Current Water and Sanitation Management in Khulna

Md Abdullah P. Eng.
Managing Director,
Khulna WASA

Khulna, 8 Sep, 2013

Country Context

-Bangladesh is considered to be one of the densely populated countries in the world with over 160 million people in a land area of just 147570 sq km.

-Although the country faces a number of micro and macro economical challenges. In the recent past, the country has maintained a steady growth rate.

-Providing access to safe drinking water and sanitation services for all is a major development goal of the Government of Bangladesh. Accordingly LGD has prepared a SDP to guide the water supply and sanitation sector in the attainment of government's goal.

-Sanitation is still one of the biggest challenges for Bangladesh although it has made some good progress in increasing sanitation coverage during the past 10 years

- A well coordinated effort by the Government, non-government development agencies and other development partners as well as the introduction of the innovative community-led Total

- Despite this significant gain, the challenge still remains high as about of the population do not have access to safe sanitation
- The 2010 WHO- UNICEF Joint Monitoring program (JMP) report shows that only about 54% of the population has access to improved sanitation facilities. Besides, 25% and over 15% population has access to Shared and unimproved sanitation facilities respectively
- Urban sanitation in Bangladesh is a big challenge but still an area that is overlooked by policy and program
- A recent gap analysis report says, " with sewerage systems (only in parts of Dhaka city0 and septic tanks (largely used in urban centers) discharging into open water bodies, the urban scenario falls far behind hygienic sanitation coverage in true sense
- With the increase in sanitation coverage in urban areas using septic tanks and pit latrines, it is expected faecal sludge (FS) volume will increase considerably within a few years

- If collection and disposal systems are not in place, serious environmental degradation and associated health risk will increase

- In Bangladesh the main sources of Faecal sludge are on-site sanitation systems like septic tanks and pit latrines. Faecal sludge management involves collection, transportation, treatment and disposal of faecal sludge. However, collection (emptying) and transportation are given more emphasis in the absence of adequate off-site treatment and disposal facilities of FS in Bangladesh

Current situation in Khulna

Demographics

- Khulna is situated in south western part of Bangladesh. It is the third largest city in Bangladesh
- It is an industrial city and its economy is experienced with the rapid growth of shrimp cultivation and processing and establishment of two universities
- the population of the city was estimated to be around 1.2 million in 2009 and population density was 21000 per sq km . The number of private households in the was estimated to be 250000 and is increasing by around 8000 annually.

Challenges of Water Supply & Sanitation Sector

- Dual Problems of Water Management (Monsoon-excess water of water, dry season-shortage of water) as a lower repairing country effecting surface water management
- Growing Pace of Urbanization: Urban areas growing very rapidly. By 2035, more than 50% of Bangladesh will live in urban areas. One-third of people of the city corporation live in slums.
- Limited Water Supply Coverage in Urban Areas: Only Dhaka it is almost 85%, in other cities it is 40-45%
- Inadequate and Inappropriate Urban Sanitation: Conventional sewerage systems are absent in all urban areas except Dhaka. All other urban areas use on site options like septic tanks, pit latrine, unhygienic latrine.
- Inefficient Operation and Maintenance
- Sliding Rural water supply coverage,
- Arsenic contamination
- Lowering Ground Water Levels
- Difficulties in Climbing the Sanitation Ladder
- Effect of Environment, climate change & Disaster
- Limited Research and Development

Water Supply and Sanitation Coverage

Areas	Percentage of Coverage Bangladesh Basic Standard
Water Supply	
Urban	82
Rural	71
Country	74
Sanitation	
Urban	86.4
Rural	78.9
Country	80.4

