

CSE Workshop on 'Excreta Management'  
 4-5 April 2016, New Delhi

Hasin Jahan  
 Country Director  
 Practical Action, Bangladesh

# Practical Action's experiences: Polices, practices and prospects around Faecal Sludge Management



Thank you!

**Acknowledgment**

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# Practical Action's experiences: Polices, practices and prospects around Faecal Sludge Management



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# **Faecal sludge management:** context and opportunities

# Context

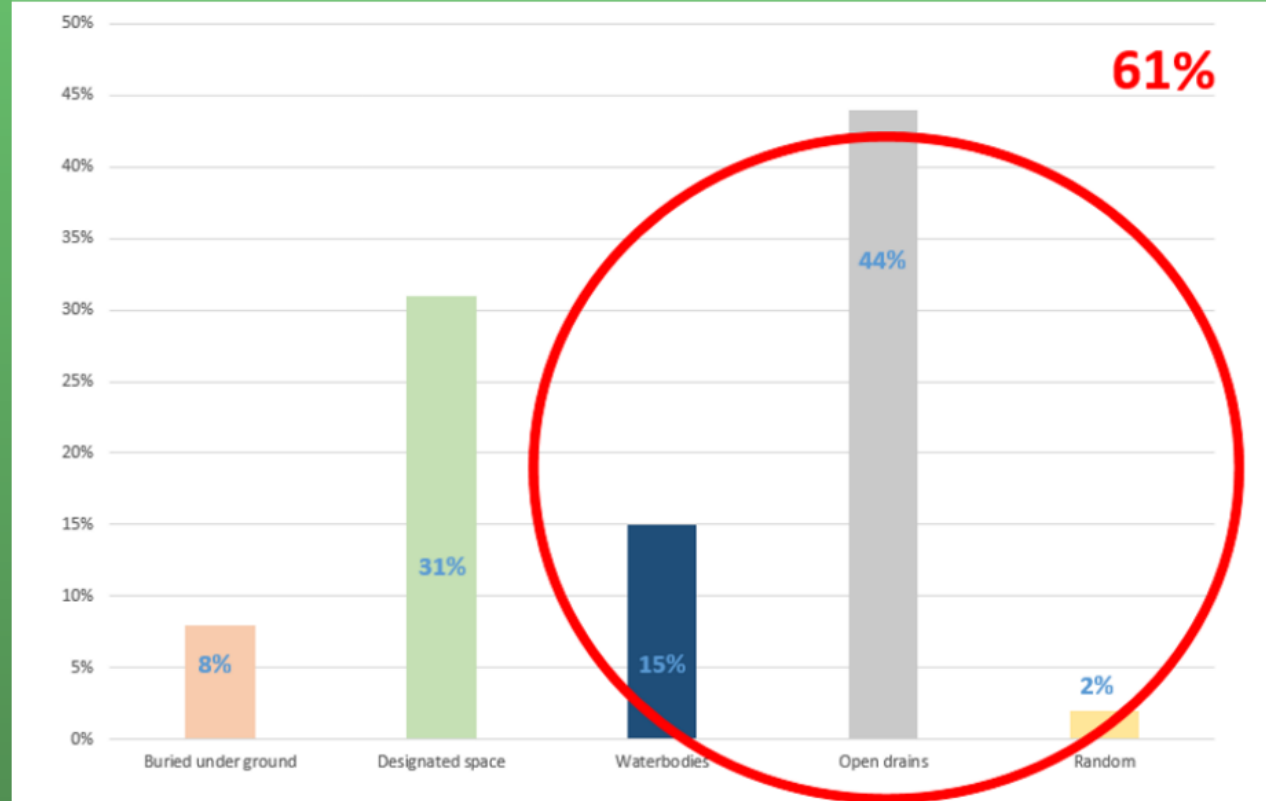
- Total amount of sludge generated is 80,000 tons/day
- Only 960 ton is treated everyday

Treated faecal waste **1%**  
Untreated faecal waste **99%**



# Context

More than 60% faecal sludge is simply discharged into open drain, waterbodies of different kind and randomly causing environmental pollution



# FSM related initiatives

Some organisations in Bangladesh (DPHE, SNV, WUSP, WaterAid, Practical Action, BRAC, ITN-BUET, DSK etc.) initiated FSM projects including action research and small to medium scale FSM plants

