

Designing and Implementing in small towns –Leh and Devanahalli

AAETI, 3rd April 2019
Rajasthan , India



Households

5600

Septic Tank

10%

Av trip/day

1

Capacity use

20%



Households

5,800

Septic Tank

1%

Av D/T

5

Capacity use

98%

To that extend this two famous FSM project
is able to “manage” “Faecal sludge” of that
particular towns ?

(1) blackwater -Solid Stream/ Sludge

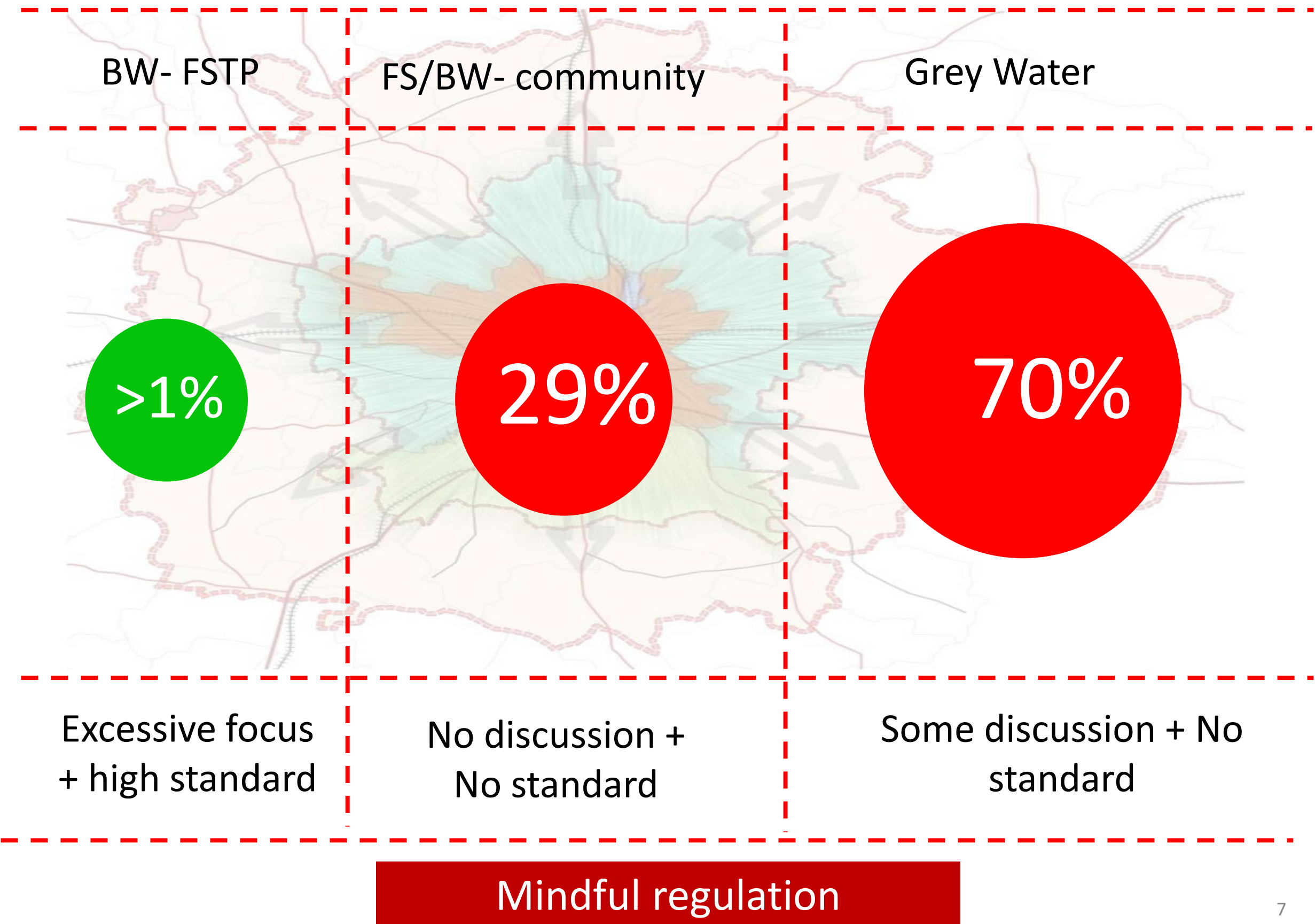
	Leh	Devanahalli
Total Sludge Generation/Year	2.5 ML	2.8 ML
Total Sludge Received at FSTP	0.125 ML	0.084 ML
% of treated at FSTP	5%	3%

Where are the sludge ?