Legal Instruments, Polices and Strategies

- Environmental Conservation Act 1995, and Environmental Conservation Rules 1997 set the standards of the quality of water to be supplied and requirement of disposal of effluents in to water bodies.
- WASA Act 1996 describes the roles and responsibilities of WASAs including te functions of the Board and Managing Director
- Different Local Government Acts of 2009 for City Corporations, Paurashavas, Upazila Parishads and Union Parisads describe the functions and responsibilities of the LGIs including matters related to WSS
- National Policy for Safe Water Supply & Sanitation, 1998
- National Policy for Arsenic Mitigation & Implementation Plan (NAMIP), 2004
- National Sanitation Strategy, 2005
- Pro-poor Strategy for Water and Sanitation Sector, 2005
- National Sector Development Programme for Water Supply and Sanitation 2005(SDP 2005)
- National Water Policy (NWP), 1999
- National Water Management Plan (NWMP), 2004
- Environmental Conservation Rules, 1997 and
- Bangladesh Climate Change Strategy and Action Plan,2009

Water supply Situation

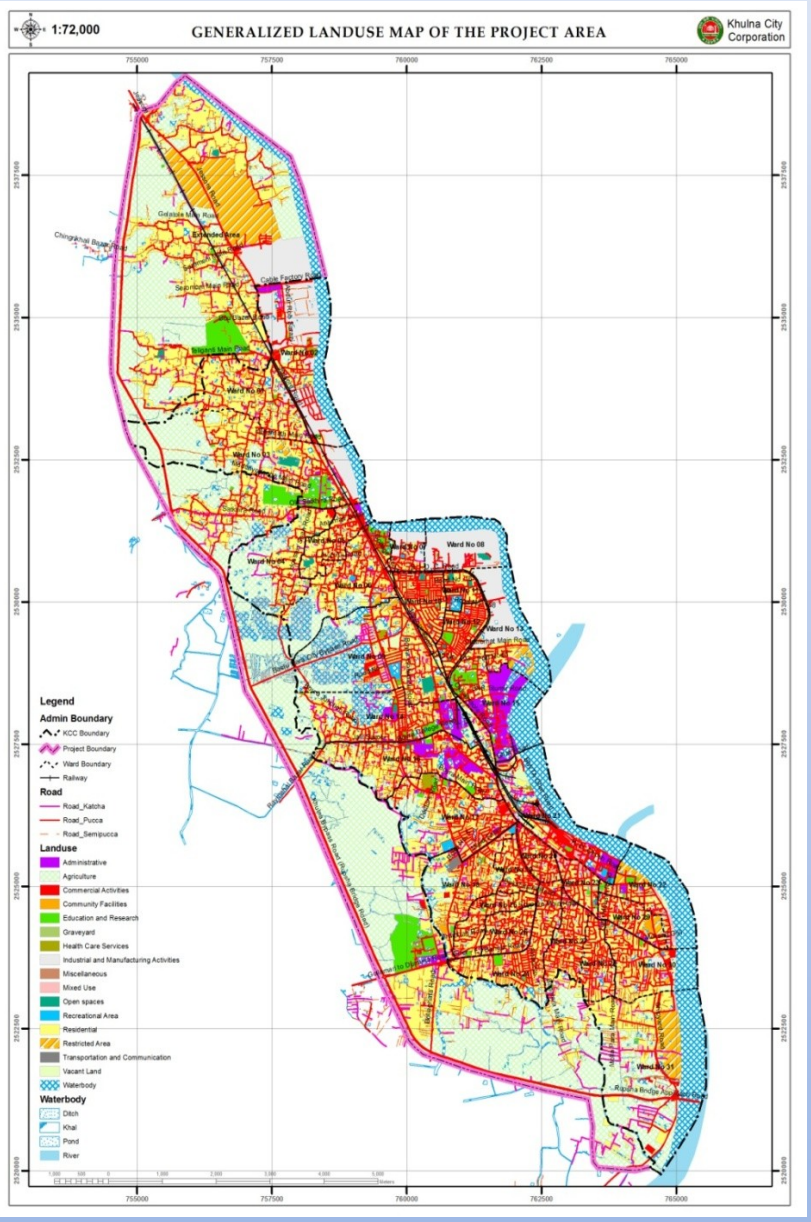
- Khulna WASA is supplying 102 MLD water entirely from ground water source, out of which 42 MLD is produced from Deep production Tube wells and water being supplied to 16900 households through pipe network .

