Directions for FSM

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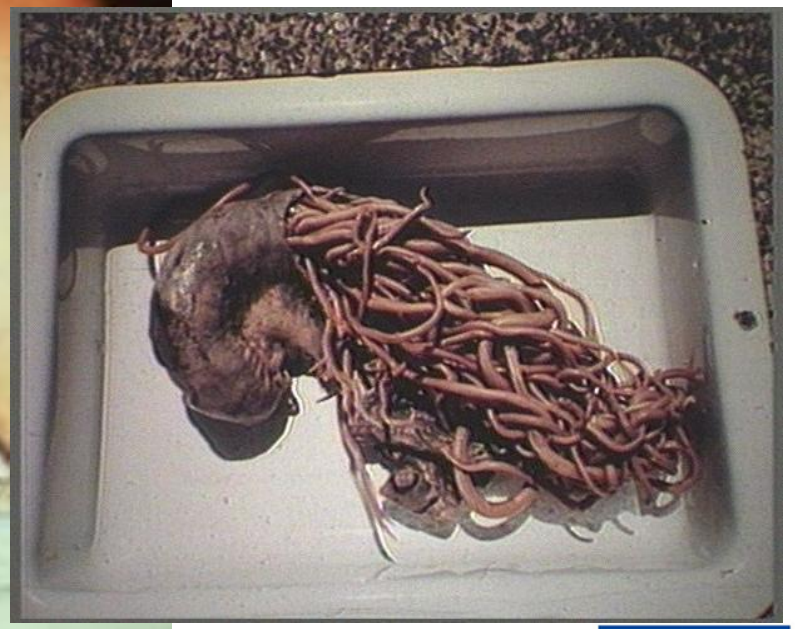
Introduction

- Sanitation is :
  - Improving human health
  - Improving public health
  - Improving environmental health
  - Breaking the transmission of faeco-oral and water related diseases



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What people want:

- Convenience – ‘flush and forget’
- Status
- Privacy
- dignity

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Human Excreta

Faeces and urine

The major global environmental pollutant

And possibly……KILLER

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Introduction

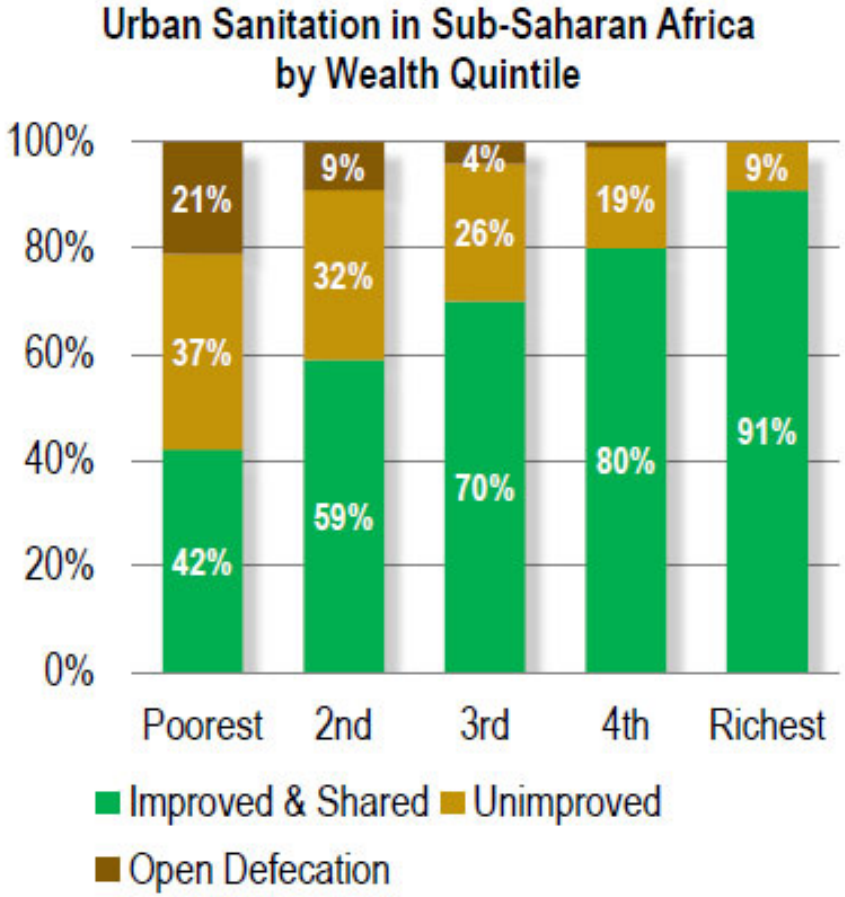
"Water should not be judged by its history, but by its quality"

Dr Lucas van Vuuren , one of the pioneers of the Windhoek water reclamation system.