(2) And (3) Blackwater- liquid stream

	Leh	Devanahalli
Total BW Generation/Year	190 ML/Year	219 ML/Year
Total BW Received at FSTP	2.3 ML/Year	1.6 ML
% of problem solved	1%	.01%

FSM from complete sanitation perspective





1. FSM as it is currently practiced by BORDA in South Asia is focused on “**solid-stream**” and “**what is removed**”,
2. We recognize and acknowledge that most of the risk remains in the **water-stream** and “**what is not removed**”

Formula of successful change

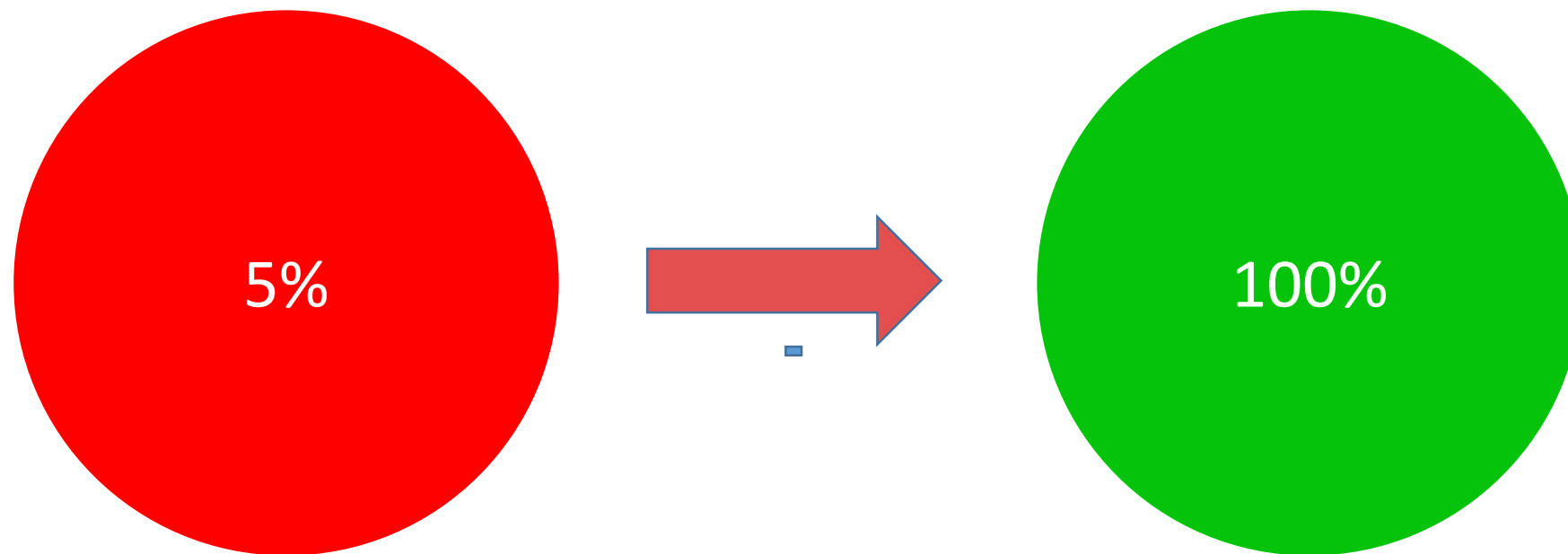
$$D * V * F > R$$

(Cathy Dannmiller)