- Another 60 MLD water is produced from nearly 10000 Hand tube wells (4000 deep and 6000 shallow tube wells) installed at various common points in the city area

- At present a large project is under implementation for supplying 110 MLD surface water

Present Status of Water Supply in Khulna City

Population	:	1.5 million
No of Holding	:	63,300
Present Water Demand	:	240 MLD (24 crore liter) (From PTW – 34 mld mini PTW – 8 mld From hand tubewell 60 mld Rest of the water demand is fulfilled by private tubewells
Everyday water supply	:	102 mld (10.2 crore liter)
PTW	:	32 Nos
Mini PTW	:	45 Nos
1.5 inch Hand tube wells	:	10000 Nos (4000 deep and 6ooo shallow)
Distribution Pipeline	:	272 km
No of Water Connection	:	16900
No of Staff	:	270



Present Water Supply Condition in the City:

Name	Location or Nos	Treatment Method	Capacity	remarks
WTP	KWASA (Surface water)	Settling-sand filter	1,250 m^3/d	On going
	Gilatola (Surface water)	Settling-sand filter	5,500 m^3/d	On going
	Khulna District, Rupsha Upazila (Surface water)	Settling-sand filter	110,000 m^3/d	On going
INTAKE	The south shore of Madhumati river near Mollahat	-	110,000 m^3/d	On going
Production				Tube well 107,700

Climate Impacts and Vulnerability on Water Supply

- Too much water
  - Flooding, water logging, health issue
- Too little water
  - Drought, increased salinity, water insecurity, decreased sanitation coverage
- Wrong type of water
  - Saline water due to SLR, salinity intrusion in agriculture, aquifer, water source, etc.
- Wrong timing of water
  - Erratic rainfall pattern, water scarcity

Fresh Water- A Precious Resource in Vulnerable Areas

Increased fresh water demand for

• Agriculture, domestic, industrial and other purposes due to increased temperature & SLR;

•Ecosystem functioning

Decrease of fresh water source due to

• Salinity Intrusion in fresh water sources

•Lowering of ground water table

•Drying of ponds a& other water sources

•Contamination of surface water sources

•Increased frequency & intensity of cyclone, storm surge & other extreme events impacting on availability of fresh water sources

Deterioration of Water Quality

•Salinity ingress towards inland due to cyclone, storm surge, floods, etc. saline and polluted water comes to land areas and contaminate freshwater source

Rainwater Harvesting System

Option	Advantages of the Intervention	Challenges for wider dissemination
Rainwater harvesting (Above ground)	• Water is free from salinity and arsenic •Doesn't require power operated system •Many government and NGOs have shown interest to promote/facilitate this system in the areas of acute water scarcity	•Requires efficient water storage mechanism which is difficult to develop and deploy •Pattern of rainfall is inconsistent therefore less reliable •Long term storage may cause biological contamination/defecti on •Initial investment is high, which is difficult to bear for the community

