SFDs – Appropriate Technology each Stage

presented by Stew, Dinesh, David, Val & Jill

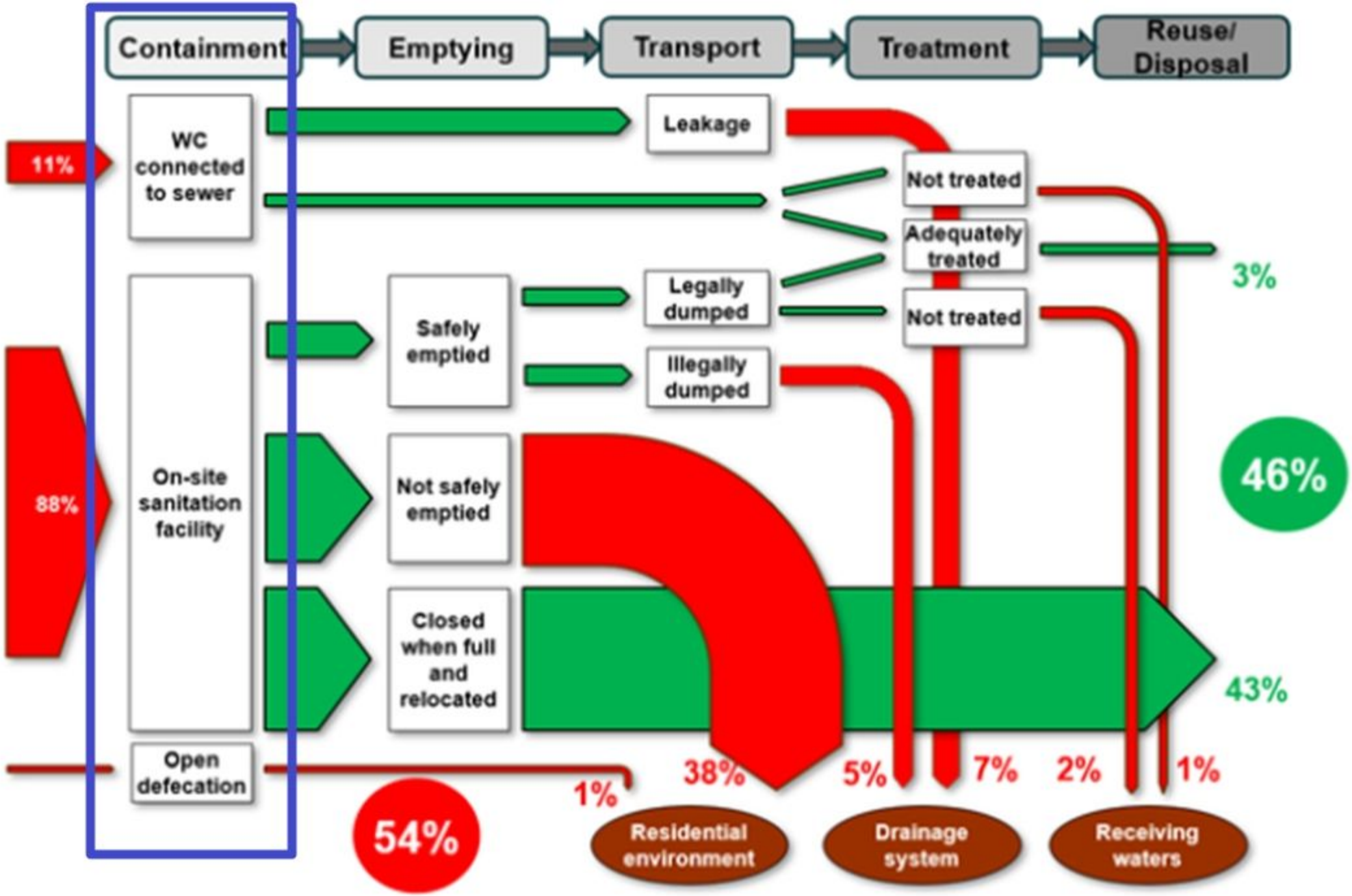
WWS 16 Tech Team
WaSH-RAG WWS 16 - on 22 May 2024

Affordable Technologies for each Stage of SFD

- Each stage of a SFD (Shit Flow Diagram)
- Technologies that are Appropriate & Affordable
- Images & diagrams
- When best Indicated to use each
- Pros & Cons to consider
- Additional Reading – your follow up, learning, case studies, country-region experience
- Q&A opportunity in each SFD Section

Key Resources & Frameworks

- Susana.org – Sustainable Sanitation (work groups, papers, manuals, discussions – section on SFD)
- WaSH-RAG.org - technical papers, like Guidelines to Planning Sustainable Sanitation Projects
- Akvopedia - Sanitation Portal
- IWA (International Water Association) - Compendium of Sanitation Systems & Technologies (comprehensive framework)
- ….
- *(more will come to you via email)*


Containment
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Transport
Treatment
Reuse/ Disposal
11%
WC connected to sewer
88%
On-site sanitation facility
Open defecation
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Leakage
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Closed when full and relocated
Legally dumped
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Not treated
Adequately treated
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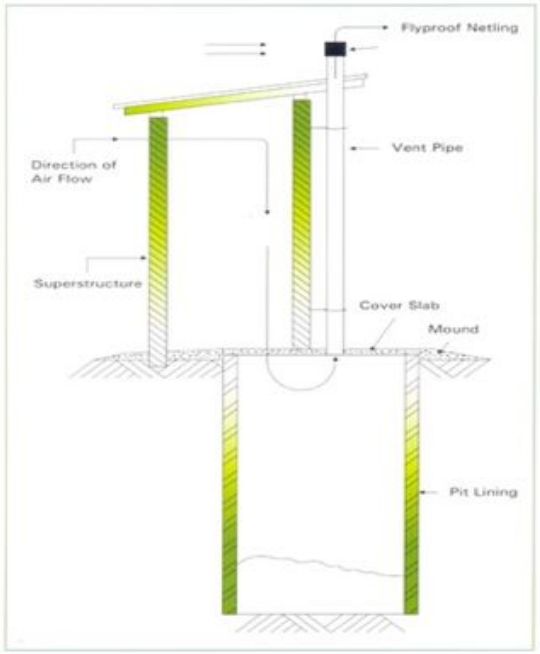
38%
5%
7%
2%
1%
3%
46%
43%
Residential environment
Drainage system
Receiving waters

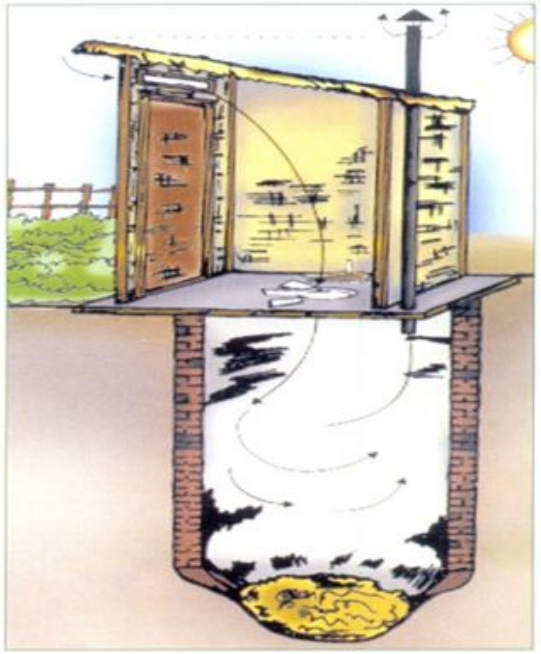
SFD 1 – Containment – Toilet Types

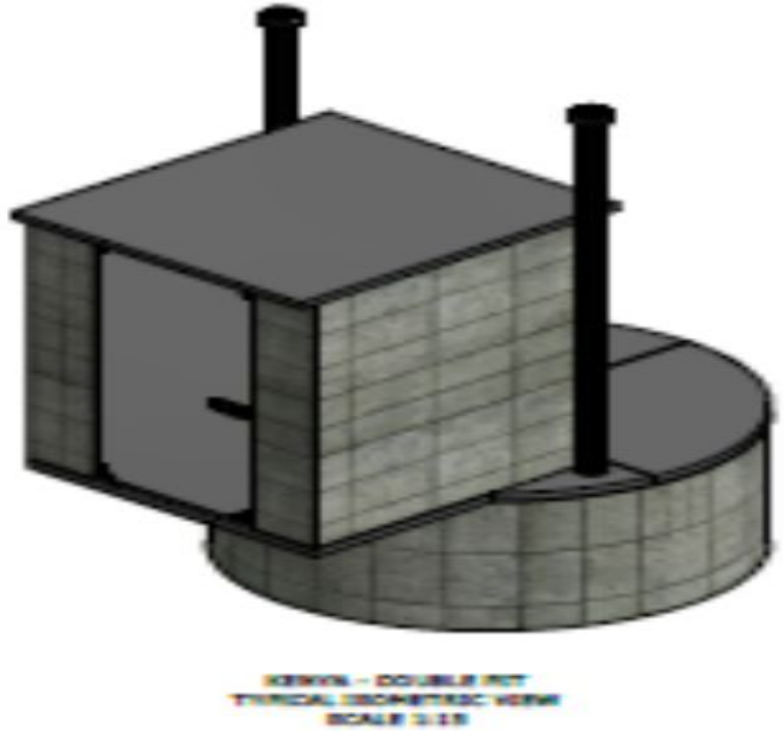
- VIP Latrine (ventilated improved pit) / VIDP (double pit)
- Pour-flush Latrine (single or double pit)
- Toilet linked to septic tank and soak pit
- UDDT – Urine Diverting Dehydrating Toilet (aka Composting)
- Vermicompost Toilets (worms) – Tiger Toilets & MicroFlush
- Toilet linked to Biogas decomposition
- High Tech self-contained toilets (B&M Gates funded research)

Note: SaTo pans can be used with most of these

Containment – 1. V.I.Pit Toilets – Single & Double







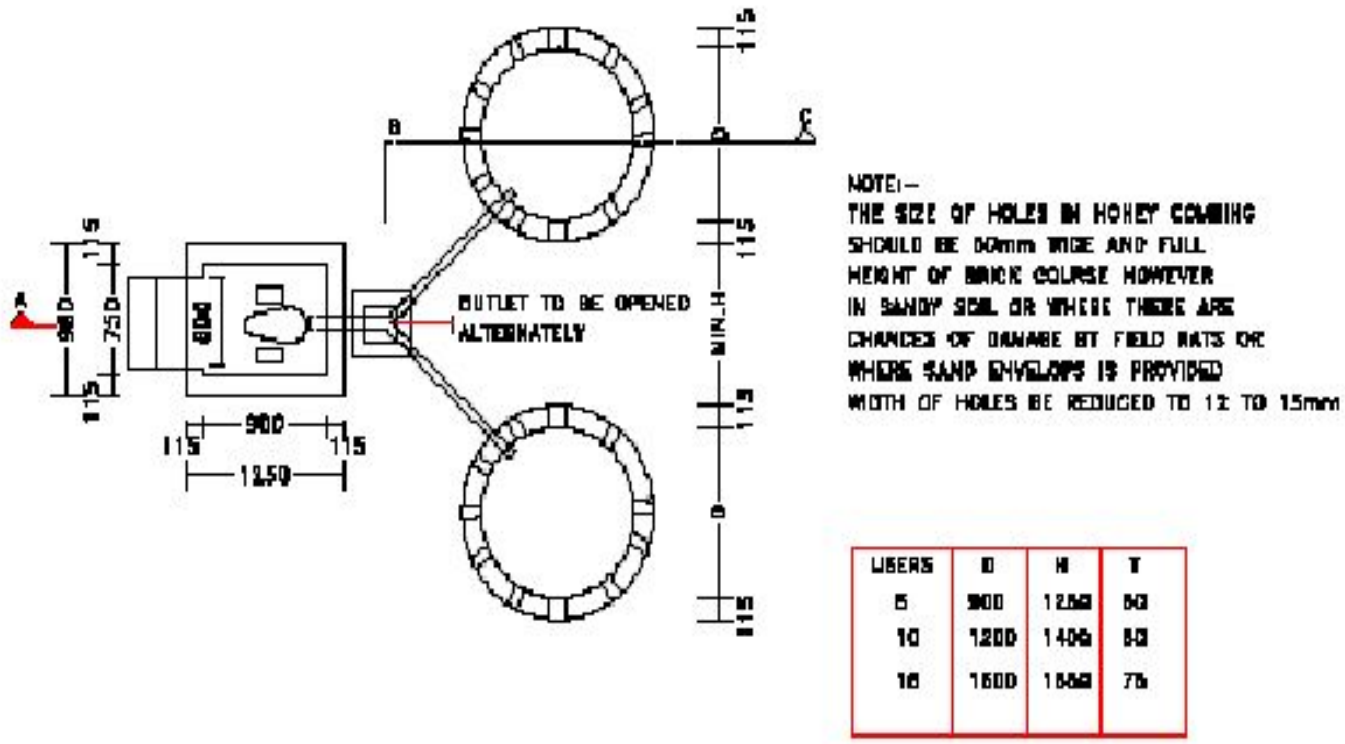
Indicated:

- Very poor rural areas, where commonly used
- Additional land is available for replacements when full
- Artisans available to construct properly (vent pipe, screen)