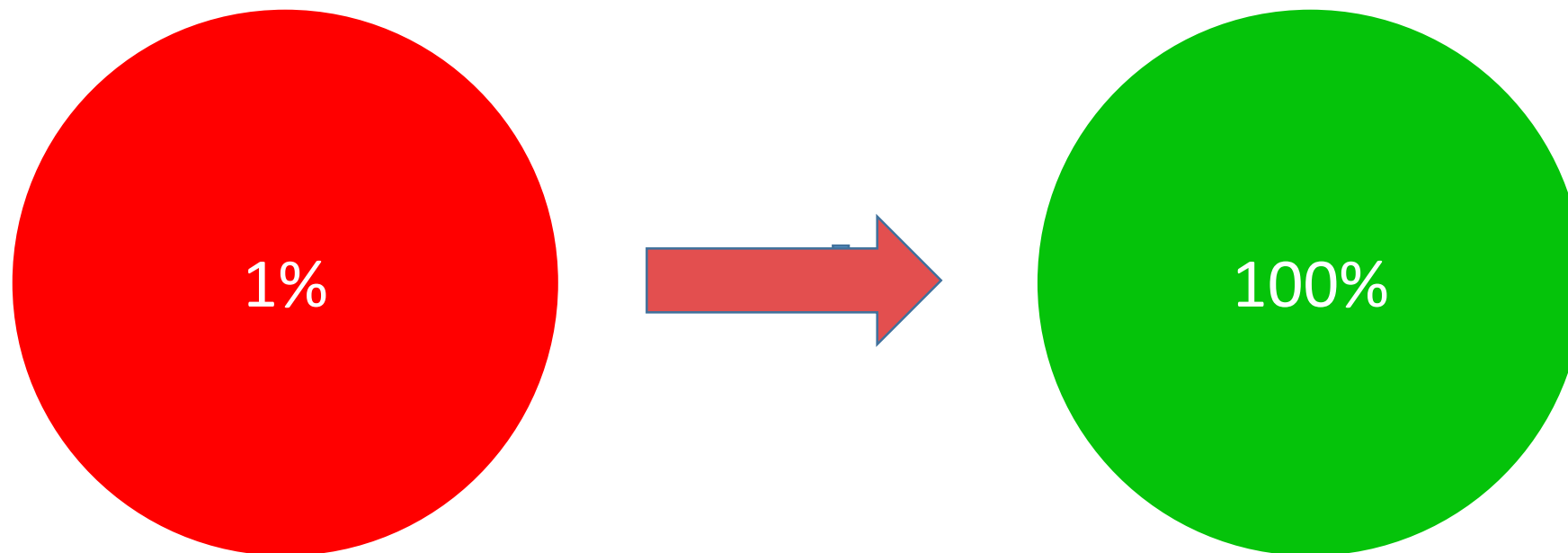
FSM is an important successful milestone in Indian sanitation history of Leh and I think so as for India.