# Prevailing gaps

Due to rapid expansion of low cost latrines, pits are filling up quickly

Often people do not know about the destination of the sludge and its impacts

Different FSM projects are coming up with plants of different sizes and producing compost but forward linkage with agricultural sector is missing

No city and municipality has any proper plan for faecal sludge management

Manual emptying is common across the country

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Bangladesh uses around 3.5 million tons of fertilizer every year of which about 2.6 million tons are imported  
Government provides subsidy @ Taka 18/kg to the farmers

Hypothetically, if we could convert the entire amount of sludge produced in the country to proper **compost/organic fertilizer**, it will turn out to be 3 million tons, which is more than the quantity we import every year

# Opportunities

Due to over use of chemical fertilizers, soil fertility has been reducing alarmingly. Use of compost could improve soil health and protect the environment

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# Practical Action's experience

# Practical Action adopted a holistic approach

A complete solution through setting up sanitation service and product value chain at mini scale at Satkhira municipality

Based on its experience, we are in the scaling up a city-wide Public Private Partnerships in Faridpur, Bangladesh

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# FSM in Satkhira

Pre-project scenario was nothing different than any other typical towns in Bangladesh



Connection to open drain



Unsafe and manual disposal

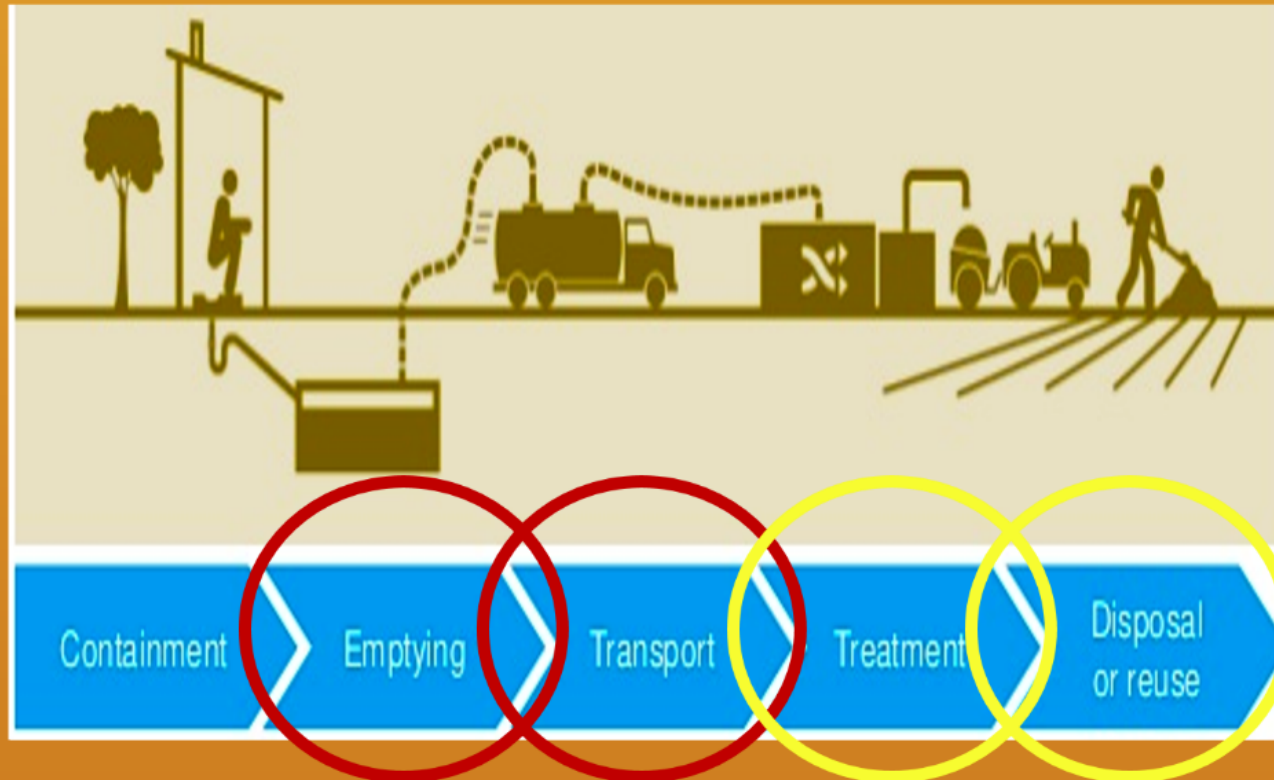


Overflowing pit

Built capacity of the Pit emptier group and tagged with municipality through formal engagement