Containment – 1. V.I.Pit Toilets – Single & Double

Pros	Cons
No or very limited water use	If not properly designed, constructed & cleaned … they are smelly & draw flies
Double pits are easy to empty, no external services. Single pits do require this.	Single pits hard to empty, require a new pit! Double pits allow one dormant, other used daily
Constructed operated & cleaned properly, little or no smell	People move up “sanitation ladder”, from dry sanitation (aspire upscale toilets); abandon this
Relatively easy to train whatever labour is available	Reuse: Single pit requires empty-transport-treatment. Double VIP can reuse on-site but only with increased awareness & training
High water tables & rocky areas can make adjustment so that still works	□ These adjustments increase costs of a VIP

Containment – 1. Offset Double Leach Pits



USERS	D	H	T
5	900	1250	50
10	1200	1400	50
15	1500	1650	75

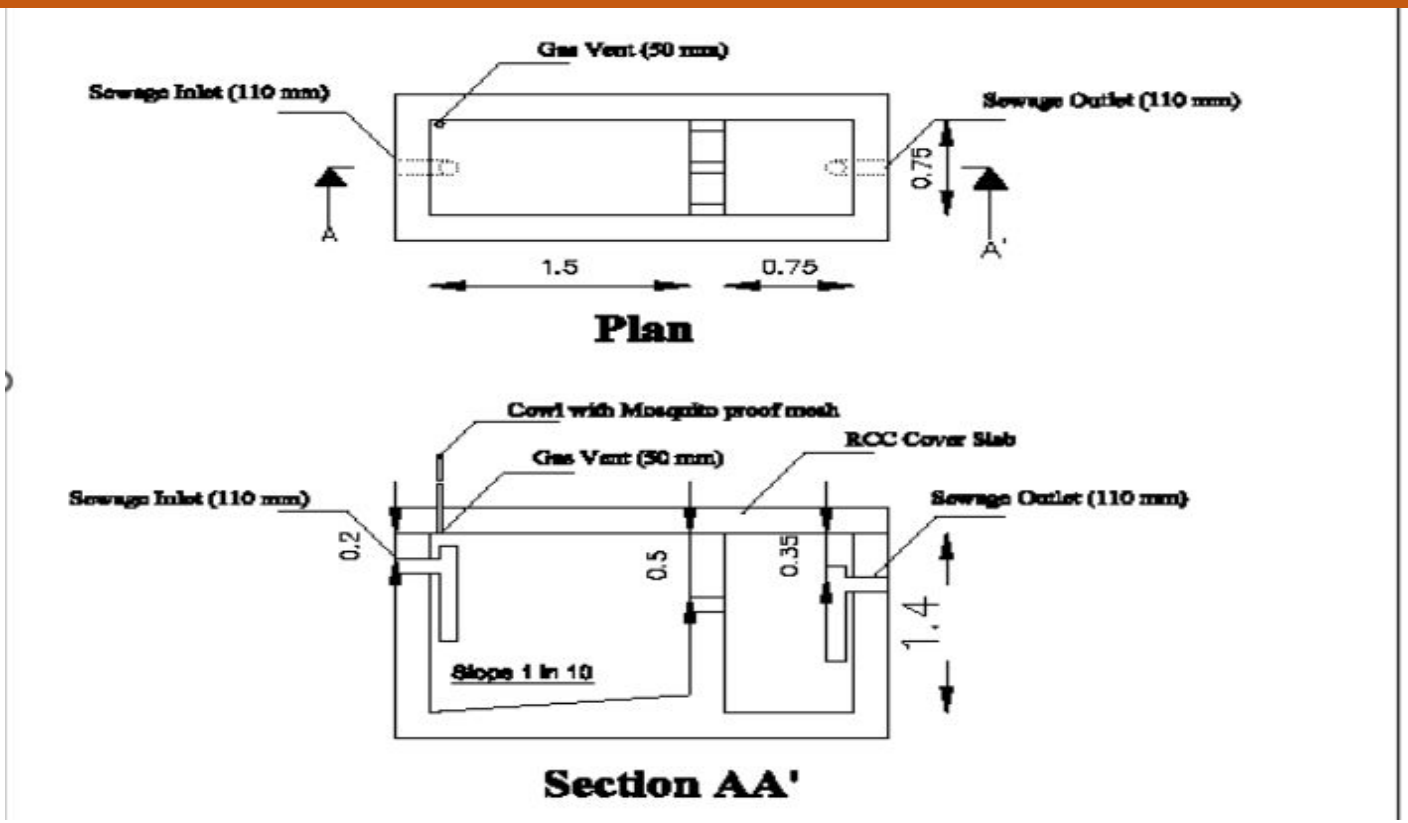
Indicated:

- Very poor rural areas, where commonly used
- Additional land is available for replacements when full
- Artisans available to construct properly (vent pipe, screen)

Containment – 1. Leach Pits

Pros	Cons
Relatively simple to construct. Long lasting.	For many countries new technology, few skilled labourers
Easy to empty and does not require external emptying services	Difficult to use in high water tables. Difficult to construct in rocky areas.
Constructed & operated properly, no smell	Reuse should not happen within 18 months
Makes human waste fit for reuse if operated properly	Requires more space (though adjustments can be made)
Safely managed system	Psychological barriers reusing human waste

Containment – 1. Septic Tanks with Soak Pits



Indicated:

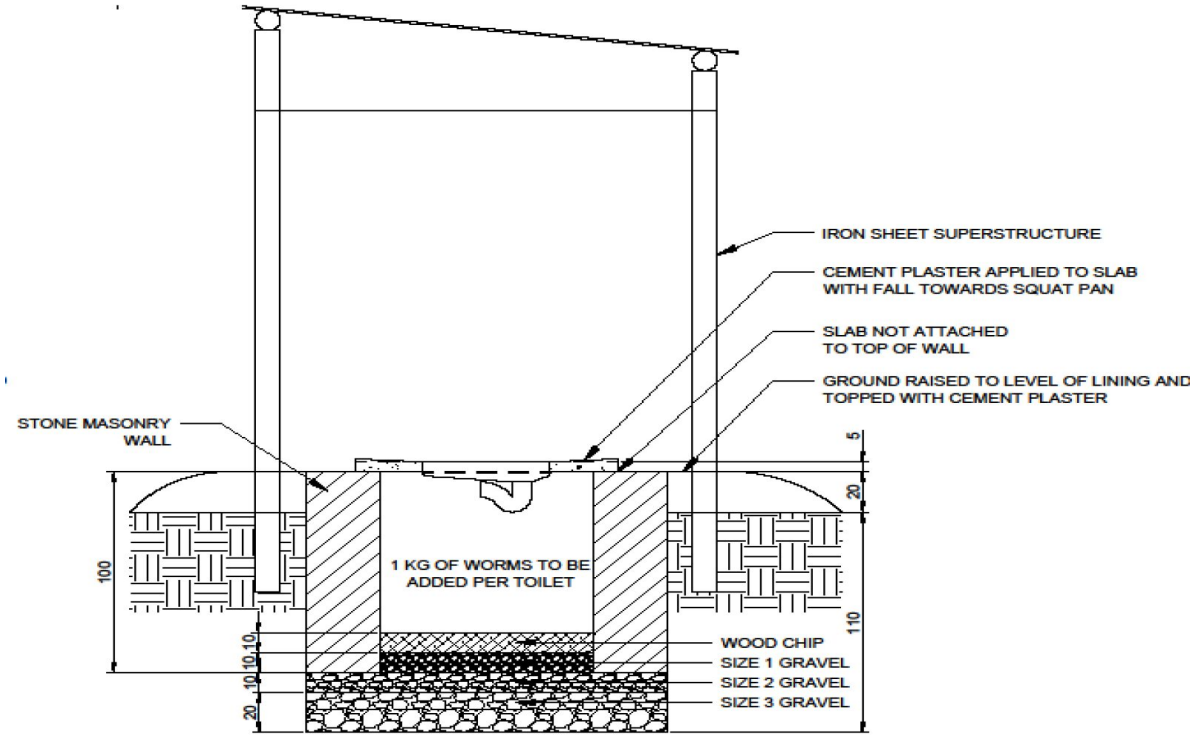
- Where water is plentiful, cheap and reliable - for decades to come
- No interest in agriculture/garden use of urine or fecal humus

Containment – 1. Septic Tanks with Soak Pits

Pros	Cons
Known technology, easy to propagate	Relatively high costs to construct. Requires plentiful reliable water
Works urban/rural, more households can be connected	Only safely managed if emptying, transport and treatment is well organized
If constructed and operated properly no smell	Requires specialized mechanical emptying
Partial treatment system is easy to operate	Difficult to construct in rocky areas. Avoid in high water tables (adjustments possible)
Long lasting	Requires more space (adjustments can be made)
Very popular with masons & artisans as it provides them solid working days	Most septic tanks have serious construction deficiencies - not function as treatment system

Containment – 1. Vermicompost & Microflush

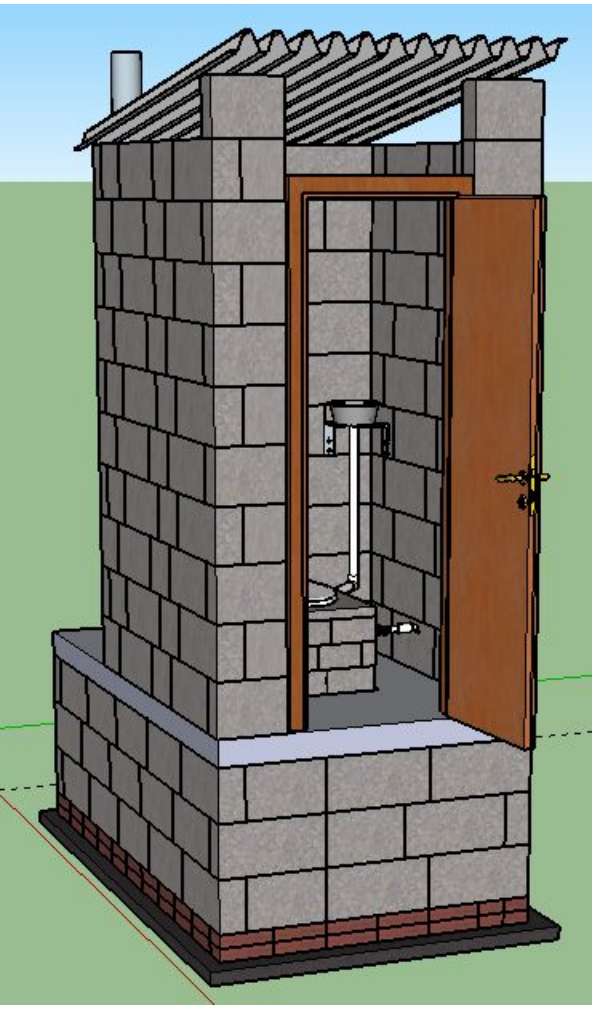
Vermifiltration Composting Toilets

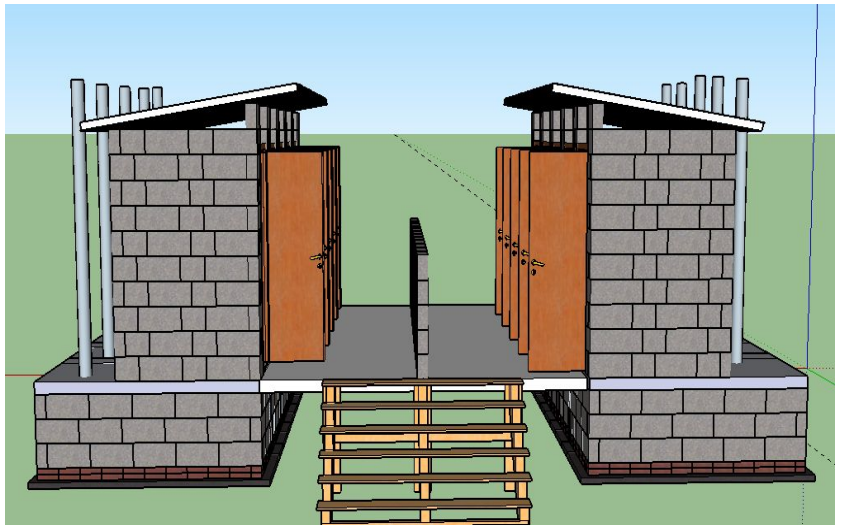


Indicated: (frequent in India, Uganda, Ghana & Myanmar)