"Is about the the toilet >wastewater>pollution nexus - Sunita Narain"

Why is Fecal Sludge Management Important?

- **Most urban sanitation access is via on-site systems:** <10% of urban Africa has sewer access
- **Virtually all poor people use on-site sanitation** or have no access to improved sanitation
- **Most urban on-site sanitation is not linked to a transport and treatment system,** resulting in gross contamination of the environment



- **Sources:**

Africa Infrastructure Country Diagnostic Background Paper 13 (2008) Elvira Morella, Vivien Foster, and Sudeshna Ghosh Banerjee

UNICEF/WHO Joint Monitoring Program (2012) Progress on Drinking water and sanitation 2012 update

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WSP study of 12 cities

Region	Country	City	Population (M)	% On-site/OD
Latin America & Caribbean	Bolivia	Santa Cruz	1.7	60%
	Honduras	Tegucigalpa	1.3	30%
	Nicaragua	Managua	2.0	61%
Africa	Mozambique	Maputo	1.9	85%
	Senegal	Dakar	2.7	75%
	Uganda	Kampala	1.5	91%
South Asia	Bangladesh	Dhaka	16.0	80%
	India	Delhi	16.3	25%
East Asia	Cambodia	Phnom Penh	1.6	75%
	Indonesia	Palu	0.35	100%
	Philippines	Dumaguete	0.12	100%
	Philippines	Manila	11.8	85%

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Country, area or territory	Year	Population (x 1000)	Percentage urban population	USE OF SANITATION FACILITIES (percentage of population)[2]											Progress towards MDG target[4]	Proportion of the 2012 population that gained access since 2000 (%)
				URBAN				RURAL				TOTAL				
				Improved	Unimproved			Improved	Unimproved			Improved	Unimproved			
					Shared	Other unimproved	Open defecation		Shared	Other unimproved	Open defecation		Shared	Other unimproved	Open defecation	
Honduras	1990	4 804	40		7	14	8	33	8	16	43	48	4	15	33	
	2000	5 236	45			10	5		5	12	33	63	5	12	20	Met target
	2012	7 936	53			5	1		4	8	14	80	6	7	7	
Hungary	1990	10 385	66		0	0	0		0	0	0	100	0	0	0	
	2000	10 224	65		0	0	0		0	0	0	100	0	0	0	Met target
	2012	9 976	70		0	0	0	100	0	0	0	100	0	0	0	
Iceland	1990	255	91		0	0	0	100	0	0	0	100	0	0	0	
	2000	281	92	100	0	0	0	100	0	0	0	100	0	0	0	Met target
	2012	326	94	100	0	0	0	100	0	0	0	100	0	0	0	
India	1990	868 861	26	50	17	5	28	7	1	2	90	18	5	3	74	
	2000	1 042 262	28	50	18	6	22	14	3	4	79	25	7	5	63	Not on track
	2012	1 236 687	32	60	20	8	12	25	5	5	65	36	9	7	48	
Indonesia	1990	178 633	31	52	8	12	19	24	6	21	49	35	7	18	40	
	2000	208 339	42	69	9	9	16	34	8	17	41	47	8	14	31	Not on track
	2012	246 864	51	71	9	6	14	46	11	12	31	59	10	9	22	
Iran (Islamic	1990	56 362	56	78	6	16	0	62	13	23	2	71	9	18	1	

60%

70%

More than 60% off the grid

Challenges

FSM is 'invisible' to policy-makers

- Sewerage widely regarded as 'proper' solution
- FSM seen as stop-gap solution for slums and left to informal and private service providers
- Very little information available

FSM is generally poor

- Many toilets hard to empty
- Widespread manual emptying
- Unregulated vacuum tankers, illegal dumping
- Treatment facilities generally lacking

India potentially has more than a billion people or 40% of the OSS users who potentially need FSM services.