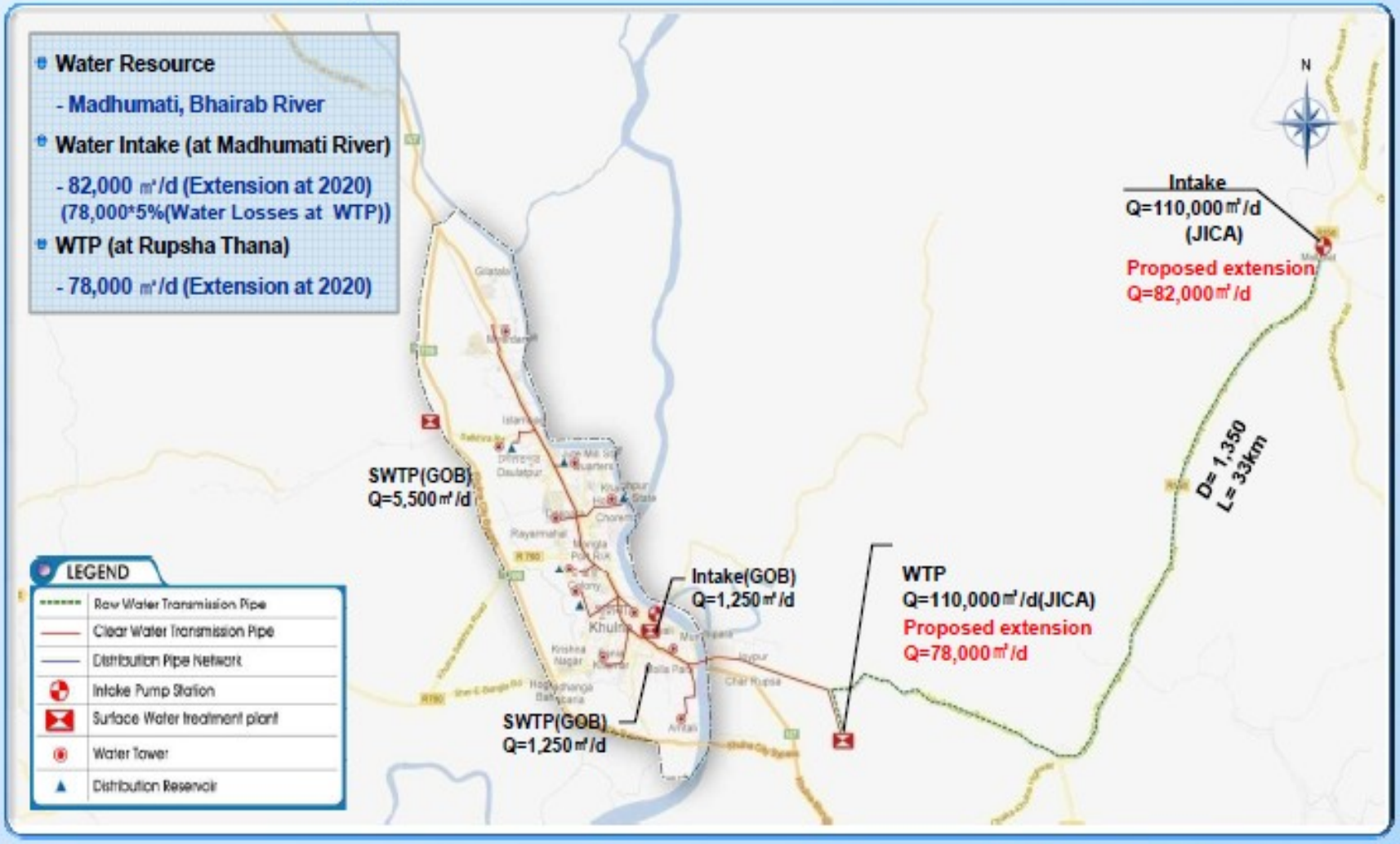
Rainwater Harvesting System

Option	Advantages of the Intervention	Challenges for wider dissemination
Rainwater harvesting (Underground)	• Water is stored at dark and anaerobic condition to avoid growth of insects •Water is free from salinity and arsenic •Doesn’t require power operated system •Many government and NGOs have shown interest to promote/facilitate this system in the areas of acute water scarcity	•Pattern of rainfall is inconsistent therefore less reliable •Suitable catchments are prerequisite •Long term storage may cause biological contamination/defection

