years	2.6	2.3	2.9	2.7

Assuming that pits were emptied as soon as they reach their storage capacity, on average, it took some 2.7 years for pits to fill up. Research findings suggest that poor HH need to empty their pits earlier than ultra-poor and non-poor HH.

These findings do not appear to be supportive of earlier results on average storage capacity of sub-structures (see information on 'Type of toilets' in section 5.2 Access to sanitation facilities). However, these findings do reflect the general impression that due to a lack of sufficient funds, poor HH tend to construct toilet sub-structures with fewer concrete rings in comparison to ultra-poor HH (which receives subsidy support) and non-poor HH (which has higher paying capacity).

A vast majority (71%) of the pits was emptied by sweepers (70%) and by others (1%), but still some 29% of HH claim to have emptied the pits themselves.

Table 25: Pit emptied by whom

	Ultra-poor	Poor	Non-Poor	Totals
By HH ('do-it-yourself')	41%	39%	21%	29%
By sweeper	59%	61%	77%	70%
By vacuum truck	0%	0%	1%	0%
By others	1%	0%	1%	1%
	100%	100%	100%	100%

As the total number of do-it-yourself HH pit emptiers appears high, further sense-making was carried out. Researchers found that in some Union Parishads, toilets were emptied 'automatically' during the rainy season when flooding occurred. Table 26 shows the correlation between pits emptied by HH and the risk of toilet flooding.

Table 26: Correlation between pit emptying and risk of toilet flooding

	Upazila	Union Parishad	% of HH that emptied full pit	% of HH at risk of toilet flooding
6	Durgapur	Goakandi	84%	58%
8	Dakop	Sutarkhali	37%	86%
9	Fatikchori	Sundarpur	0%	79%
13	Jamalgonj	Fenarbak	88%	88%
14	Jamalgonj	Jamalganj	69%	73%
	Average	All union	29%	26%

Of the five Union Parishads at high risk of toilet flooding, three showed an equally high percentage of pits emptied by the HH themselves; only one Union Parishad did not reflect this association. This implies that the total number of HH that empty their own pits may be lower than the 29% average found in Table 26. Due to the absence of mechanised pit-emptying service providers, all toilets had been emptied manually — a huge majority of which is done by locally-available sweepers.

Demand for pit-emptying services

A total of 25 pit emptiers (sweepers) were interviewed as part of the market research. For reasons unclear to the main researchers, remunerators were unable to locate sweepers in all sample Union Parishads even when HH interviewed in the same unions indicated that they employed sweeper services for pit emptying.

A fifth of the respondents (22%) identified pit emptying as their core and fulltime business. More than half of all respondents (57%) indicated that they engaged in side jobs.

Based on information gathered from the 25 pit emptier respondents, the frequency in pit emptying is presented in Table 27.

Table 27: Pit-emptying frequency and volumes per provider

	MIN	MAX	Average
# of pits emptied per month	1	150	43
# of septic tanks emptied per month	0	20	4
Average capacity per day in # of pits emptied per sweeper	0.9	3.3	1.5

An initial comparison of current supply and demand for pit-emptying services suggests that the number of pit emptiers to address current and future supply is insufficient. However, as difficulties were encountered in locating sweepers and because during the interviews, HH did not indicate any problems in availing pit-emptying services — the research concluded that current supply is sufficient. However, supply is only sufficient for today’s reality of 60% sanitation coverage; an increase to 100% coverage will merit revisiting the numbers and availability of pit-emptying services.

Seasonal variation

Pit emptiers interviewed stated that the busiest time of the year for pit emptying is during the rainy season: from June to August (47%), followed by the winter season: from mid-November to early January (26%). The rainy season often results in high water tables, which in turn triggers toilet flooding. Pits can experience toilet flooding even when not filled with faecal matter. High water levels in the pits may affect the proper functioning of pour-flush toilets; hence, the need to empty pits during this time.

Table 28: Timing of pit emptying

	In %
Summer (March to May)	14.0%
Rainy season (June to August)	46.5%
Autumn (September to mid-October)	2.3%
Late autumn (mid-October to mid-November)	0%

	In %
Winter (mid-November to early January)	25.6%
Spring (January to February)	11.6%

Costs of pit-emptying services

Out of the 1,189 HH interviewed, 838 HH had paid money to have their pit emptied. The average cost for manual pit emptying is Taka 350 per pit, which translates to some Taka 70 per concrete pit ring.