# Adopted a complete sanitation service and product value chain



# Emptying: mechanical de-sludging



Introduced  
mechanical de-  
sludging for  
safe and quick  
emptying  
ensuring health  
and safety  
concerns



# Transportation:

Locally fabricated vehicle has been used for sludge transportation – easy to access in narrow roads of municipality



Low-cost locally fabricated of capacity 1000 liters & cost 1500 USD

# Treatment:



Unplanted sun drying  
filter bed for sludge  
treatment

# Action research with sludge



Action research with  
Department of Agriculture  
for comparing the productivity at  
different combinations of mix of  
compost and chemical fertilizer

# Results from the action research

## Several trials made on different ratio for crops

Cow dung only

Sludge cake only

Mix of cow dung and chemical fertilizer

Mix of sludge cake and chemical fertilizer  
(ratio varied for depending on types of crop)

**Ultimately the mix of sludge cake and chemical fertilizer scored the highest**

# Disposal: use and promote of compost

Demonstration of composts and promote sale



## **Scale up:**

Private Public Partnership led faecal sludge management system considering the entire sanitation value chain at city scale in Faridpur

**Follow through a very  
systematic process**

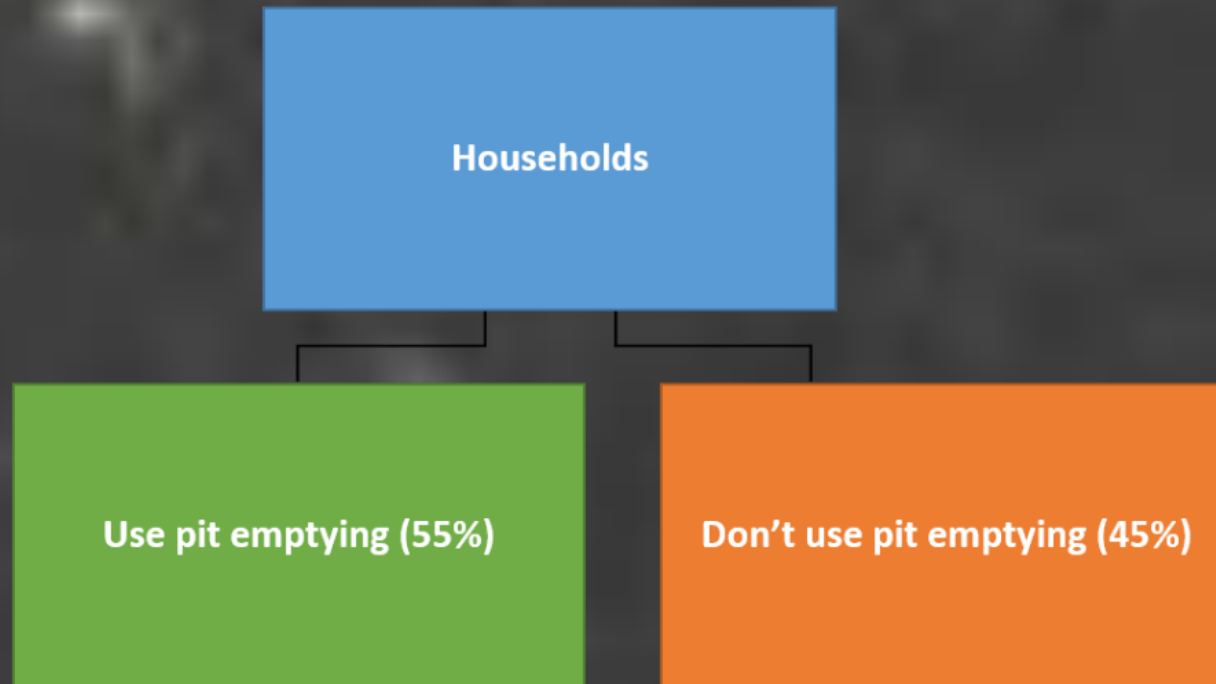
Dialogue with Municipality being the lead remain the kick off venture to facilitate the PPPs in FSM services in Faridpur