Part-2

(1) blackwater -Solid Stream/ Sludge

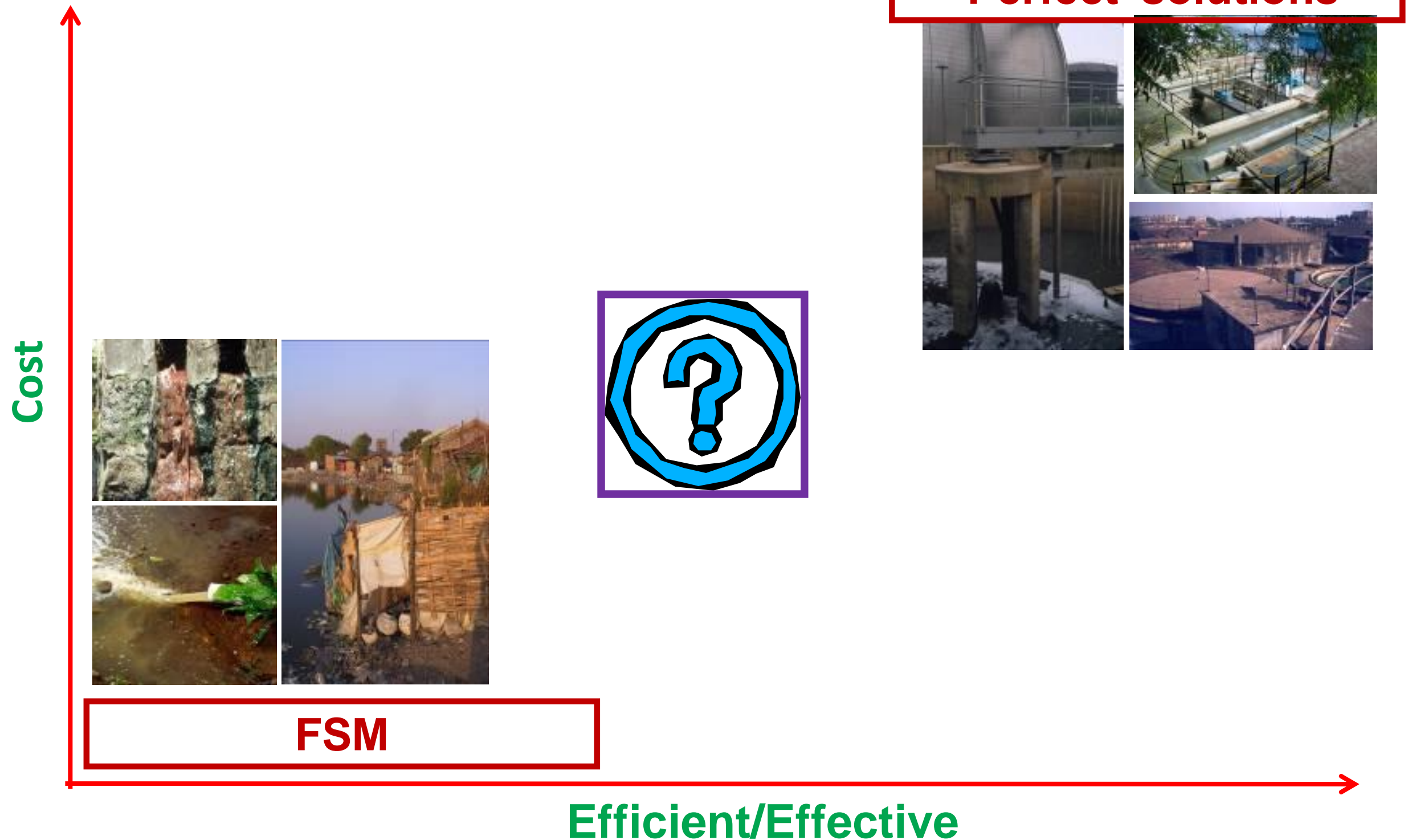


(2) Blackwater- liquid stream



Good Response to legacy problem

Extreme is done - middle is missing



One such low cost middle path!

1 , Collect ALL the stream

2 , Collective Primary treatment – gravity based

3 , License to contravene

4.1 More treatment

4.2 , Different treatment

4.3 , Connect to network solution

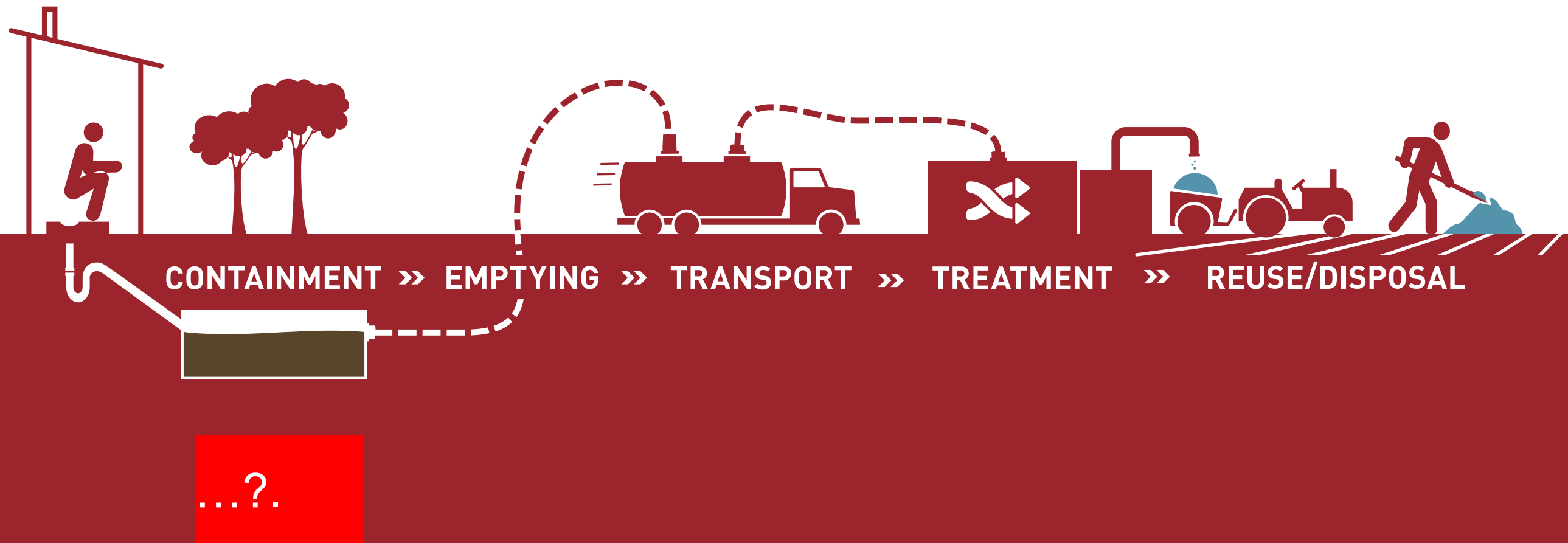
Incremental Integrated Approach Vs FSM

	FSM	IIA
Cost	40 lacs + 10 lac + 10 Lac	20 lacs + 25 Lac
Effectiveness/BW	Small part	Large/full
Scope	Part blackwater	All stream