Table 29: Average cost in Taka for pit emptying paid by HH

	Ultra-poor	Poor	Non-Poor	Totals
Costs for emptying one single pit	250	275	375	350
Average cost per ring				70

The prices quoted by the pit emptiers are noticeably higher, with an average cost of Taka 115 for one concrete pit ring.

Table 30: Cost for pit emptying in Taka quoted by pit emptiers

	MIN	MAX	Average
Average cost for pit emptying per ring	50	300	115

It is assumed that pit-emptying costs mentioned by the HH are more reliable because number of HH respondents (838) is tipped in favour of HH; only 25 pit emptiers were interviewed.

Faecal sludge disposal practices

Interviews with HH established that 84% dumped faecal sludge in a (newly-dug) pit near the existing pit. This is pretty much in line with the answers provided by the manual pit emptiers. Some 8% of the HH mentioned that the contents of the pit were disposed of out in the open environment, either 'automatically' when toilets get flooded (6%) or on common ground (2%).

Table 31: Most common disposal and reuse options

	Producers	Consumers (HH)
Disposal options		
<i>Near or around the house</i>	95%	93%
<i>Away from the house</i>	5%	6%
<i>Taken away by pit emptier</i>	0%	0%
Reuse options		
<i>Direct use</i>	20%	2%
<i>Indirect or delayed reuse</i>	18%	2%
Total reuse	38%	4%

Only 4% of the HH claimed to have reused faecal sludge either by dumping it directly on their fields (or vegetable gardens), or in fish cultivation ponds.

BRAC is currently investigating both small-scale and large-scale faecal sludge reuse business models.

Promotion and marketing

None of the pit emptiers undertake any serious form of promotion or marketing activities. The arrival of mobile phones appears to have made a huge impact on both the providers and consumers: 18 pit emptiers (78%) waited for service calls; 15 (65%) relied on ‘word-of-mouth’; and 6 (26%) still walk around the villages to directly offer their services to potential consumers.

Business constraints

Table 32 presents an overview of business constraints faced by the pit emptiers interviewed. The lack of transportation to reach out to customers, the low volume of work and the lack of mechanised equipment to empty pits were mentioned with frequency.

Table 32: Business constraints faced by manual pit emptiers

Business constraints	In %
Lack of transportation to reach customers	25%
Low volume of work	21%
Lack of mechanised equipment	20%
Difficulties in accessing pit content	11%
Lack of faecal sludge disposal sites	9%
High competition	7%
Low-income levels	5%
Other constraints	2%

Although manual pit emptying is a risky and potentially dangerous occupation, the lack of safety equipment was not brought up by anyone. However, it is possible that respondents felt that safety equipment was also addressed by ‘mechanised equipment’.

6 Conclusions and recommendations

6.1 Conclusions

WHO are the customers and WHO are the supply side actors?

Households: 4,753 HH in 92 villages in 16 Union Parishads were included in the sample. 76% of all HH had access to a toilet, either through: actual ownership (60% of all HH) or the use of neighbouring (or other’s) toilets (41% of HH without toilet). Some 16% of all HH continued to defecate out in the open and the remaining 8% of all HH either use someone else’s toilet or no toilet at all.

Supply chain actors: 93 different supply chain actors were included in the sample. Toilet part producers were found in all but 2 Unions and hardware stores and pit emptiers were operating in all 16 Unions.

Producers: 18 producers were affiliated to the BRAC WASH programme and a quarter of all producers had not diversified their product and or business portfolio.

PLACE: Where are the customers and where are the supply side actors?

Except for one Union Parishad, most HH have relatively easy access to the producers, even though only 76% of the 92 villages sampled were accessible by rickshaw or any other type of small vehicle. Hardware stores are everywhere, and businesses are growing rapidly. In a couple of Union Parishads, the researchers found it difficult to locate manual pit emptiers, despite HH claims to have obtained pit-emptying services. As there is still a lot of shame surrounding the admission to pit emptying, the number of HH that emptied their own pits may actually be remarkably higher.⁸

PRODUCTS: What is needed and what is made available?

Regarding first-time consumers, 99% of HH without a toilet were not satisfied with the present situation. Inconvenience and low status were the strongest reasons. 79% of HH were interested to have a toilet, whereas 9% were not interested; the remaining 12% expressed uncertainty and needed to put more thought into it.