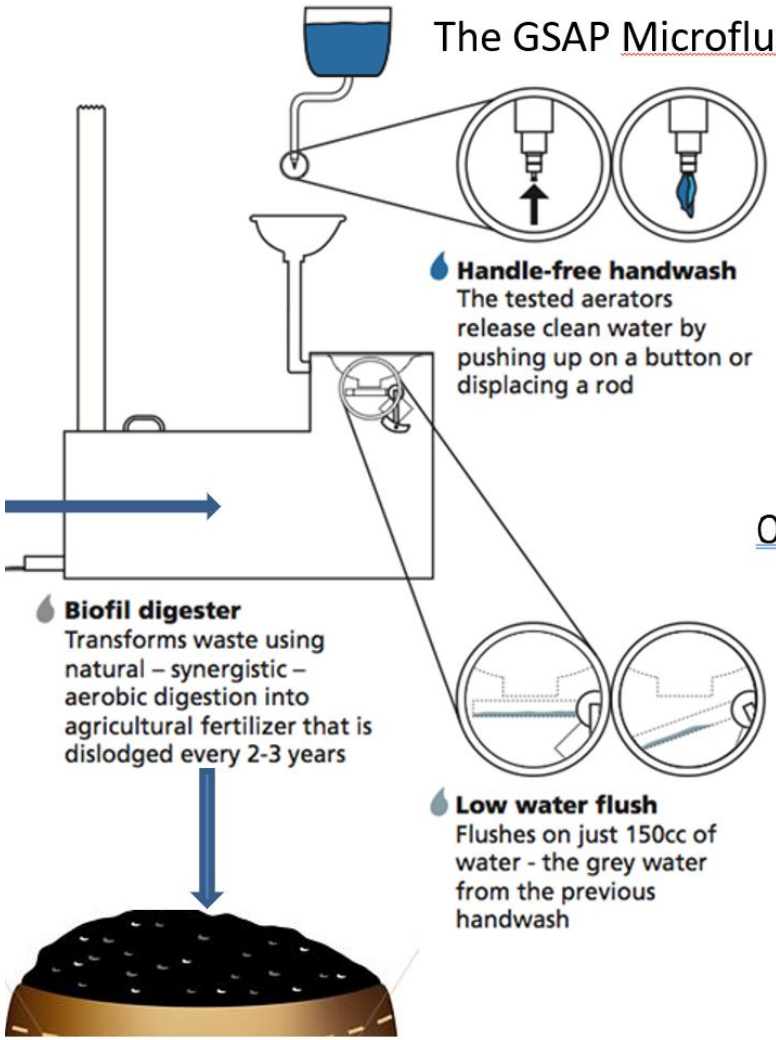
- Water is scarce; moderate water table, less flooding
- Community cares about ecology; source of worms nearby
- a plus - local agriculture, garden or plant nursery

Containment – 1. Microflush (vermicompost)



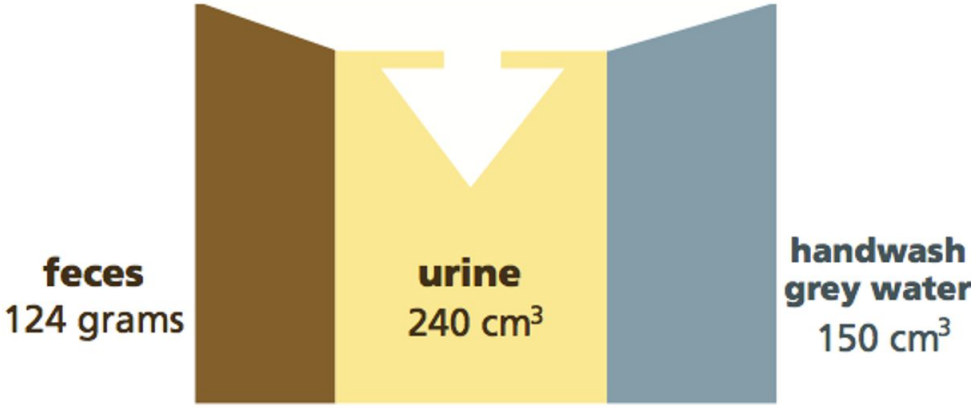


Containment – 1. Microflush (vermicompost)



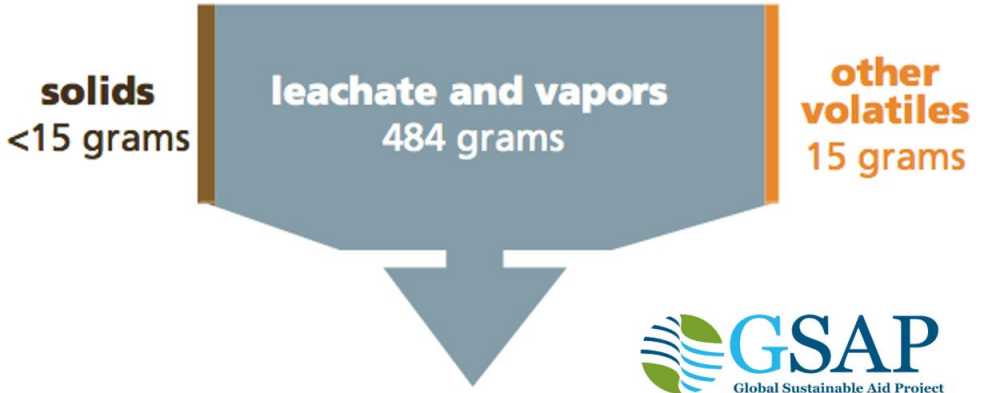
Or, simple pour flush

What goes in:



Filter-Dewatering + Aerobic Digestion
significant Macro organism role

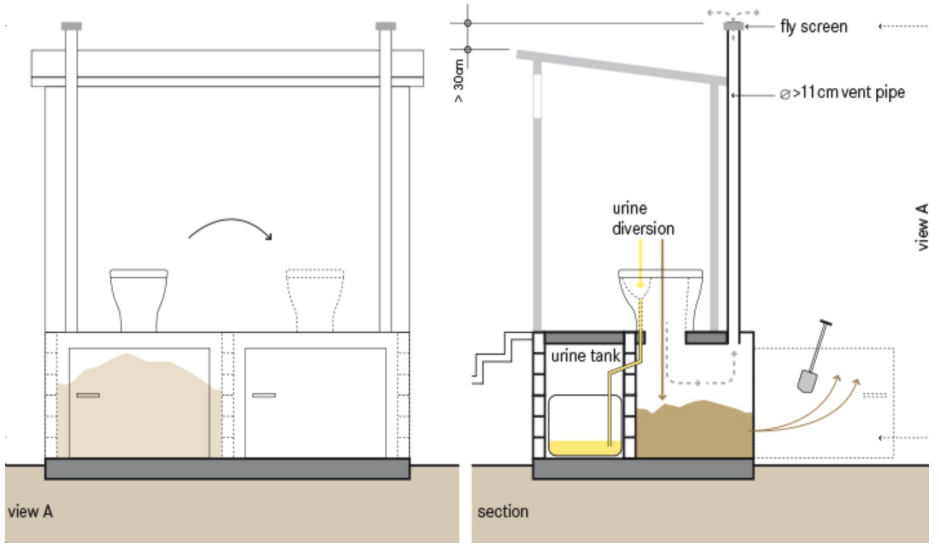
What comes out:



Containment – 1. Vermicompost & Microflush

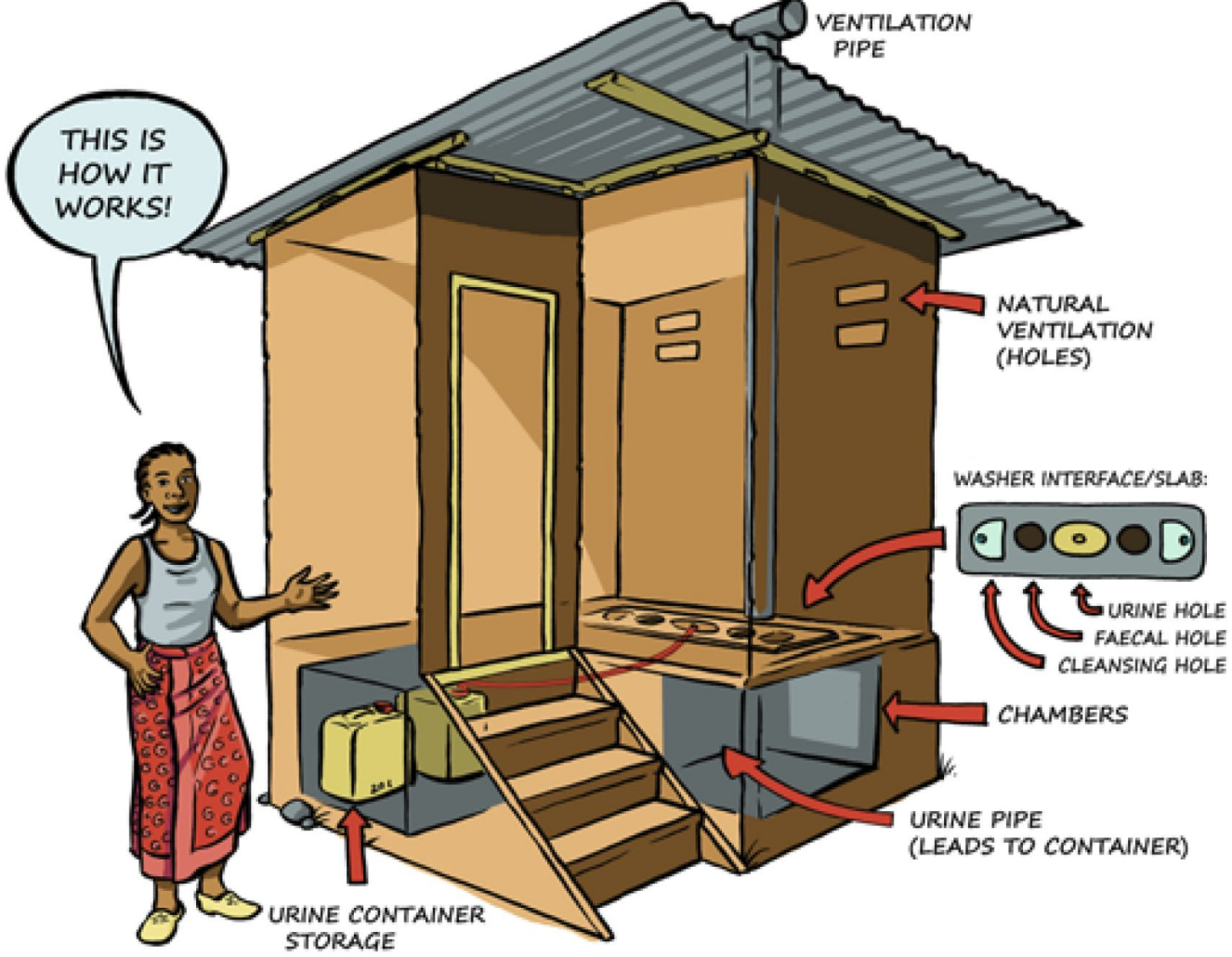
Pros	Cons
No Pit - No machinery to empty. Simply shovel dry castings every 1 to 4 years	Needs to be regularly used (only few days away) or worms can die
Handwash sink at toilet can provide water for “microflush”	Needs regular water (microflush or 150cc to ½ liter), but not extensive, or worms can die
Single structure, lasts for years; no rebuild when pit gets full (no pit)	Training takes a bit more time
Single vault, worms digest feces reducing 80% of original mass → worm castings	Soil needs to allow infiltration of liquids
Can use with SaTo pan. Can use urinals.	Usual design has no capture of urine; soak pit.
Output can be used in plant nurseries, growing grain, may sequester carbon	Need nearby worm source for initial batch

Containment – 1. UDDT (Urine Diverting Dehydrating Toilet)



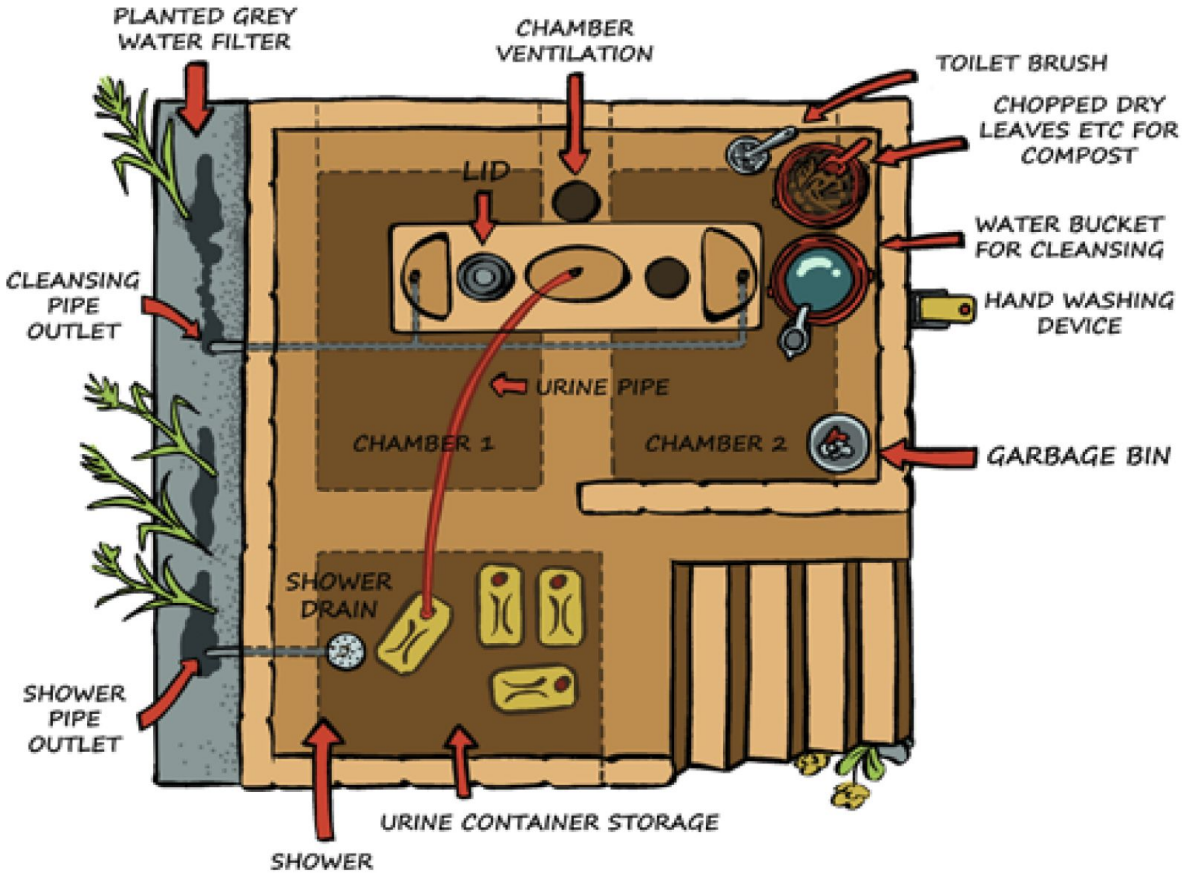
Indicated:

- High water table, flooding (sits on a mound, stays dry)
- Agricultural community, output is good natural fertilizer
- Better on sloped ground (fewer steps up, empty access is downhill)



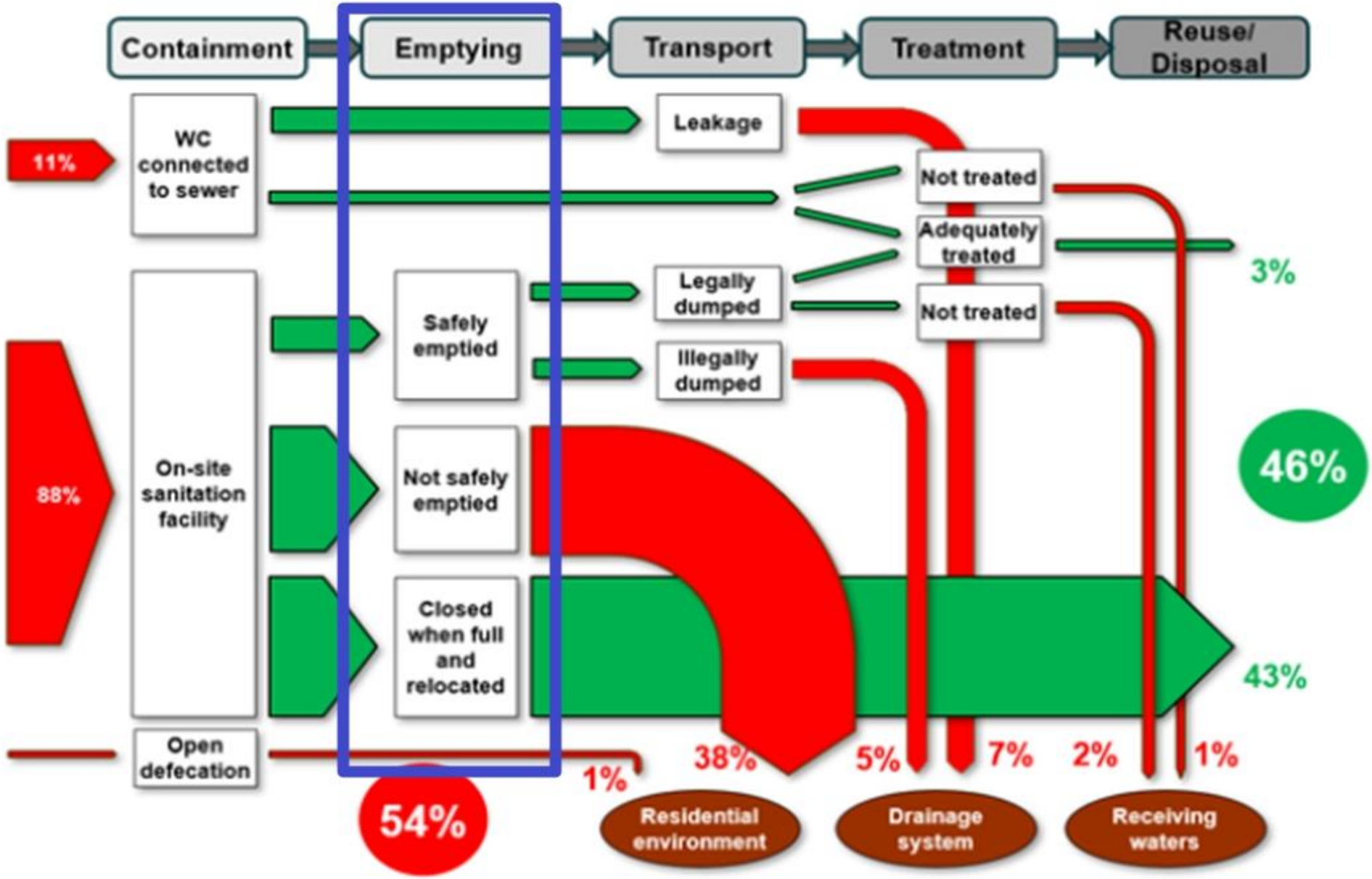
Outside View

Inside Top View



SFD 1 – Containment 1. UDDT

Pros	Cons
No Pit, No machinery to empty	Without Agriculture, find a place to dispose
Single structure, lasts for years; no rebuild when pit gets full (no pit)	Potential stigma against handling human waste – need training & use it; wash hands
Dual Vault much easier to maintain & use	Need to keep urine lines/jug tightly connected, no leaks; periodic rinse gear
Can use with SaTo pan	Elevated floor, so disabled need a ramp (build on slope to reduce this)
Urine is great fertilizer, plants & crops; dried feces becomes humus, amends soil	Difficulties to sit & use, so urine is separated (takes practice)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Residential environment
Drainage system
Receiving waters

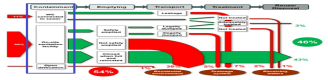
SFD 2 – Emptying, Collection - Summary

- Manual emptying of pits – buckets, hand pumps
- Manual (shovel) emptying of drier humus
- Smaller motorized devices – Gulper (v6), Pu-pu, etc.
- Larger trucks with vacuum & tank

- Conditions for legal emptying-collection

- Business opportunities

- (Val's note: have data from an old study on employment and income, also on youtube you amy find a video called: *These Guys Are Extremely Liquid*, though old it shows business perspective)



SFD 2 – Collection (manual)

SFD 2 – Emptying, Collection

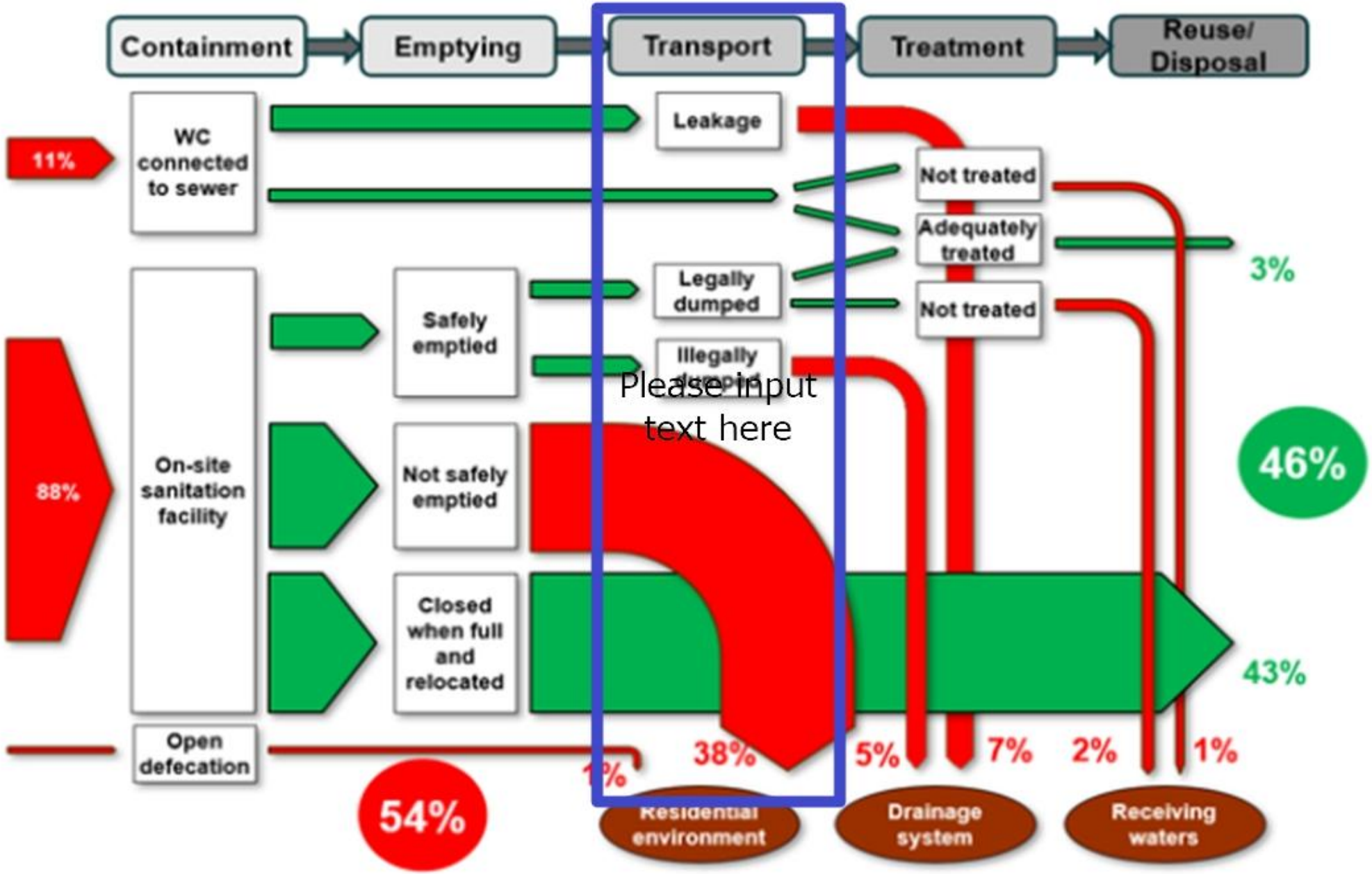
SFD 2 – Emptying, Collection – Manual Emptying

Pros	Cons
Removes liquid easily, and some accumulated solid waste	Poor respect and low safety of workers
Relatively easy, available	Limited transport
Not costly – for client and business owner (little investment)	Difficulty finding proper-legal final disposal
Daily business requires little skills	Smelly & spillage in community & environment
Cashflow daily	Sometimes illegal business (extortion)

SFD 2 – Collection

SFD 2 – Emptying, Collection – Truck Emptying

Pros	Cons
Can transport over long distances	Empties mostly the top portion (liquid, avoids much solid; less use for dry systems)
Relatively easy Available in urban, some peri-urban	Requires significant investment; hard to get bank loans
Empties waterborne systems	Difficulty finding proper-legal final disposal
Daily business requires little skills	Worker safety
Cash flow periodically	Sometimes illegal business (extortion)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SFD 3 – Transport

Remove & Transport to an offsite (Semi-) Centralized Treatment, Use & Disposal technology:

- Manual – wheeled carts, buckets or hoses
- Truck – contains tank, hoses
- Finding Legal & Safe disposal locations

C.1 Jerrycan/Tank

C.2 Human-Powered Emptying and Transport

- Gulper ~ $150
- Manual Diaphragm Pump ~$300-$850

C.3 Motorized Emptying and Transport

- Vacutug ~ $5,000
- Pu-Pu Pump ~ $6,000
- Vehicle-mounted vacuum equipment (diesel or petrol)

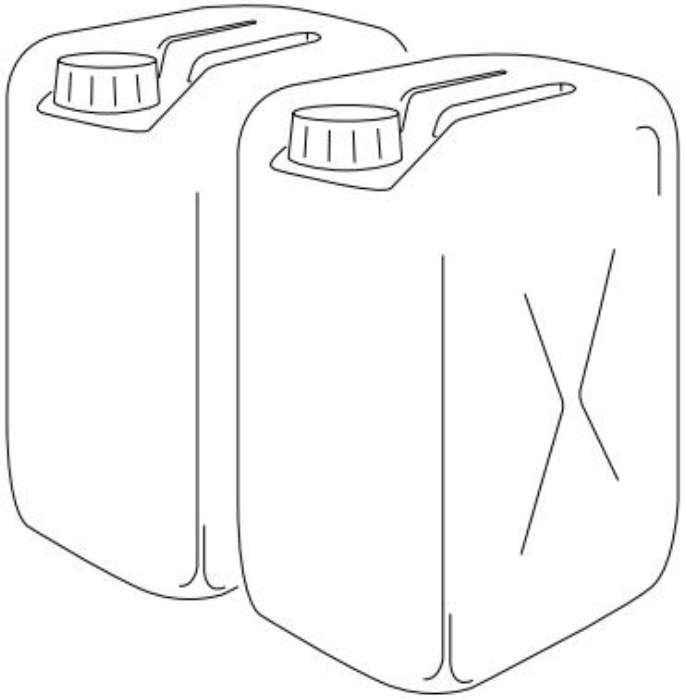
C.4 Simplified Sewer

C.5 Solids-Free Sewer

C.6 Conventional Gravity Sewer

C.7 Transfer Station (Underground Holding Tank)

SFD 3 – Transport - Jerrycans



20 Liter Jerrycans

Features

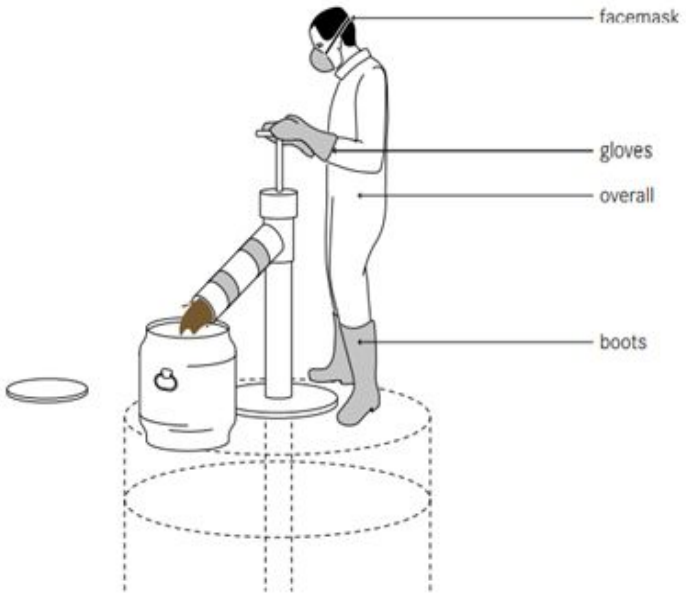
- Plastic containers - carried by one person
- Can be collected in jerrycans
- Or filled with urine stored in Storage Tanks / Containers for transportation to agricultural fields or to a central storage facility.
- Micro-enterprise - specialize in collection & transport of jerrycans, e.g. bicycles, donkeys, carts or small trucks.