# Situation analysis

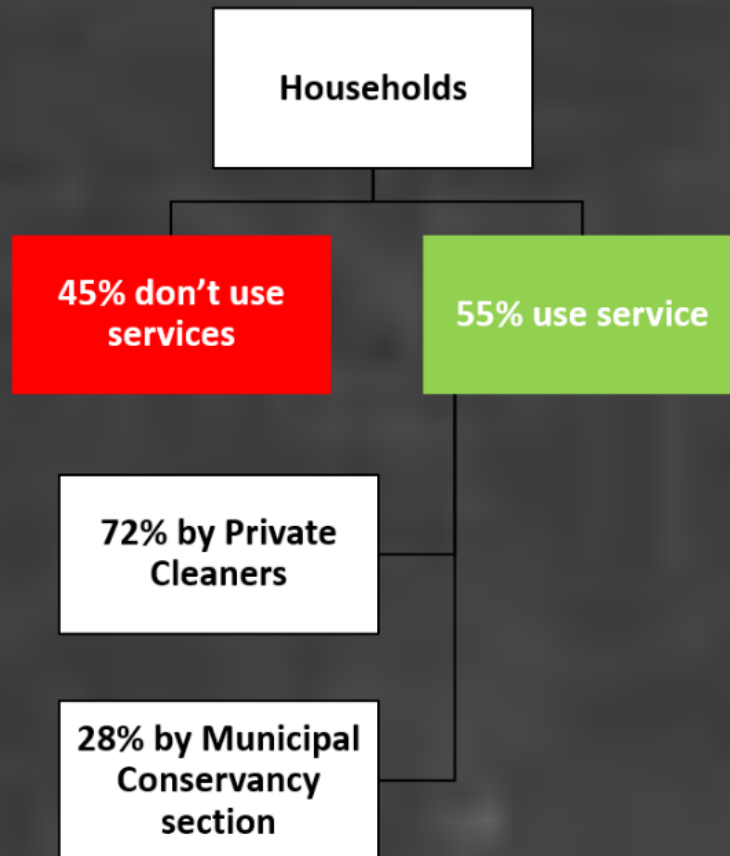
# Situation analysis: Households



More than half of the households  
go for pit emptying

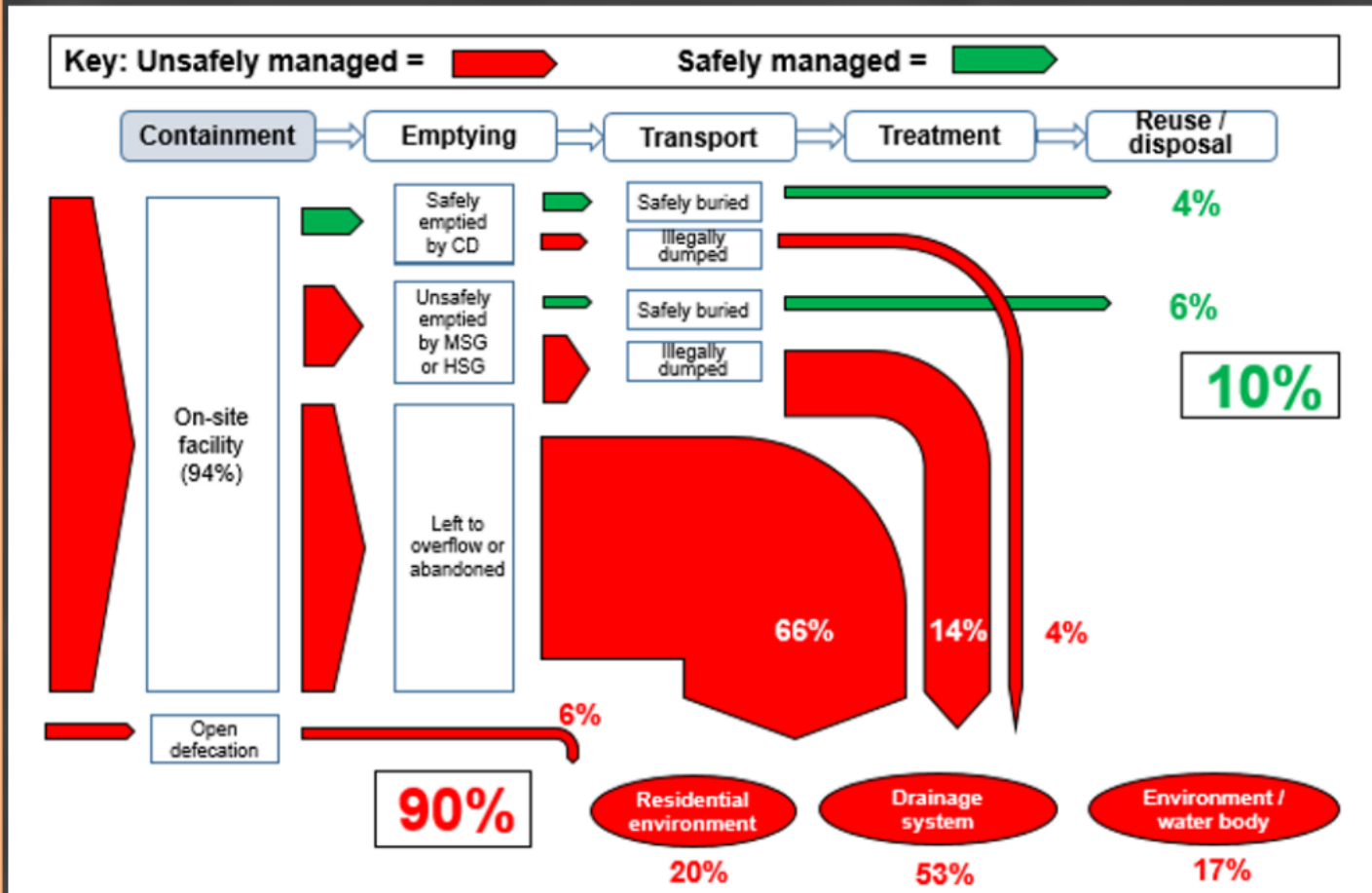
Illegal connections are prevailing

# Preference of households taking pit emptying service



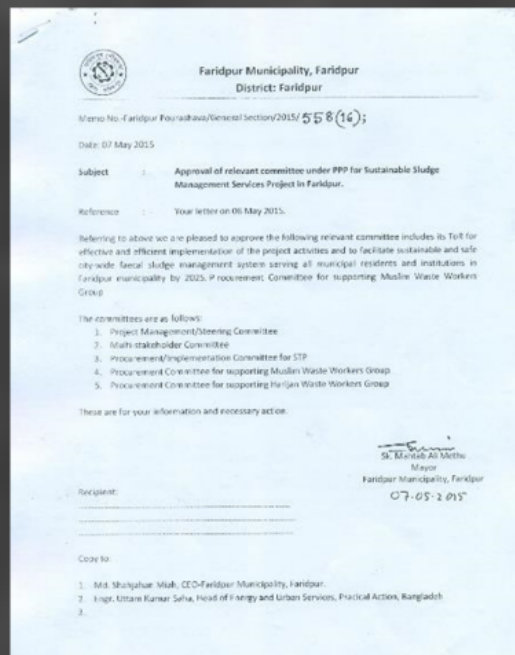