56% of HH with a toilet were not (fully) satisfied. Dissatisfaction on the quality of construction (durability, appearance, etc.) was expressed the strongest. Only one out of four toilets met construction quality standards. Non-functioning water seals and the location of toilets (proximity to a drinking water source) were considered the main problems. Almost half of all HH were considering improvements (11%), replacement (8%), or the construction of an additional toilet (30%).

In six Union Parishads, a shortage in supply of toilet parts was found; this is considered to likely have negative consequences in the uptake of toilets. In nine Union Parishads excessive supply was considered problematic and will most likely have a negative impact on the sustainability or viability of producers. Across the Union Parishads, 13 out of 35 producers were found to deliver below-standard products, often due to non-functioning syphons and low-quality toilet pans.

Findings point out to the need for supply chain actors to provide for first-time consumers and repeat consumers, with the latter increasingly making up the larger segment of the market. At present toilet part producers primarily sell their products to ultra-poor and poor HH, who are recipients of external financial support. Very soon, producers will need to diversify their products and service range to attract non-poor HH.

Demand for pit-emptying services was found to be relatively low, but is expected to grow with increased coverage. A large majority of the pits are emptied by sweepers; however the research could not establish whether sweeper numbers can cope with future increases in demand.

PRICE: How much can they afford and how much does it cost?

Most ultra-poor and poor HH will find it difficult to construct the types of hygienic toilets promoted by BRAC, without financial support.

⁸ Jess MacArthur, Research Team Lead and WASH Technical Advisor, of iDE commented the following while proof reading the final draft of this report: "I actually think this is because people are not telling the truth. We found that there is a lot a shame around pit emptying. Both for those who are employed to do it and those who do it on their own. While everyone could tell me how much it costs to empty a pit, I got the impression over and over that they were trying to make up something about using a sweeper." Personal communication with the author dated 23 September 2014.

Differentiated support extended to ultra-poor and poor HH have created noticeable distinction in the types of toilets owned by each social grouping. Fixed grant and loan amounts fail to cover the full construction costs of toilets, and do not systematically account for social grouping ability and willingness to pay; ability-to-pay problems were found in seven out of the 16 Unions sampled.

Standard fees for toilet parts paid by BRAC at the start of the programme had remained unchanged. Standard fees do not reflect the reality and have yet to be adjusted according to annual inflation rates, geographic differences (for production costs), etc. Consequently toilet parts sold to non-BRAC customers are on average 22% more expensive than those sold to BRAC. To avoid market distortion and to support the establishment of viable businesses it is essential that a fair price is paid to the producers.

PROMOTION: Are products promoted?

None of the producers carried out any active marketing or promotion activities. The absence or lack of such activities does not appear problematic as almost all HH claimed to know where toilet parts may be obtained. Even so iDE found that sales figures went up significantly with active promotion using sales agents. Even in areas with high latrine saturation, sales were taking place with promotional activities. A wider product line would additionally strengthen these activities.

Promotion becomes even more critical when producers decide to diversify their product line and or business portfolio.

Do they have the KNOWLEDGE to decide or to advise?

Only 26% of HH were found to have sufficient (access to) knowledge. A recurring problem is the tendency to duplicate the work of others — including those with an adverse effect in improving sanitation coverage.

Only 37% of all toilet part producers were found to have sufficient knowledge. They may know how to produce and sell toilet parts, but they were found to lack the capacity to advise customers about their different toilet options.

6.2 Recommendations and possible supply chain interventions

Provide alternative toilet designs

The uniform toilet design employed by the programme is not appropriate for all geographic locations and socio-economic conditions in Bangladesh. Alternative technology options should be considered, taking into account water logging areas and the high occurrence of flash floods (e.g., raised toilets). Research on low-cost sanitation technologies is ongoing and is expected to offer alternatives.

Toilet options that provide a better ‘match’ with the ability and willingness of households to pay will also need to be considered. A modular system that allows consumers to build up their toilet, whenever they are able to afford it, should be considered.

Development of an easy-to-use sanitation catalogue will help interested villagers and rural sanitation centres (RSCs) to make informed choices and decisions on technology options, payments, etc.

Ensure safe location of toilets

Toilets must be located safely away from tubewells. The programme played a crucial role in raising awareness within the target population to ensure safe distances. For this purpose key communication messages on safe distance between toilet and drinking water points must be developed and tested in the field. Field staff will have to receive the appropriate training on how to communicate and disseminate key messages to Village Water Committees (VWCs), tubewell drillers and the general public. An easy-to-use catalogue will be most beneficial.