1. FSM is a solution – not THE solution
2. FSM is good response to legacy problem
3. Every town/city should do FSM /FSTP, however, one must not stop there or stretch it to far
4. Status of FSM town should be defined by mere presence of FSTP - but % of sludge managed
5. We should have some guidelines or mindful standard

Thank You

FSM



FS Treatment Calculations – Leh

Description	Calculations	Value
FS Generation per day		300 gms
HH size		5
Total sludge generation/ family/ year	= $300 \times 5 \times 365$	≈ 550 kg or 600 litres per family per year
Total sludge accumulation/ year	30% volume reduction ($600 \times .7$)	≈ .4 kl or .4 m ³ per year
Total sludge accumulation/ 3 year desludging period	= $.4 \times 3$	1.2 m ³
Total storage required	= $1.2 \text{ m}^3 \times 120\%$ (other liquid seepage+scum)	≈ 1.5 m ³
Total HHs		5000
Total sludge generated per 3 years	= 1.5×5000	7500 m ³ = 7.5 ML
Volume to be desludged every year for complete coverage in 3 years	= $7500/3$	2500 m ³ = 2.5 ML
LEH Treatment		
Volume treated by Leh FSTP in 2018		2.5 ML
Sludge Content	5%	.125 ML
Sludge treated/ Sludge generated	= $.125/25$.05 or 5%
Time for complete coverage		20 years

Water Treatment Calculations – Leh

Description	Calculations	Value
WW (contaminated with faeces) generation per day		20 litres
HH size		5
Total WW generation/ family/ year	= $20 \times 5 \times 365$	≈ 37,000 litres per family per year
Total WW generation/ 3 year desludging period	= $37,000 \times 3$	110,000 litres or 110 m ³
Total HHs		5000
Total WW generated per 3 years	= 110×5000	≈ 550,000 m ³ = 550 ML
Volume to be treated every year for complete coverage in 3 years	= $550/3$	≈ 190,000 m ³ = 190 ML
LEH Treatment		
Volume treated by Leh FSTP in 2018		2.5 ML
WW Content	95%	2.3 ML
WW treated/ WW generated	2.3/190	.01 or 1%
Time for complete coverage		100 years

Costing Calculations - CIA

Description	Calculations	Value
Water supply per person		70 litres
WW generated		60 litres
HH size		5
Total HHs		100
Total WW generation/ day	$= 60*5*100$	30,000 litres or 30 m ³
Sizing Calculations		
Total length of branch pipe 6 inch dia	$=5*200*1.17$	≈ 1200 metres
Total length trunk sewer	$=200*1.17$	≈ 250 metres
Branch Manholes required		50
Trunk Manholes required		6
Costing Calculations		
Branch Pipe Cost (per metre cost = 8,000)	$=1200*800$	≈ INR 10,00,000
Trunk Pipe Cost (per metre cost = 1,200)	$= 250*1200$	≈ INR 3,00,000
Branch Manhole cost (per metre cost = 8,000)	$=50*8000$	≈ INR 4,00,000
Trunk Manhole cost (per unit cost = 20,000)	$=6*20,000$	≈ INR 1,00,000
HH Connection Cost (per unit cost = 2,000)	$=2000*100$	≈ INR 2,00,000
Total Cost		≈ INR 20,00,000

Cost Comparison

Description	Calculations	Value
CIA Calculations		
Total Piping Cost		≈ INR 20,00,000
WW treatment cost for 30 m ³	=40,000 * 30	INR 12,00,000
Total CIA cost		INR 32,00,000
Per HH cost	=32,00,000/100	INR 32,000
FSM Calculations		
Per HH Septic Tank cost		INR 40,000
Treatment capacity required for 100 HHs		≈ 1.5 KLD
Cost of Treatment Facility for 1.5 KLD		≈ INR 10,00,000
Total cost for FSM for 100 families	=(40,000*100)+10,00,000	INR 50,00,000
Per HH Cost	=50,00,000/100	= INR 50,000