SFD 3 – Transport - Jerrycans

Pros	Cons
Jerrycans - widely available and robust	Heavy to carry
Very low capital and operating costs	Spills may happen
Potential for local job creation and income generation	Mild to strong odour when fill & empty jerrycans (depends on storage conditions)
Easy to clean and reuse	
Low risk of pathogen transmission	

SFD 3 – Transport - Human Powered Emptying and Transport

Sludge can be collected in barrels, bags or carts,



Manual Transport
Up to 200 Liters – 3km

Application

- Dense, urban & informal settlements
- Areas not served or not accessible by vacuum trucks
- If vacuum truck emptying is too costly

Onsite sanitation facilities

Manual empty and/or transport:
1) Buckets and shovels
2) Portable, manually operated pumps (eg Gulper, Manual Diaphragm Pump)
Note: Solid material - Fossa Alterna / Dehydration Vaults emptied by shovel

SFD 3 – Transport - **Human Powered Emptying and Transport**

Pros	Cons
Potential for local job creation / income generation	Spills can happen which could pose potential health risks and generate offensive smells
Simple hand pumps - built / repaired with locally available materials	Time consuming: emptying pits out can take several hours/days depending on their size
Low capital costs; variable operating costs depending on transport distance	Garbage in pits may block pipe
Services to areas / communities without sewers	

SFD 3 – Transport - **Human Powered – Gulper (v6)**

Price: $160
Average flow rates of 30 L/min

Features

- Manually operated - works in confined spaces
- Empty contents of pit latrines semi-solid sludge
- Constructed using locally available materials
- Can reach 1m-1.5m into pit - extendable up to 2m
- Open source (Uganda, Cambodia, Tanzania, Malawi)
- Transport by trycicle / bicycle to transfer station.

SFD 3 – Transport - Human Powered – Diaphram Pump

Price $300 - $850
Maximum flow 100 L/min

Features

- Diaphragm is alternately pushed and pulled causing it to deform into concave and convex shapes similar to a rubber plunger used to unblock a toilet.
- Suitable for pumping low viscosity sludges
- Maximum pumping head of 3.5m – 4.5m

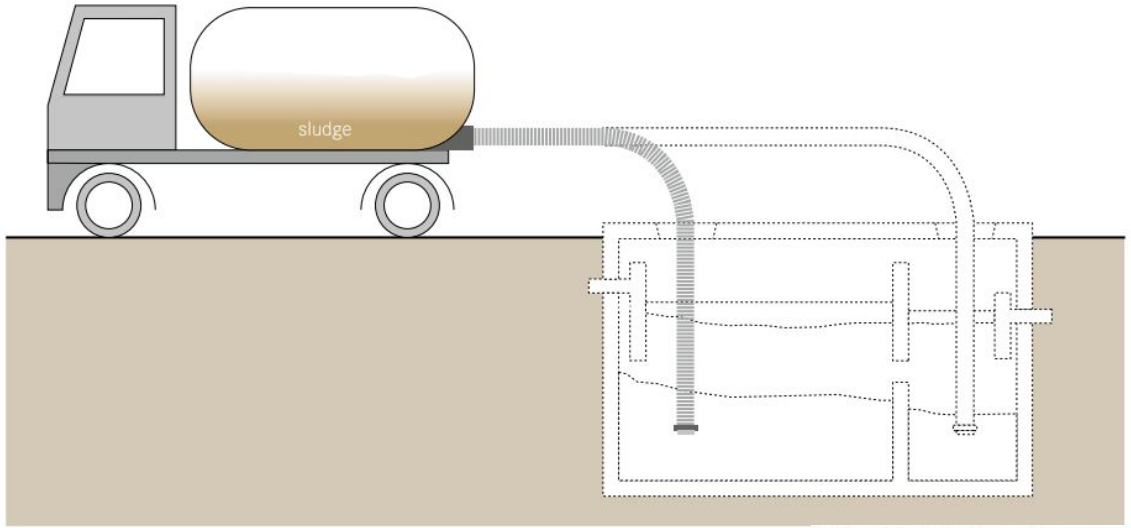
Cons

- Clogging - high non-biodegradable content
- Difficult to seal fittings at pump inlet
- Pumps / spare parts currently not locally available

https://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/publikationen/EWM/Book/FSM_Ch04_lowres.pdf

SFD 3 – Emptying & Transport – Motorized

Storage capacity - between 3 - 12 m^3



Features

- Vehicle (e.g. vacuum truck) equipped with a motorized pump and storage tank for emptying and transporting faecal sludge and urine.
- Truck with pump is connected to a hose lowered down into tank (e.g., Septic Tank) or pit,
  - sludge pumped into holding tank on the vehicle.

Figure 4.12 Example of correct method where the hose is easy and quick to assemble (photo: Linda Strande).

Figure 4.13 Example of an improperly maintained hose held together with plastic bags and twine (photo: David M. Robbins).

SFD 3 – Emptying & Transport – Motorized

Pros	Cons
Fast, hygienic and generally effective sludge removal	Cannot pump thick, dried sludge
Efficient transport possible with large vacuum trucks	Garbage in pits may block hose
Potential for local job creation and income generation	Cannot completely empty deep pits - limited suction
Provides an essential service to unsewered areas	Very high capital costs; variable operating costs
	Vacuum truck unaffordable for poor households
	Not all parts and materials may be locally available
	May have difficulties with access
	Operators may discharge sludge at improper locations

SFD 3 – Emptying & Transport – Vacutug

Price: $5,000
Removes 1,700 liters / minute

Features

- 500 Liter steel vacuum tank
- A 4.1 kW petrol engine
- Speed ~ 5km/hr.
- Dimensions - 1.5m long by 1m high
- Waste evacuated by 3-inch diameter PVC vacuum hose
- Neighbourhood collection-disposal point - vacuum tankers can transfer to city treatment plants

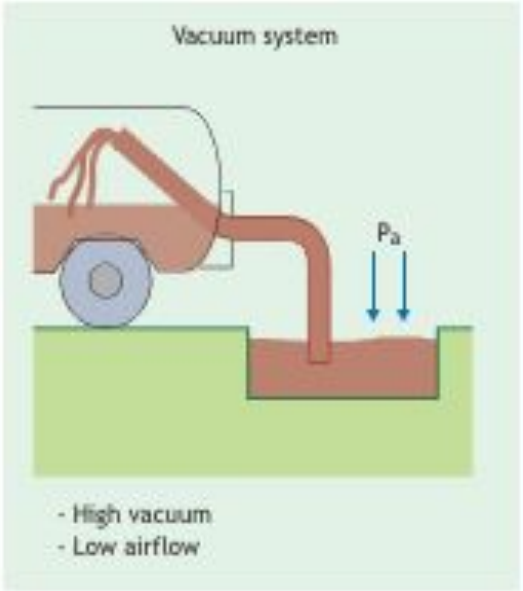
SFD 3 – Emptying & Transport – Pu pu pump

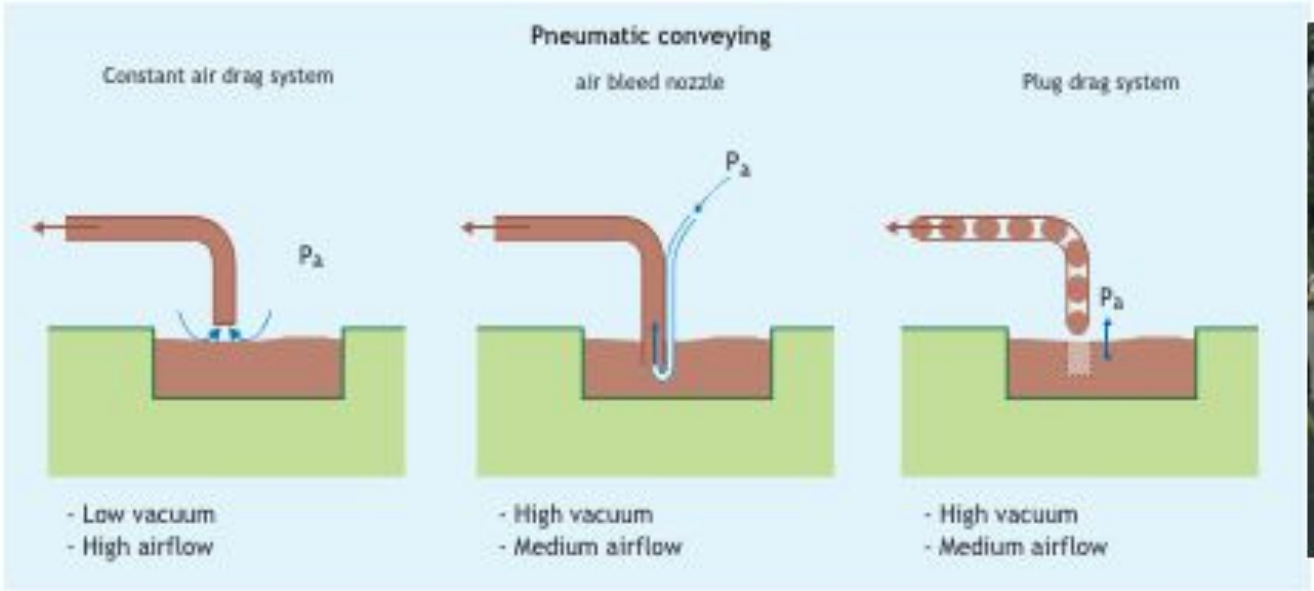
Price: $6,000
Yield ~ 7,000 liters / hour
(depends on viscosity, limitations)

Features

- Pumping distance ~ 100 meters (depends on viscosity)
- Suction depth - 8 meters
- Suction & delivery hose 100 mm diam.
- Hose length – up to 30 meters

SFD 3 – Emptying & Transport – Vehicle Vacuum





Features:

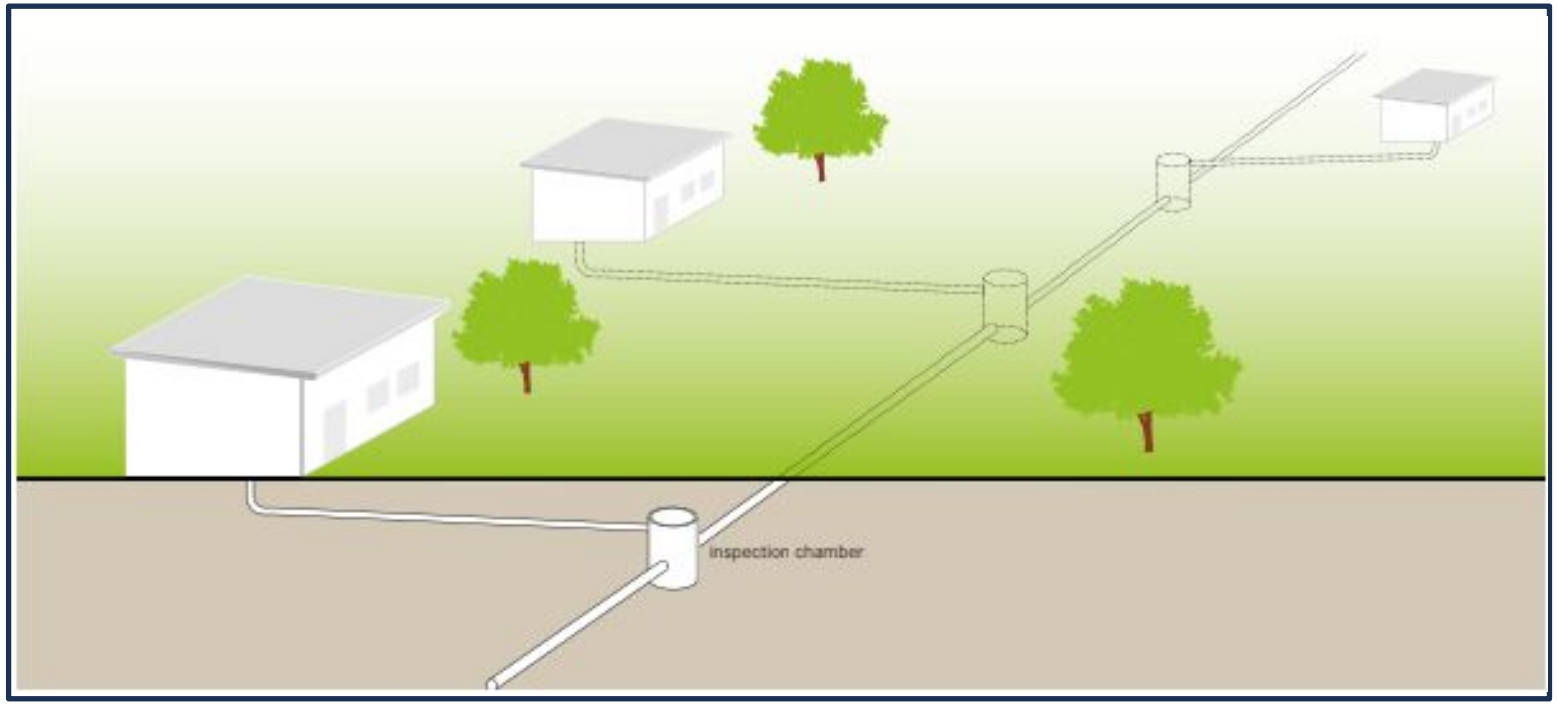
- FS Vacuum Trucks volume generally 10,000 litres

Success is Influenced by:

- typical volume of tanks or vaults to be serviced
- road widths & weight constraints
- distance to treatment plant
- availability & budget and
- skill level of the operators

Best suited for Septic Tanks

SFD 3 – Emptying & Transport – Simplified Sewer



Application

Population density is ~ 150 people per hectare; must have reliable water supply (at least 60 L/person/day)

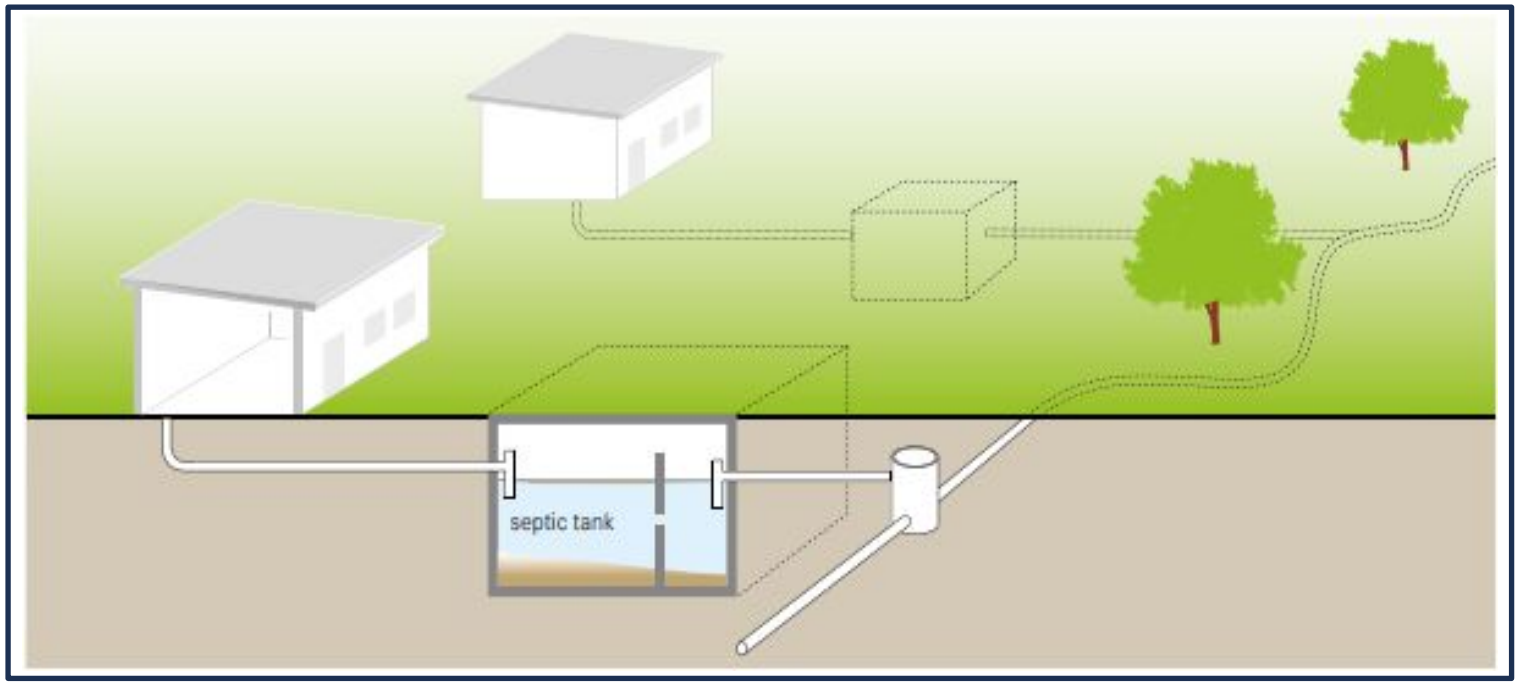
Features

- Smaller diameter & shallow depth pipes compared to Conventional Sewer
- Allows more flexible design at lower costs, better adapted to local situations
- Pipes within property boundaries (back / front yards)

SFD 3 – Emptying & Transport – Simplified Sewer

Pros	Cons
Shallower depth with flatter gradient than Conventional Sewers	Requires repairs & removals of blockages
Lower capital & operating costs than Conventional Sewers	Requires expert design and construction
Can be extended as community grows	Leakages pose a risk of wastewater exfiltration and groundwater infiltration - and are difficult to identify
Greywater can also be managed concurrently	
No onsite primary treatment required	

SFD 3 – Emptying & Transport – Solids Free Sewer



Application

- Transports pre-treated / solids-free wastewater (eg, Septic Tank effluent) in peri-urban areas.

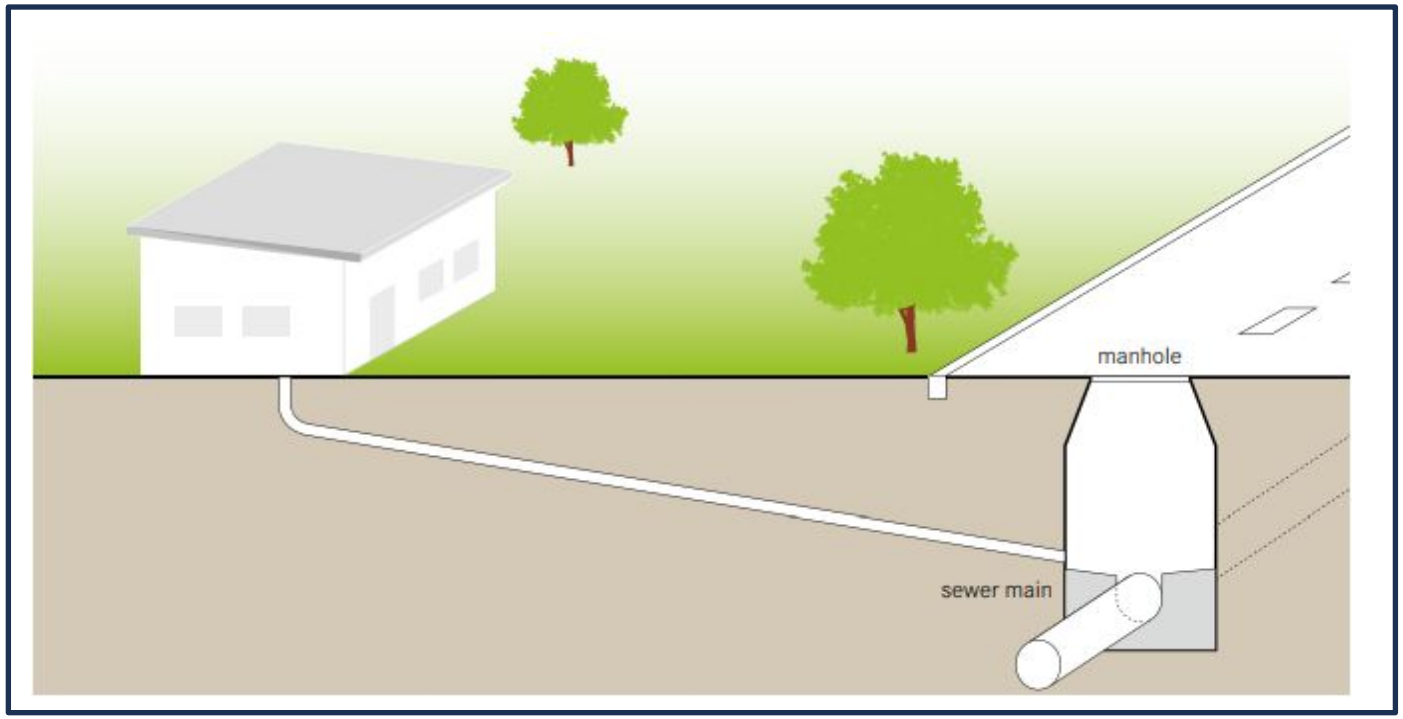
Features

- Installed at a shallow depth - does not require minimum wastewater flow or slope to function.
- Interceptor, e.g. Septic Tank captures settleable particles
- When sewer follows ground contours, the flow varies between open channel and pressure (full-bore) flow.

SFD 3 – Emptying & Transport – Solids Free Sewer

Pros	Cons
Does not require a minimum gradient or flow velocity	Space for interceptors is required
Can be used where water supply is limited	Regular desludging of Interceptors to prevent clogging
Lower capital /operating costs (conventional gravity sewers)	Requires training and acceptance to be used correctly
Can be extended as a community grows	Requires more frequent repairs and removals of blockages
Greywater can be managed concurrently	Requires expert design and construction
	Leakages pose a risk of wastewater exfiltration and groundwater infiltration and are difficult to identify

SFD 3 – Emptying & Transport – Conventional Gravity Sewer



Application

- Designed with many branches - primary (main sewer lines along main roads), secondary and tertiary networks (networks at the neighbourhood and household level).

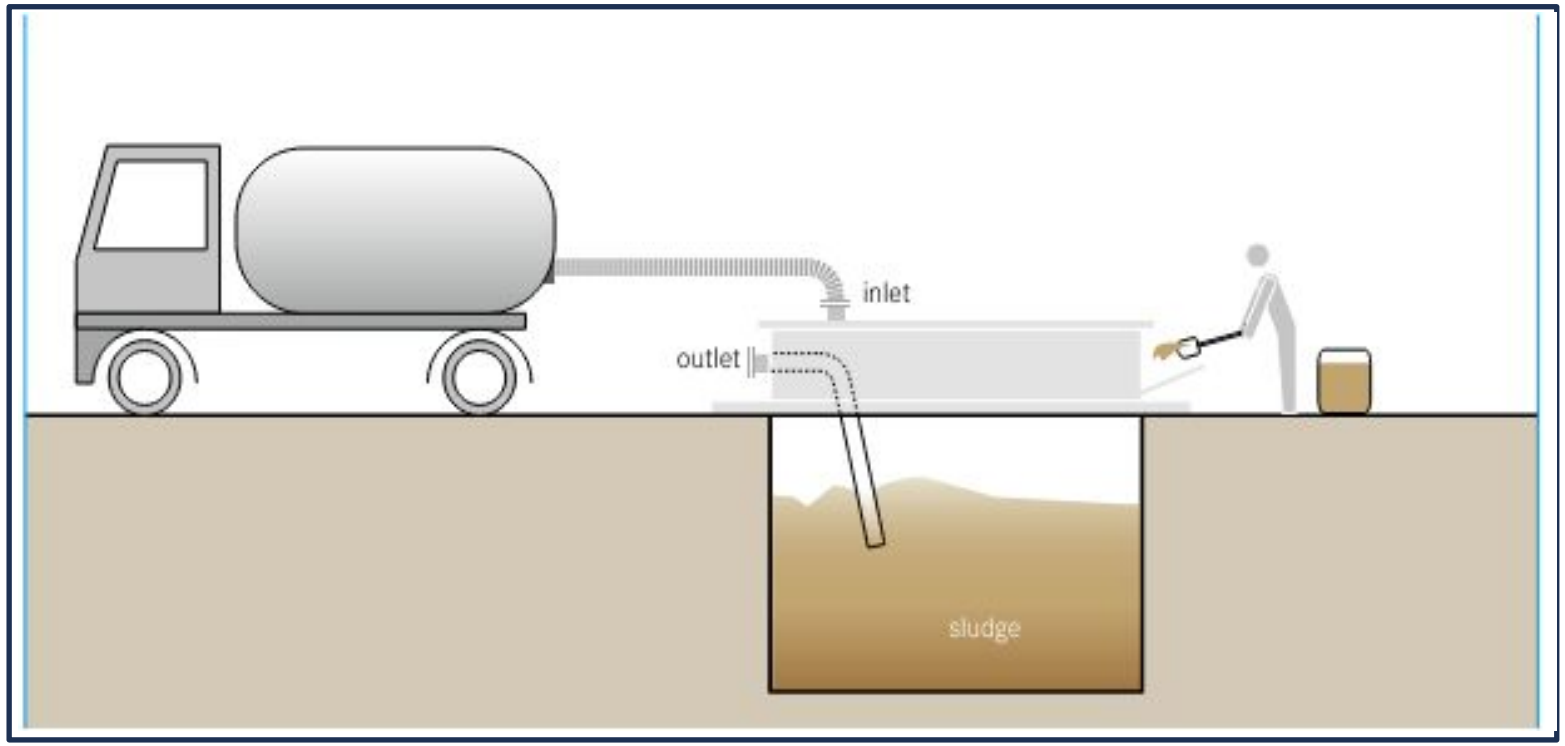
Features

- Large networks of underground pipes that convey blackwater, greywater and, in many cases, stormwater from individual households to a (Semi-) Centralized Treatment facility, using gravity (and pumps when necessary).