Only one third of the emptying is done by municipality conservancy section while two-thirds emptying is done by privately hired cleaner

# Excreta flow diagram

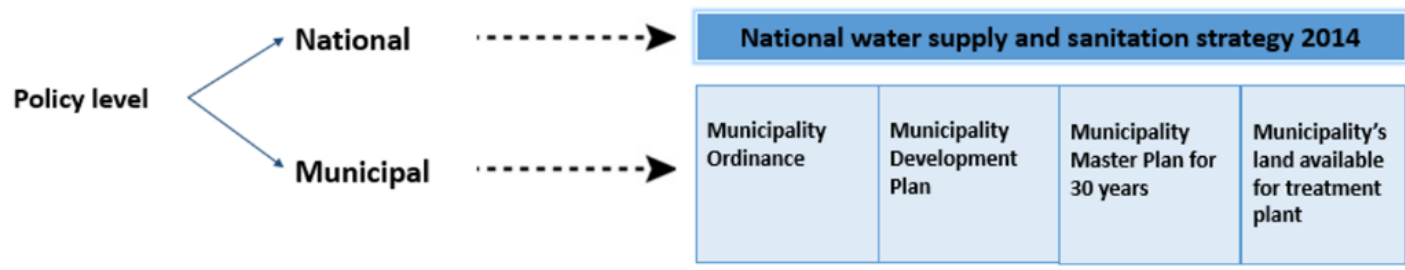


# A formal Project Management System established

A multi-stakeholders committee formed by the Municipality with specific ToR for overseeing the FSM venture of the municipality