Design alternative and more flexible financial support mechanisms

A more flexible approach to offering financial support should be developed to also benefit poor HH. Existing grant and loan arrangements are insufficient and lack in context, that is, the ability and willingness of ultra-poor and poor HH to pay. This could mean increasing the amount of grants and loans where necessary, and decreasing where possible. As this is understandably a complex and contentious issue, strategic thinking at senior management level is required to develop appropriate and effective solutions for implementation, within the limits of resource availability.

The following provides an overview of elements that need to be considered when developing supply chain strengthening interventions.

Selection of rural sanitation centres (RSCs)

Before engaging with new RSCs, rapid assessments of RSCs should be conducted to get better insight into: 1) the quality of production; and 2) the overall performance of the business. The assessment should answer the question 'How healthy is the business' by looking at issues, such as sales volume, profitability, entrepreneurial skills, talent and attitude, product and business diversification, access to finance and so on. Where possible, well-performing entrepreneurs with long-term potential should be identified and selected.

Capacity building

'Tailored' capacity building support should be determined on the basis of the rapid assessment conducted, and entrepreneurs should participate to ensure that they receive the training required to meet their needs and those of their consumers. Some training activities to be considered include: 1) basic training focused on quality of production and increasing knowledge on the different toilet types available in the market; and 2) business skills training focused on imparting skills to run a successful business. Training activities could consist of different modules, such as: 1) demand creation through promotion and marketing activities and product development; 2) bookkeeping, costing and profit setting; and 3) linking with financing institutions, preparation of loan requests, etc. Post-training follow-up activities should be provided to interested entrepreneurs.

Business diversification

Producers will go out of business — particularly in areas where sanitation coverage is reaching saturation point — if they do not diversify. It is important that a sufficient number of producers remain in business to respond to current and future consumer demands. The programme should actively promote or encourage business diversification as no producer will survive solely on producing and selling toilet parts.

RSCs will have to address the needs of both first-time and repeat consumers, and they should also develop products and services that meet the needs of the non-poor. A range of options should be considered, both for existing business-related product development, for

example producing other concrete products, providing after-sales services (transportation, installation, repair services), and diversifying into new businesses. Opportunities will however vary depending on the location of the business.

Quality assurance

The programme should apply BRAC's updated quality standards and its newly-introduced RSC certification system in all BRAC-associated RSCs. All programme staff will have to receive training on the application of both. Similarly Upazila Managers and Programme Organisers need to receive training on coaching to enable them to provide on-the-job guidance to Programme Assistants. Regular visits to RSCs should be carried out to check the quality of production and a RSC-reward or recognition system may be beneficial to acknowledge the work of well-performing RSCs.

Financial support

The programme should facilitate linkages between RSCs and existing financing institutions as the programme will never be able to provide the sort of loans required to run a business especially if it decides to diversify its portfolio. Consider providing interest-free loans to RSCs as the amounts borrowed are never significant and should be considered as a token of goodwill. Alternatively, an advance payment — of up to 20% of the total value of the order depending on its size, for example — at the time of order placement will significantly reduce loan-related administrative burden on the programme, and will provide the RSC with working capital.

Sanitation options catalogue

Develop a simple sanitation options manual or informed choice catalogue that provides detailed information on a range of existing alternative toilet options. The catalogue will be used by programme staff and RSCs to inform potential consumers on the different options available to them. Training on the use of the informed choice catalogue needs to be provided to programme staff and to the RSCs.

Price setting

A more flexible approach will be required because fixed prices do not meet the context and place-specific realities of the country. BRAC should pay fair market prices for its toilet parts from RSCs. Should prices continue to be set, pricing will need to consider differences in production costs in different parts of the country, as well as general price increases as a consequence of annual rates of inflation.