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IMPORTANCE OF CHARACTERISATION

WIPERS

WASHES

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IMPORTANCE OF CONTEXT

DRY SLUDGES

WET SLUDGES -SEPTAG

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What we know now

- No two faeces are the same
- No two pits are the same
- Pits and materials are now homogenous across the depth
- Very little biological degradation occurs in pits
- Rheology varies across the pit depth
- Wet mass more easy to desludge
- Wet mass more expensive to transport

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CHALLENGES

- pits filling faster than design
- access to pits is a challenge
- pit desludging is expensive
- desludging poses risks
- material is not safe and stable
- airborne pathogens
- naivety of O&M
- solid waste – flying toilets
- systems seen from a civil engineering and project management perspective
- no holistic management
- focus on superstructure

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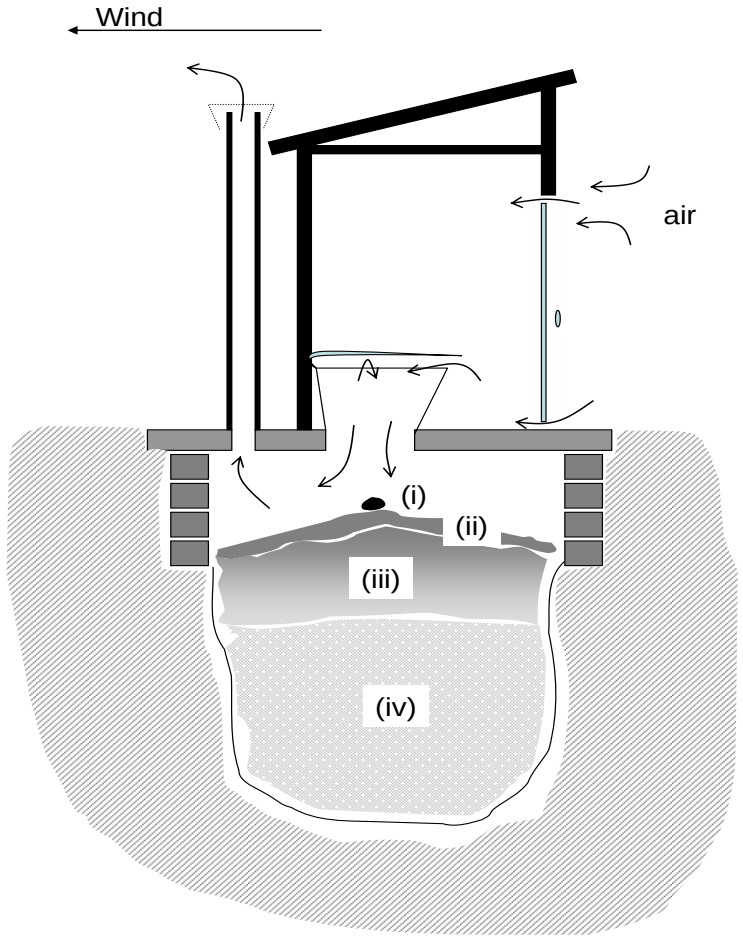
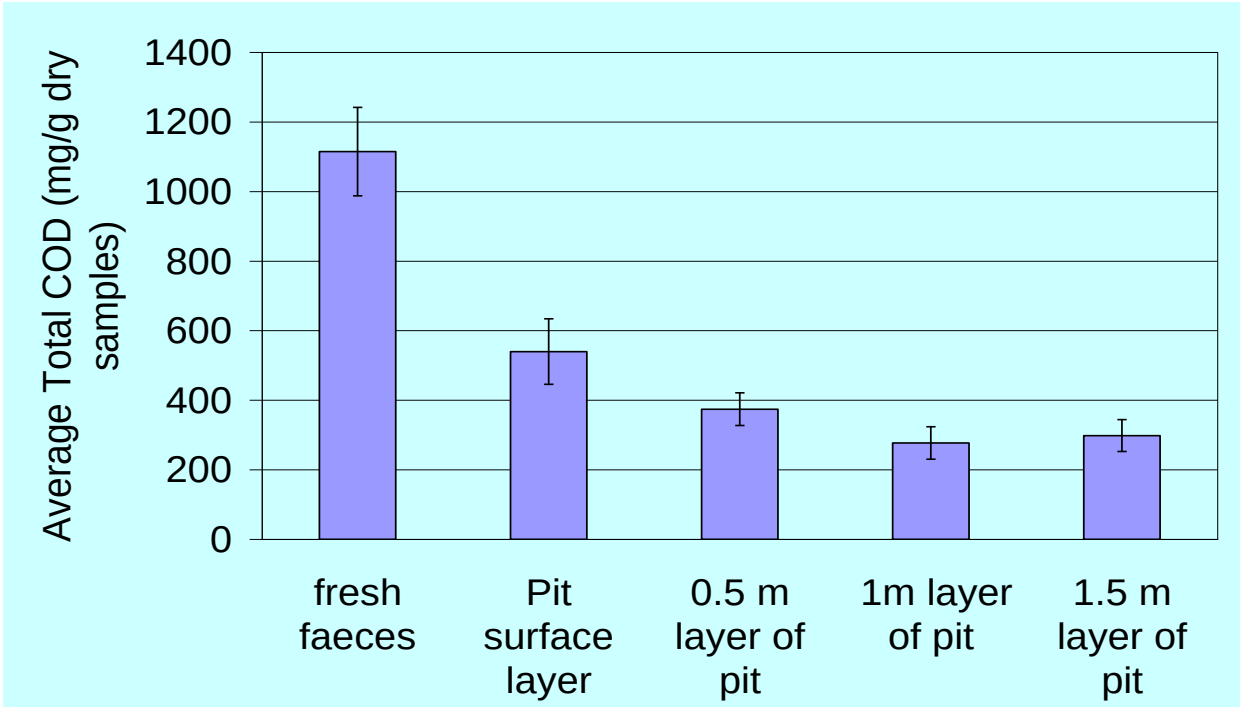
What happens in a pit?