SFD 3 – Emptying & Transport – Conventional Gravity Sewer

Pros	Cons
Less maintenance – Simplified / Solids-Free Sewers	High capital, operation and maintenance costs
Greywater & stormwater managed concurrently	Minimum velocity to prevent deposition of solids
Handles grit & other solids, large flow volumes	Requires deep excavations
	Difficult & costly to extend as a community grows or changes
	Requires expert design, construction and maintenance
	Leakages pose a risk of wastewater exfiltration and groundwater infiltration; difficult to identify

SFD 3 – Transfer Station – Underground Holding Tanks



Application

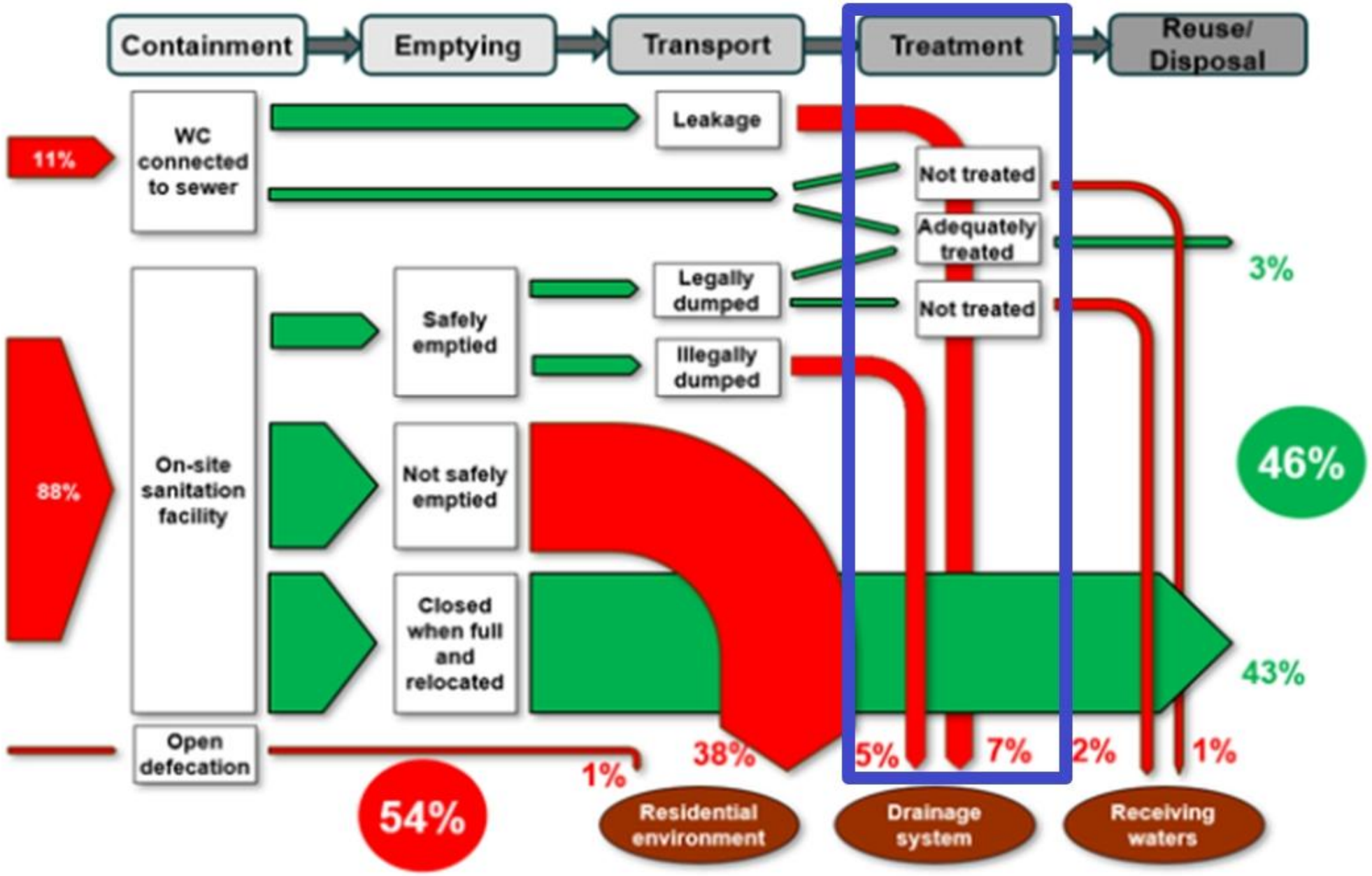
- For dense, urban areas - no alternative discharge points for faecal sludge
- Intermediate dumping points for faecal sludge. when it cannot be easily transported to a (Semi-) Centralized Treatment facility.

Features

- Vacuum truck required to empty transfer stations
- Operators of Human-Powered or small-scale Motorized Sludge Emptying Equipment discharge sludge at a local transfer station (rather than illegally dumping it or travelling to discharge at a remote treatment / disposal site).

SFD 3 – Transfer Station – Underground Holding Tanks

Pros	Cons
Sludge transport to treatment plant is more efficient, particularly for small-scale service providers with slow vehicles	Requires expert design and construction, also capital investment
May reduce the illegal dumping of faecal sludge	Can lead to odours if not properly maintained
Costs can be offset with access permits	Avoid leaching and/or surface water infiltration
Potential for local job creation and income generation	Temporary holding tank - what is the long-term solution for this approach?

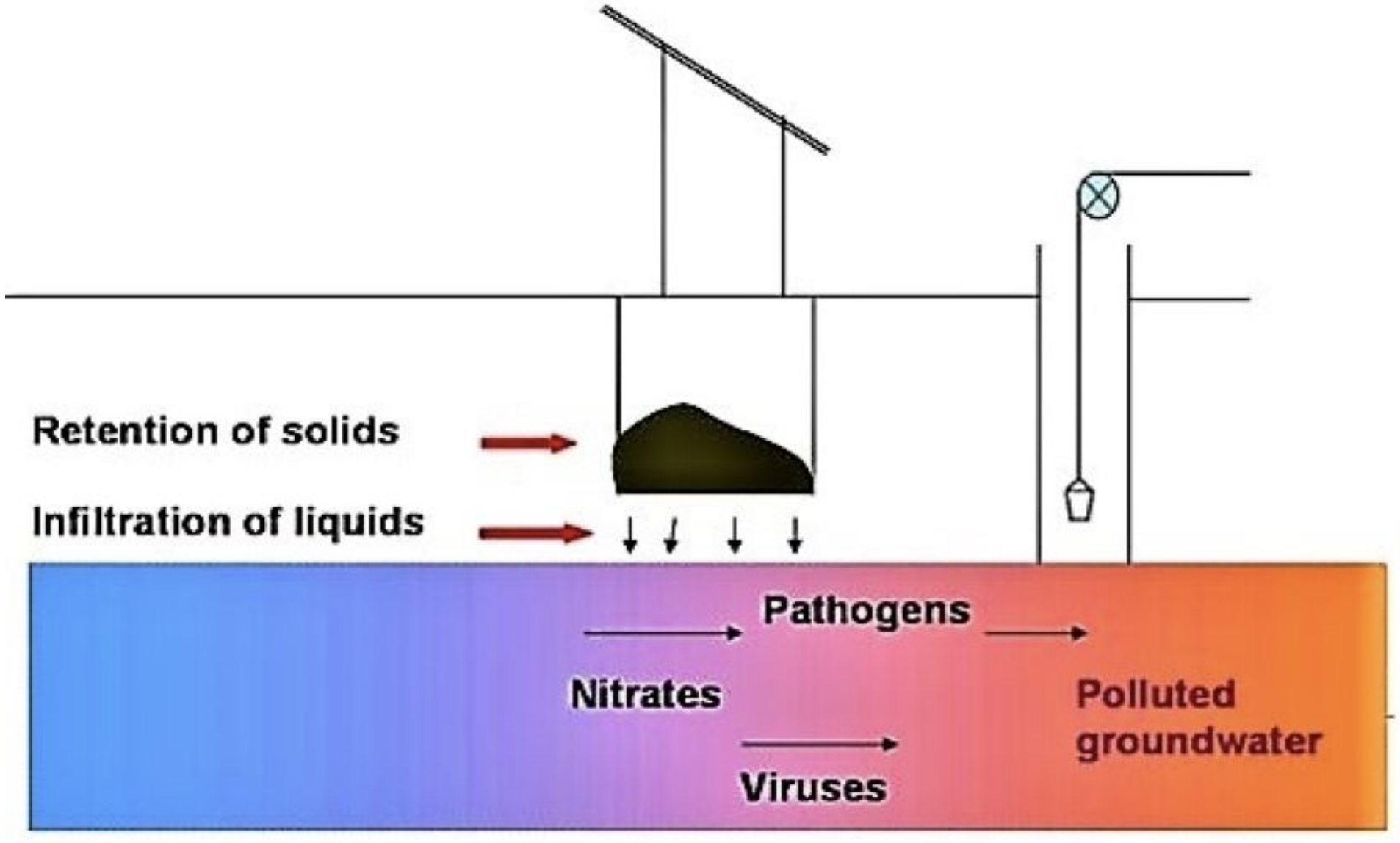

Containment
Emptying
Transport
Treatment
Reuse/ Disposal
11%
WC connected to sewer
Leakage
Not treated
Adequately treated
3%
Legally dumped
Not treated
Safely emptied
Illegally dumped
88%
On-site sanitation facility
Not safely emptied
46%
Closed when full and relocated
43%
Open defecation
1%
38%
5%
7%
2%
1%
54%
Residential environment
Drainage system
Receiving waters

SFD 4 – Onsite & Offsite Treatment Options

1. **Composting Toilets:** Adequate on-site containment, includes some treatment
2. **Septic Tanks**: Septic tanks (underground chambers separate solids & liquids) are common. Twin-pit & pour-flush septic tanks are popular alternatives.
3. **Pit Latrines**: Simple pit latrines are common (hole covered w/ slab or platform) provides some treatment. “Improved” (VIP) latrine requires vent pipe to reduce odor and flies.

Offsite Simplified Wastewater Treatment: anaerobic baffled reactors (ABRs), constructed wetlands. Decentralized wastewater treatment systems (DEWATS) for off-site treatment. All use natural processes to treat wastewater.