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List of annexes

Annex 1: Sample size calculator

BRAC WASH II PROGRAMME DEMAND AND SUPPLY STUDY UPAZILA SHERPUR				
DETERMINED SAMPLE SIZE IN %			5%	
UNION	TOTAL NO OF HH	IN % OF TOTAL	CALCULATED SAMPLE SIZE	ROUNDED SAMPLE SIZE
BOROKANDA	2,224	44%	111	110
MANIKERCHAR	2,882	56%	144	140
		0%	0	0
		0%	0	0
		0%	0	0
		0%	0	0
		0%	0	0
	5,106	100%	255	250

DEMAND AND SUPPLY STUDY UPAZILA SHERPUR BOROKANDA UNION										
TOTAL SAMPLE SIZE FOR THIS UNION			110							
SAMPLE SIZE PER VILLAGE				125	25					
VILLAGE	NO OF HH	IN %	PROPORTIONAL SAMPLE SIZE	MAX SAMPLE SIZE PER VILLAGE	MIN SAMPLE SIZE PER VILLAGE	FINAL SAMPLE SIZE		FINAL SAMPLE SIZE		
						IN #	IN %	HH WITH TOILET	HH WITHOUT TOILET	
HARIPUR	762	34%	38	38	38	25	3%	17	8	
FARAJIKANDI	48	2%	2	2	25	25	52%	20	5	
DURGAPUR RAMPUR	125	6%	6	6	25	25	20%	18	7	
SONAKANDA	279	13%	14	14	25	25	9%	18	7	
KANDARGAON	262	12%	13	13	25	25	10%	18	7	
BAROKANDA	748	34%	37	37	37	25	3%	17	8	
		0%	0	0	0	0	0%	0	0	
		0%	0	0	0	0	0%	0	0	
TOTALS	2,224	100%	110	110	125	150	7%	107	43	
TOTAL # OF HH	2,224		110			150				
	100%		4.9%			6.7%				

DEMAND AND SUPPLY STUDY UPAZILA SHERPUR BOROKANDA UNION				
VILLAGE #1	HARIPUR		SAMPLE SIZE	25
	HH	IN %	SAMPLE	
HCP	152	20%		5
POOR	78	10%		3
NON-POOR	532	70%		17
TOTALS	762	100%		25
HH WITH TOILET	510	67%		17
HH WITHOUT TOILET	252	33%		8
TOTALS	762	100%		25

Annex 2: Example of the dashboard of Algi Union in Bhanga Upazila

DEMAND SIDE		SUPPLY SIDE
WHO are the potential customers?		WHO are the supply side actors ?
→ Type and quantity of potential customers / consumers		→ Type and quantity of supply side actors
▶ Hard-core poor, poor and non-poor households		▶ Producers, hardware stores and pit emptying services
▶ Households with and without toilets		→ Background and experience of key supply side actors
PLACE: Where are the customers?		PLACE: Where are the supply side actors?
→ Location		→ Location
▶ Distance and accessibility		▶ Distance and accessibility
▶ Appropriateness of BRAC sanitation technology		
PRODUCTS: What do they need now and in future?		PRODUCTS: What products and services are made available?
→ Type and volume of products and services		→ Type and volume of products and services
▶ Demand for new toilets		▶ Demand for new toilets
▶ Combined demand for new toilets and upgrades		▶ Combined demand for new toilets and upgrades
▶ Pit emptying services current demand		▶ Pit emptying services current demand
▶ Pit emptying services future demand		▶ Pit emptying services future demand
		→ Quality of available products and services
PRICE: How much can they afford?		PRICE: How much does it cost?
→ Ability and willingness to pay		→ Costs of products and services
▶ Ability to pay for new toilets		▶ Costs of a BRAC toilet
▶ Ability to pay for improving existing toilets		▶ Costs of a new pit and slab
▶ Ability to pay for pit emptying services		▶ Costs of pit emptying
▶ Amount willing to pay for new toilets		
▶ Amount willing to pay for improving existing toilets		
		PROMOTION: Do they promote their products?
		→ Promotion by key supply chain actors
		▶ Intensity of promotion activities
Do they have KNOWLEDGE to make an informed decision?		Do they have KNOWLEDGE on sanitation technology options?
→ Knowledge about sanitation technologies		→ Technical experience
▶ Overall judgement on customers' knowledge		▶ Suppliers' production and technical knowhow

How to read the traffic lights in the dashboard?

- Green: balance between demand and supply of 75% and more: these issues require no attention.
- Yellow: balance between demand and supply between 50% and 75%: these issues deserve attention but only after the red traffic light issues have been addressed.
- Red: balance between demand and supply of less than 50%: these issues require immediate attention and need to be analysed further.

Annex 3: Rural sanitation supply chain actors map for BRAC WASH I and II areas