- fast degradation on top
- slows when covered
- very slow low down
- pathogens throughout the depth

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Pit Characterisation

Highly concentrated, varying wetness & trash content

1 VIP = 1 Megalitre of normal sewerage

	Pit latrine sludge	High strength sludge from bucket latrines and public toilets	Low strength sludge from septic tanks	Sewage – in waterborne sewerage systems
Source	Brouckaert and Foxon, 2008	Heinss et al, 1998		
COD (mg/l wet)	90 000-225 000	20 000-50 000	< 10 000	500 – 2 000
COD (mg/g dry)	210-1230	571-1429	<333	50-200
N as NH_4 (mg/l wet)	9 000 (TKN)	2 000-5 000	<1 000	
N as NH_4 (mg/g dry)	100 (TKN)	60-150	<33	
Total solids (%)	20	>3.5	< 3	
Soluble solids (mg/l wet)	220 000	≈ 30 000	≈ 7 000	20

Source: Foxon KM and Still DA (2012) *TACKLING THE CHALLENGES OF FULL PIT LATRINES Volume 1: Understanding sludge accumulation in VIPs and strategies for emptying full pits*

Pictures: WINSA Seminar Report, 14-15 March 2

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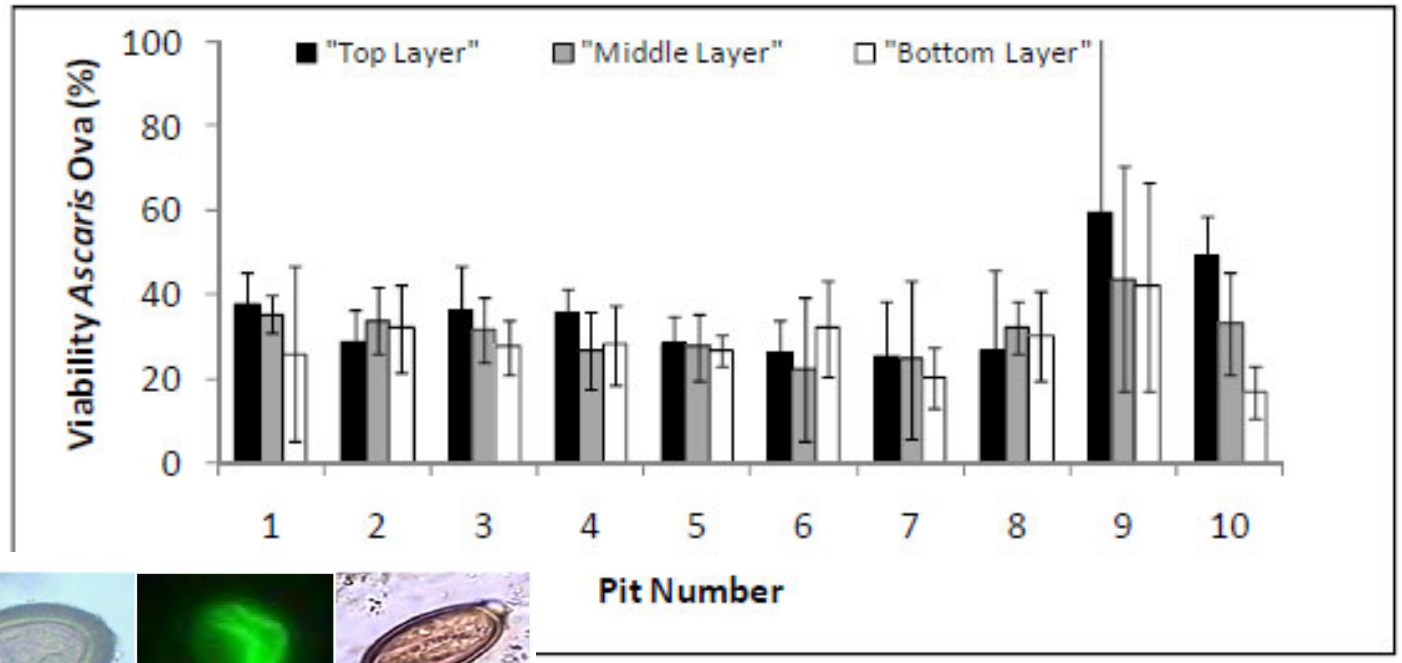
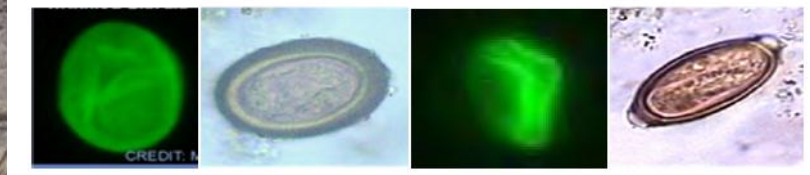
Challenges

Pit emptying is messy and a hazard to health





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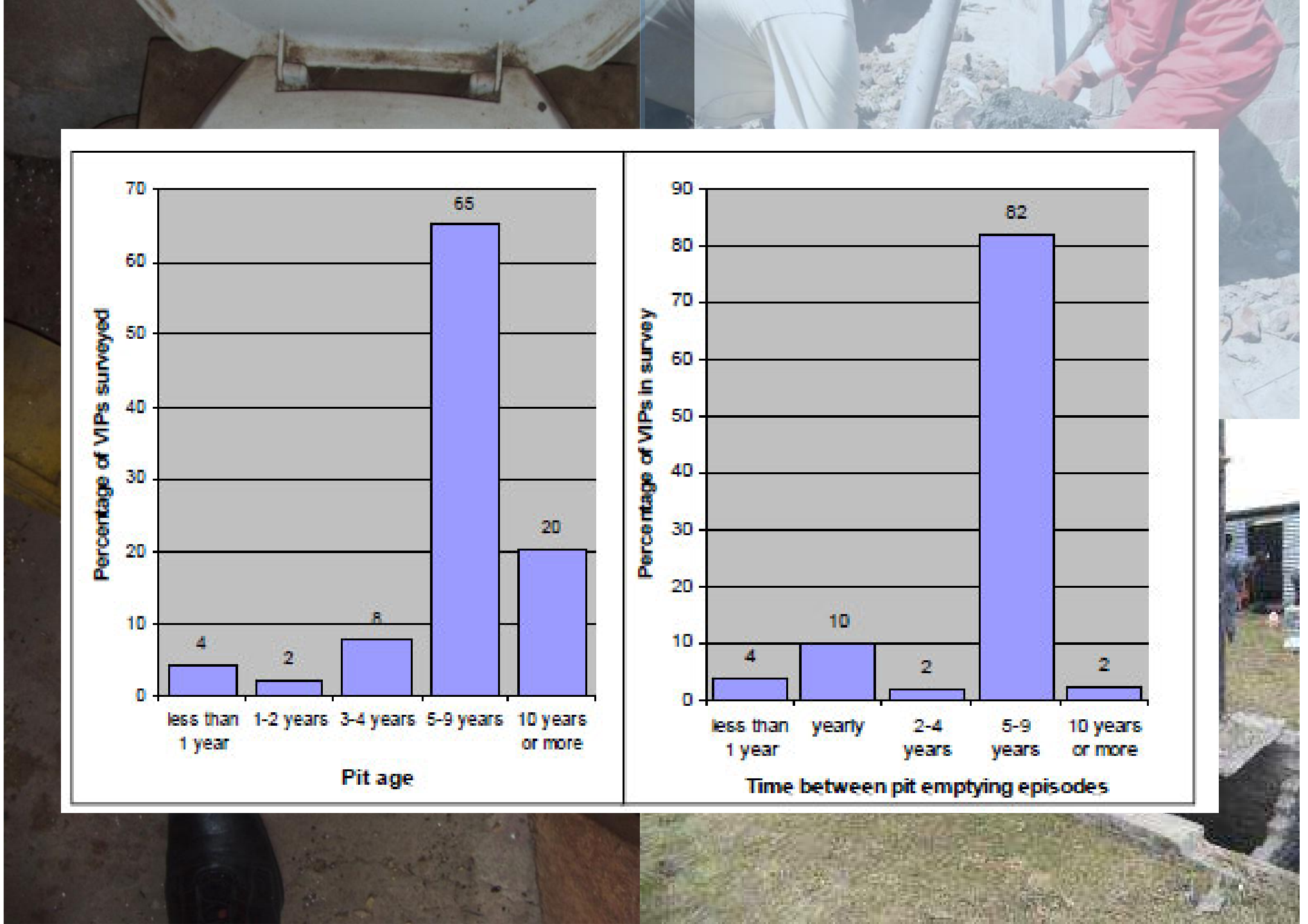