# Sludge Market Map-Faridpur



	Service Value Chain	Product Value Chain
<b>Client Base</b> Individual Households Institutions	<b>Emptying</b> Conservancy section, Municipality Private cleaner	<b>Disposal</b> 10% safe 90% unsafe
<b>Risk factors</b>	Illegal connection to drains & waterbodies Inaccessibility to septic tank	No treatment plant of a huge capacity No proper disposal/reuse mechanism
<b>Supportive elements</b>	1. Media 2. Private emptier groups 3. Local technicians/manufacturers 4. Adjacent agricultural fields 5. Compost producers	

# Reformation of Pit emptier groups as private entity



In absence of any typical private sectors ready to take sludge operation, we reformed the existing Pit emptier groups into private sector entity through facilitating them for obtaining legal status and strengthening them by building capacity



# Service level agreement with Municipality



**Informal pit emptier groups have now turned into formal business entity:**

Kuthibari Cleaner Sromojibi Somobay Somiti Ltd.  
Signed formal MoU with Municipality





# Business model development



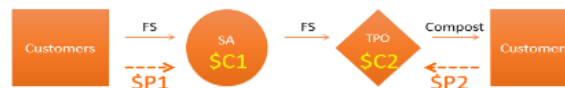
Together with Municipality and Experts a business model has been outlined estimating cost and revenues etc from improved FSM and waste management services and expenses associated with establishing the entire system

# Different tools used for developing business model

Parameter	Existing Scenario	Less favourable Scenario	Favourable Scenario
Number of SA	1-2	2	2
Number of trips per day	3-5	4	6
Volume of sludge per trip (m3)	1.8	2	2
Number of days a week	6	6	6
Number of weeks a year	8-10	37	48
Total annual sludge volume (m3)	2,506	3,552	6,912
Service fee (BDT)	650	650	650
Revenue from emptying service (BDT)	1,628,900	2,308,800	4,492,800

Parameter	Existing Scenario	Less favourable scenario	Favourable scenario
Daily sludge emptying volume	5.4-18	16	24
Unplanted bed capacity	6	6	6
Daily sludge disposal to unplanted bed (minimum of above)	5.84	6	6
Number of days a week	6	6	6
Number of weeks a year	37	37	48
Sludge quantity factor	0.05	0.05	0.05
Solid quantity factor	0.1	0.1	0.1
Safety factor	4.8	4.8	4.8
Total annual compost production (1000 kg)	1.35	1.3875	1.8
Compost sale value (BDT per 1000 kg)	8,000	8,000	8,000
Revenue from compost sales (BDT)	10,800	11,100	14,400

Public private participation - the simple idea



Proposed first stage is limited by **current capacity** of stakeholders. To serve 13 % of Faridpur.

Costs / Revenue	Estimation (BDT)	Calculation
\$C1	2,718,900	From emptying and transport costing model
\$P1	4,492,800	Service fees: 6912 cum per year (around 24 cum per day * 6 days * 48 weeks) * BDT 650
\$C2	1,612,611	From treatment plant costing model
\$P2	576,000	Compost production and sale 72,000 kg * BDT 8

# Key features of Private Public Partnership FSM service and product value chain of Faridpur

A comprehensive and holistic planning by Municipality through adopting the FSM Business model

Create market for produced compost and promote use

National market survey for organic fertilizer and identify policy gaps and translate actions at municipality level

Introduction of sludge tipping fees for ensuring safe disposal to the plant by the emptier groups

Communication campaign for creating awareness of the citizens

Formal engagement with Pit emptier groups

Setting tariff as suggested by the business model in consultation with different client base

On-line demand management from the clients

FSM plant design and construction (on-going)

Leasing out the treatment plant to the potential operators through bidding process

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# Snapshot of few interesting on- going initiatives

A call center at municipality will receive calls/demand from clients and queued the requests to the Pit emptier groups

Sludge Calculator will be introduced for calculating the charge for the service depending on volume of sludge, distance of septic tank from the road etc.