1. The Future Plan on water supply and sewerage facilities

1.1 Khulna

1.1.3 Plan of Water Supply Facilities



1. The Future Plan on water supply and sewerage facilities

1.1 Khulna

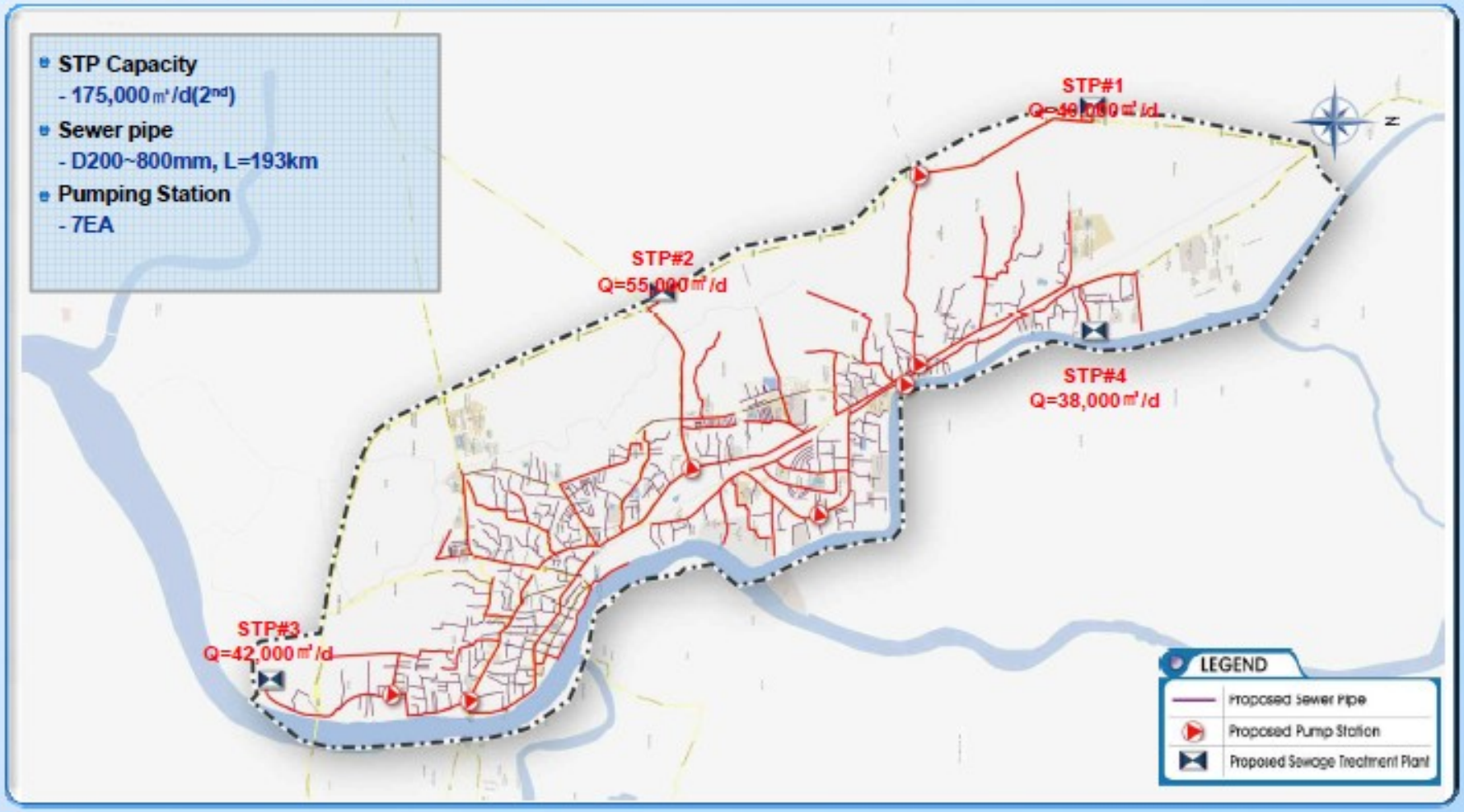
1.1.4 Future Sewerage Flow Rate

Items / Year	2013	2015 (1th)	2020 (2nd)	2025 (3rd)	2030 (4th)
Population(person)	1,036,000	1,078,000	**1,190,000**	1,314,000	1,450,000
Total water demand(ℓpcd)	112.5	133.3	**133.3**	133.3	133.3
Conversion rate into Sewage(%)	80	80	**80**	80	80
Daily Average Sewage Flow rate(ℓpcd)	90.0	106.7	**106.7**	106.7	106.7
Peak Factor	1.25	1.25	**1.25**	1.25	1.25
Daily Maximum Sewage Flow rate(ℓpcd)	123.8.	146.7	**146.7**	146.7	146.7
Infiltration rate(%)	10	10	**10**	10	10
Design Flow(㎥/d)	128,205	158,107	**174,533**	192,720	212,667
STP Capacity(㎥/d)	-	159,000	**175,000**	193,000	213,000
Additional Capacity(㎥/d)	-	-	**16,000**	18,000	20,000

1. The Future Plan on water supply and sewerage facilities

1.1 Khulna

1.1.5 The Plan of Sewerage Facilities



Sanitation/ Sewerage

- Khulna WASA (Khulna water supply and sewerage authority) was established in 2008 and till now carrying out the responsibility of water supply only. The sanitation and sewerage related activities like sludge management are still being carried out by the Khulna city corporation (KCC)
- There is no sewerage network in Khulna city. So of the toilets are on site facilities, like septic tanks or pit latrines. 68.4 percent toilets have septic tanks and remaining 31.6 percent toilets are with pit.

- Despite the fact that the city has a drainage network, households seldom connect their septic tanks with the drainage network
- Emptying Methods : Manual and Mechanical
- Fecal sludge emptying is done mostly by manual sweepers in Khulna city. The manual emptying is most hazardous as they don’t use anything other than bucket, shovel and plastic drum to transport, even they don’t use any hand gloves to avoid contact with sludge.
- This manual method is extremely harmful for the emptier and the environment
- A very limited percentage of FS emptying is done by Mechanical method by using Vacu tug toed by tractor and equipped with suction pump.