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Policy requirements – *'THE ENABLER and PROTECTOR'*

National policy and legislation that specifically deal with faecal sludge management.
Fragmentation - Aligning policy and legislation across different government departments.

- **Enabling the legal, institutional, policy, financing and other constraints to service delivery**
  - Institutional
  - Health and Safety
  - Regulation and standards
  - Job Creation
  - Environmental
  - Public awareness and social marketing
  - Financing
  - Monitoring compliance
  - Promoting Innovations

Not a technical problem, but governance failure

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POLICY REQUIREMENTS

- *A uniform standard.*
- *WASH campaigns that include educating children and adults (males and females) to be responsible and hygienic toilet users and cleaners.*
- *The sanitation value chain*

TECHNICAL STANDARDS

- Emptying technology
- Transport or conveyance
- Safe treatment and disposal
- Handling
- Proper septic tank design and construction
- Septic tank desludging and septage transportation
- Infrastructure for septage treatment and disposal
- Reuse applications

- REGULATIONS
  - sludge quality
  - Reuse
  - Treatment requirements

Research Support

- **Characterisation**
  - science
  - sludge accumulation
- **desludging techniques and management**
- **Improved toilet technologies**
- **Emerging contaminants**
- **Rapid Diagnostics and Guidelines for Fecal Sludge Management**
  - Practical rapid diagnostic and advocacy tools
  - Economic analysis of options
  - Guidelines for program design and implementation
- **Re-use options**
- **Public health risk assessment**
- **FSM demand analysis**
  - Tool to estimate quantity and composition of sludge
  - Challenging due to wide variability
  - Needed in order to plan FSM services
- **Economics of Sanitation FSM**
  - Estimates impact of poor/absent FSM services
  - Allows for comparison of options, including sewerage
  - Cost-benefit and affordability estimation
  - Helps identify financing packages
  - Estimates market volume
  - Funding flows

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Proposed SDG targets

- **Target 1: By 2025**, no one practices open defecation, and inequalities in the practice of open defecation have been progressively eliminated
- **Target 3: By 2040**, everyone uses adequate sanitation when at home, the proportion of the population not using an intermediate drinking water supply at home has been reduced by half, the excreta from at least half of schools, health centers and households with adequate sanitation are safely managed, and inequalities in access to each of these services have been progressively reduced
- **Target 4:** All drinking water supply, sanitation and hygiene services are delivered in a progressively affordable, accountable, and financially and environmentally sustainable manner.

THANK YOU!!!!!!!!!!!!

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