Steering committee will oversee and compare these records for monitoring and ensuring safe transfer of the sludge to the treatment plant

# Online demand management system

The quantity of sludge collected and disposed into the plant will automatically be recorded

Users satisfaction will be surveyed

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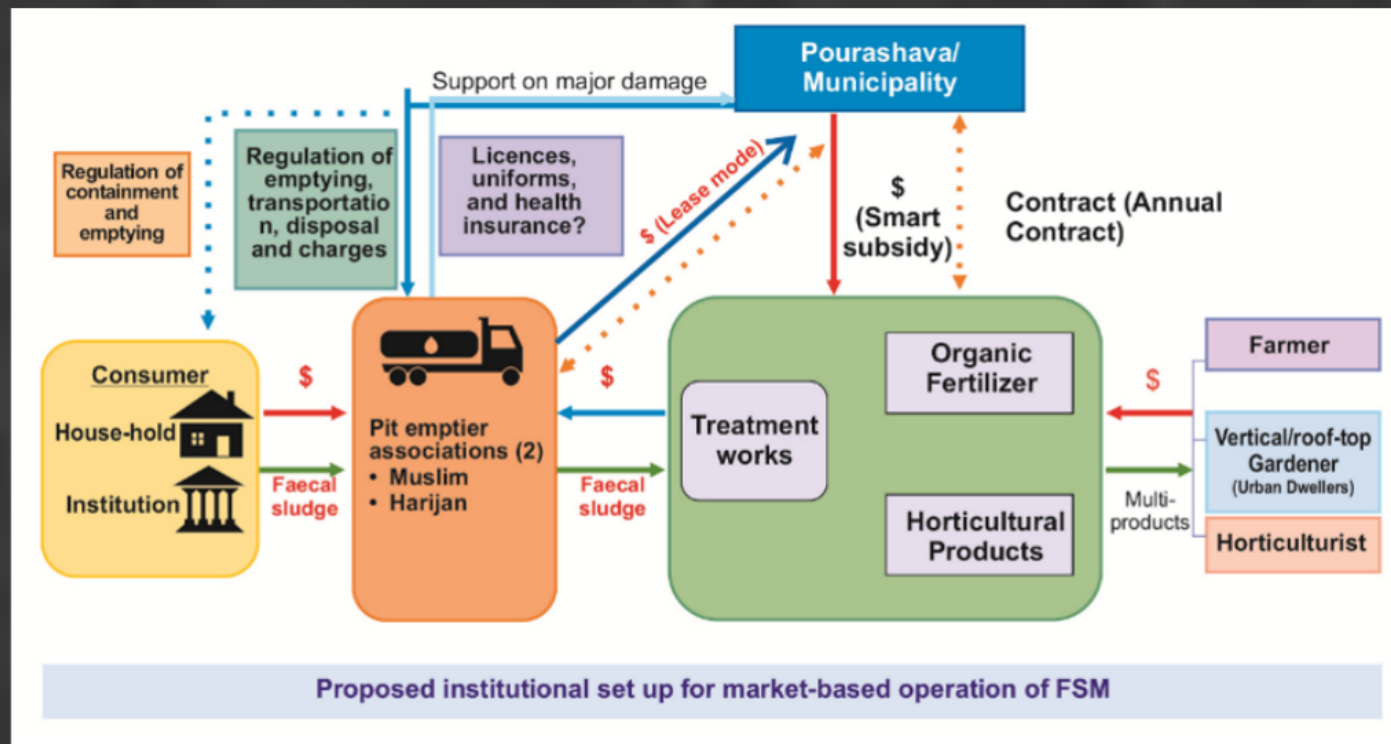
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# FSM Business Model



## Design factors

1. Solid Liquid ratio is 44 KG/1000 L
2. Plated drying bed capacity 18 cubic meter/day
3. Unplanted drying bed capacity 6 cubic meter/day
4. Land area of the treatment plant is 1.25 Acre



# Construction of FSM plant is on-going



Public awareness campaign  
at Faridpur  
"Treasure Hunt"





# Way forward

Developing a comprehensive replicable sanitation service and product value chain model at municipality context

Promoting the product through fostering policy engagement in the agricultural sector with a wider outlook

# Acknowledgment

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GATES *foundation*





[Hasin.Jahan@practicalaction.org.bd](mailto:Hasin.Jahan@practicalaction.org.bd)



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Thank  
you!