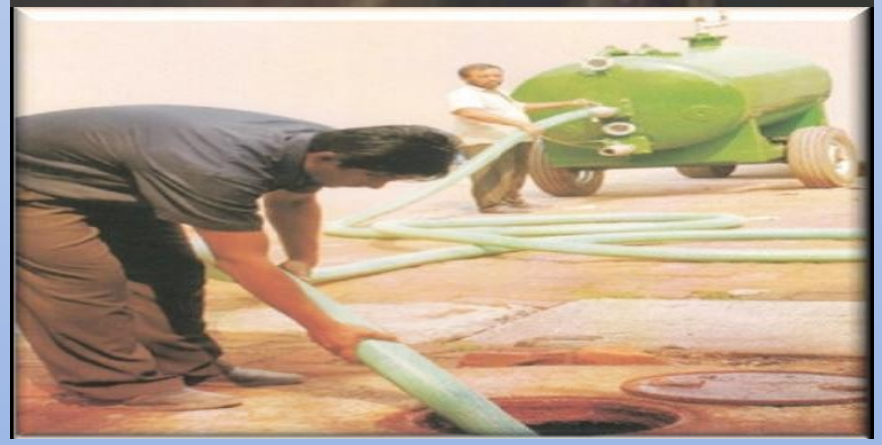


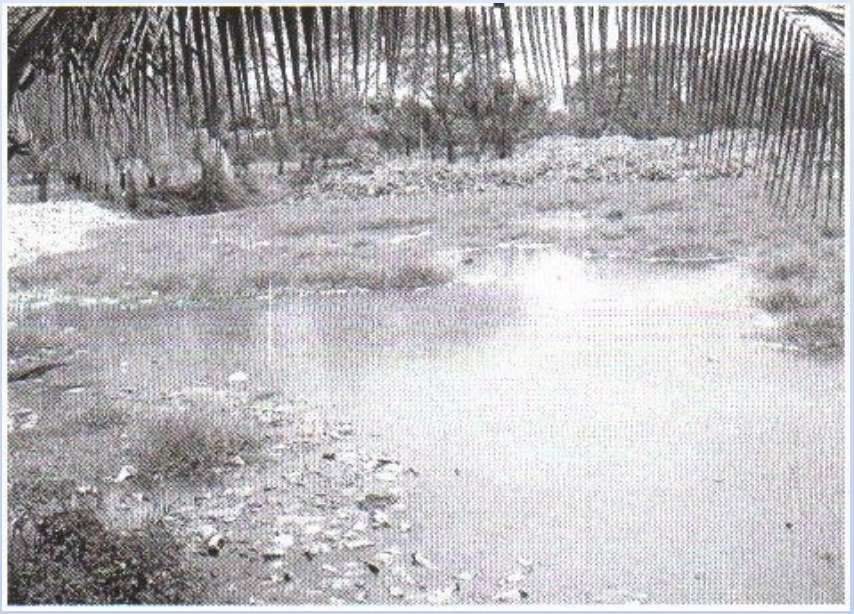
Table : Methods of emptying

Methods of emptying	Khulna
% HH that use manual emptiers	96.3
% HH that use mechanical emptiers	2
Other (pump out liquid part mechanically and solid part manually)	1.7

- kCC charges a fee tk. 2000 for providing mechanical emptying to a house hold. They also use few containers to provide transportation services but mostly collected sludge is dumped into open water.

Transportation and dumping :

- It is a great environmental concern that in most cases, collected sludge is not managed in an environmentally safe way. They are either put here and there or dumped into open drains or water bodies which contaminate surface water.



- There is no dumping site designated for FS in the city, however, dumping site is available to dump domestic solid waste
- About 24.5 % collected sludge is dumped in a particular place in he undesignated site which is used for domestic solid waste disposal.

Table : Destination of extracted sludge

What happen to extracted sludge	Khulna
Dumped here and there	2.4
Dumped into open drain	30.0
Dumped in a particular place (undesignated)	24.5
Put into a well and covered with mud	39.7
Open water body	3.4
Total	100.0

Treatment and Disposal :

- There is no facility available in khulna city for FS treatment and subsequent disposal. KCC has an open dumping site, 10 km away from the city, where FS is also dumped and it is harmful for nearby housing areas.

General observations :

-Inadequate logistic support for service delivery

- Lengthy process for delivering services
- Lack of awareness to service provider and users
- Obstacle to enter the septic tanks
- Absence of designated dumping site for FS
- Weak enforcement of relevant rules and regulations

Recommendations :

- Gradually switch over to surface water supply and maintain the level of ground water abstraction in a scientific basis.
- Tariff should be adjusted in a level so that at least O & M cost can be recovered.
- Providing water supply to the low income community.
- Continuous monitoring for ensuring safe water supply.
- Continuous effort to be given to expand water supply coverage for the people.
- Easy access of equipments to septic tanks and pits for emptying purpose.
- Compliance of BNBC through proper monitoring of KDA.
- Thus, number of Vacu tug, container and other equipment should be increased.
- Proper tools for safety and hygiene to be applied by manual emptiers or sweepers.
- Awareness program to be launched for household owners and employees to prevent connection of septic tanks and pits to drain and not dumping to open water bodies and enforcement of rule for this purpose.
- Motivational campaign to be conducted to enhance willingness to pay.
- Commitment of Executive Agency, users and employees.
- Mechanical emptying services to strengthened and official process to be made simpler and rapid.
- Research and development activities to be strengthened.

Thanks for your attention