SFD 4 – Treatment – VIP Seepage Process

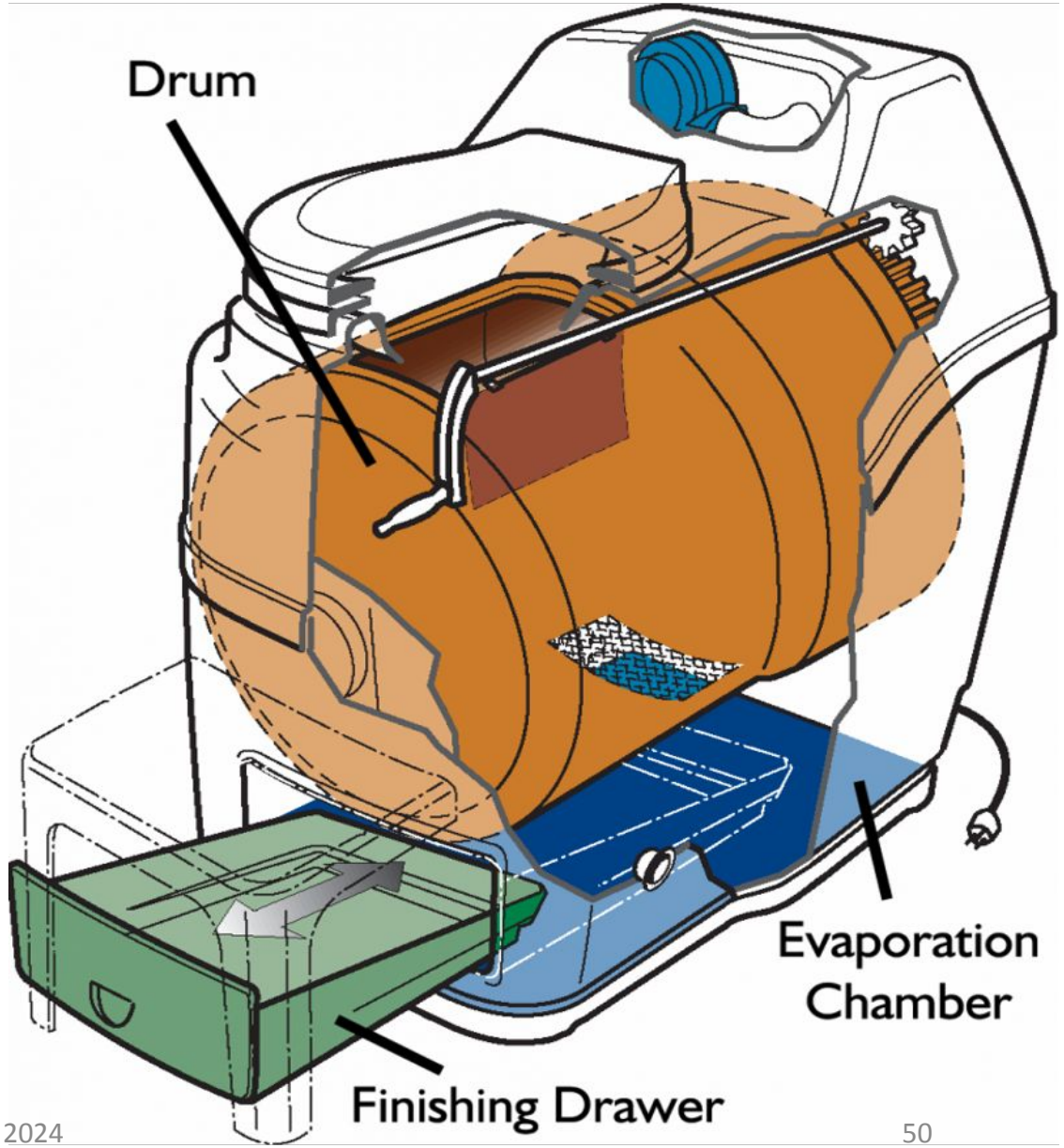


SFD 4 – Treatment – Self-Contained Compost Toilets

Composting toilets *decompose human waste into compost using aerobic decomposition. Particularly suitable for rural areas where water and sewage infrastructure are lacking.*

Some manufacturers (many more):

- Sun-Mar (pictured): https://www.sun-mar.com/
- Nature's Head: https://natureshead.net/
- Separett: (on Amazon) https://separett.shop/
- Etc.



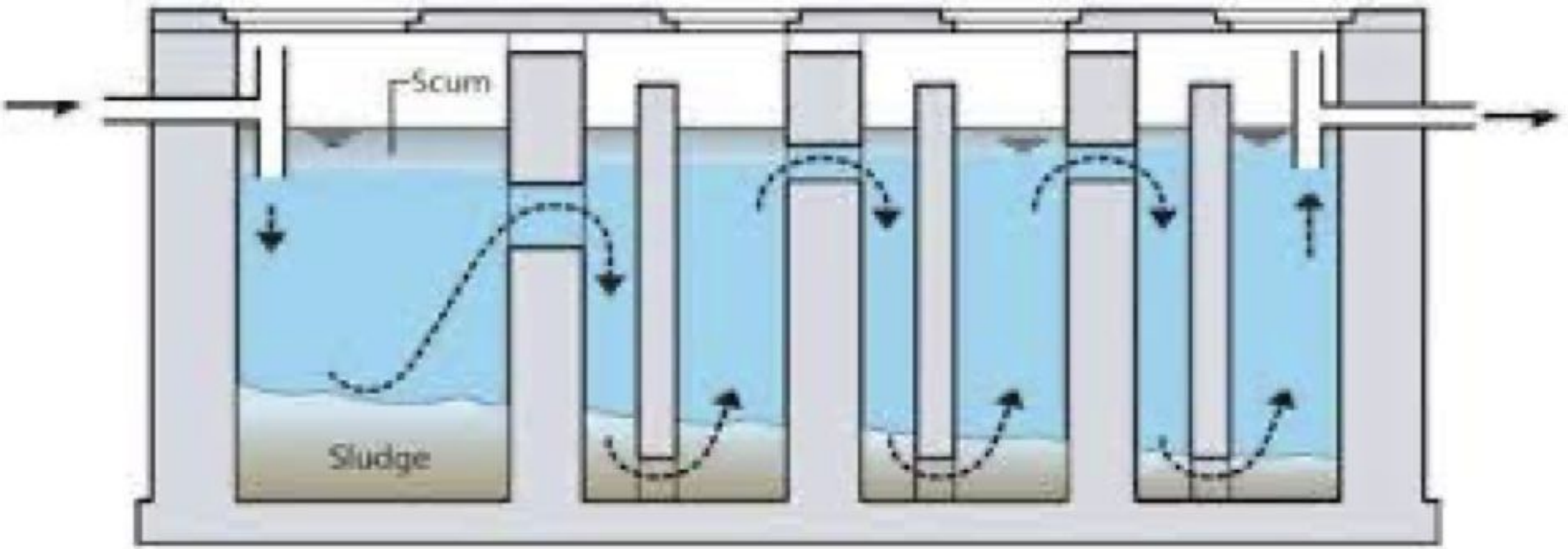
SFD 4 – Onsite Treatment

Pros	Cons
Requires no community collection	Depends upon individual household for proper use and maintenance
Simple and inexpensive	At best, provide only primary treatment for wastewater
No possibility of collection system leakage impacting groundwater quality	Ventilated improved pits (VIP) may negatively impact groundwater quality if improperly designed or maintained
Effectiveness is minimal – usually only primary wastewater treatment (solids separation, further steps)	

SFD 4 – Off-site Treatment

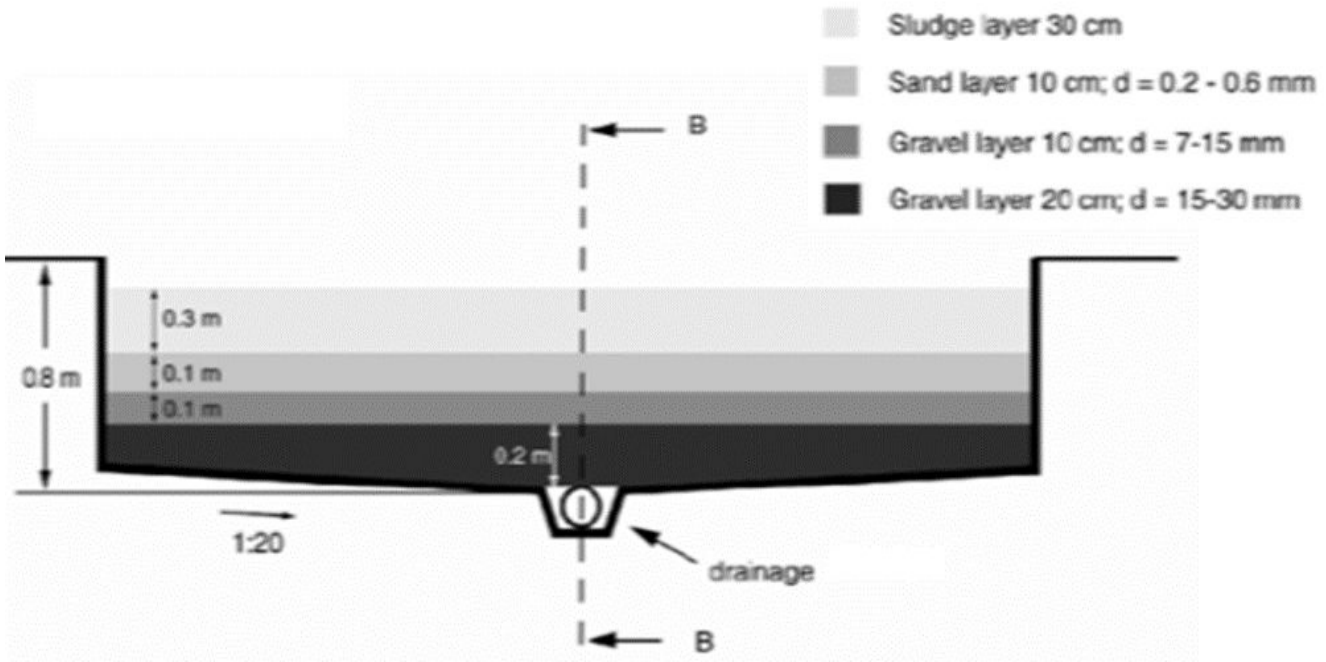
Pros	Cons
Off-site treatment, either centralized or decentralized, allows better oversight & maintenance, if needed	Expensive, due to need for collection system (piped or trucked) and oversight/maintenance staff, if needed
Can provide higher level of treatment than on-site systems (primary plus)	Possibility of piped collection system leakage impacting groundwater quality
Can provide economies of scale, more sophisticated equipment & processes	More government intervention likely, national policies & requirements

SFD 4 – Treatment – Anaerobic Baffled Reactor (ABR)



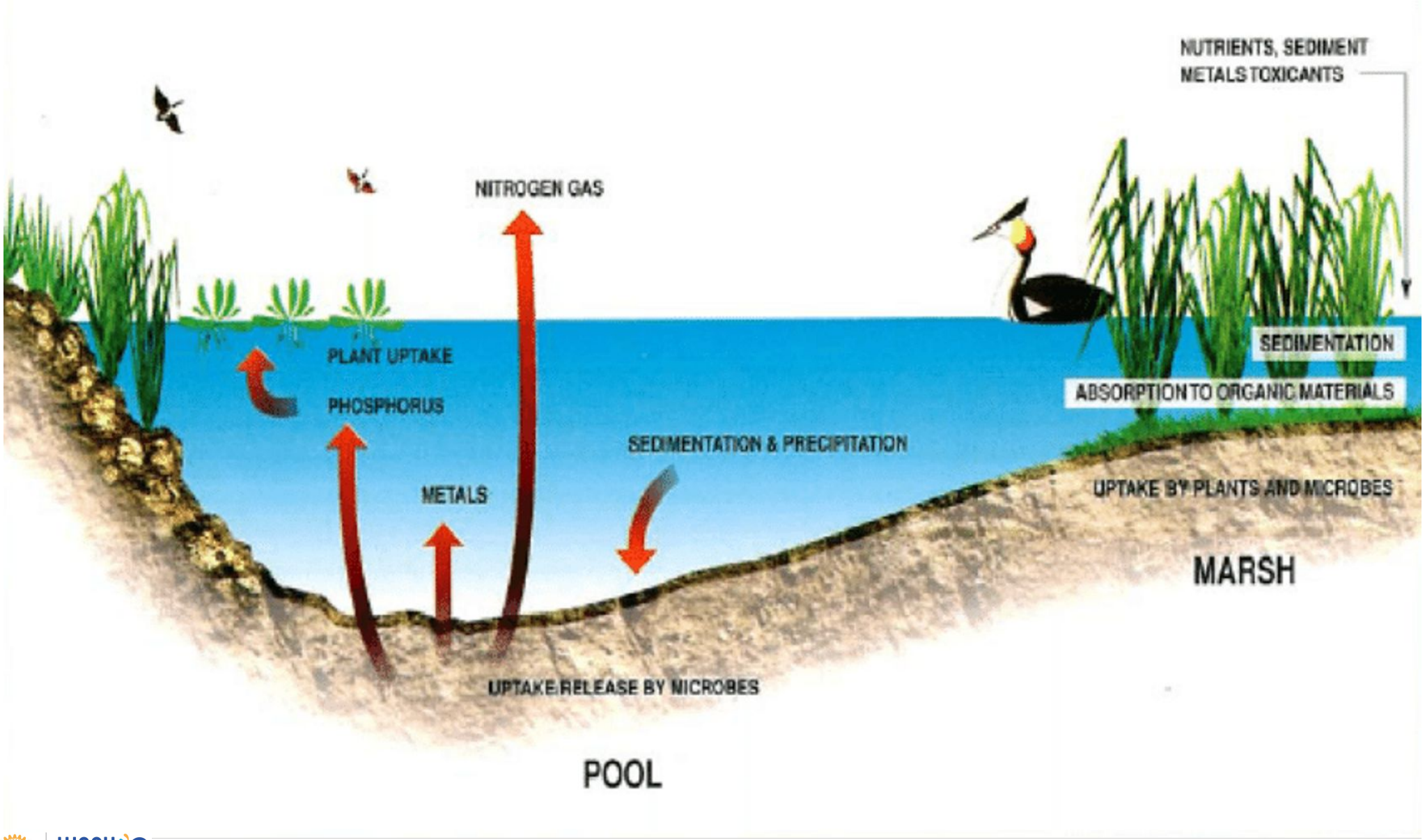
Anaerobic baffled reactors (ABRs), most commonly used for industrial wastewater, include a series of vertical baffles containing large active microbial mass are arranged to force the wastewater to flow under and over (or through) the baffles covering the full surface of baffles enabling contact between influent wastewater and biomass.

SFD 4 – Treatment – Drying Beds

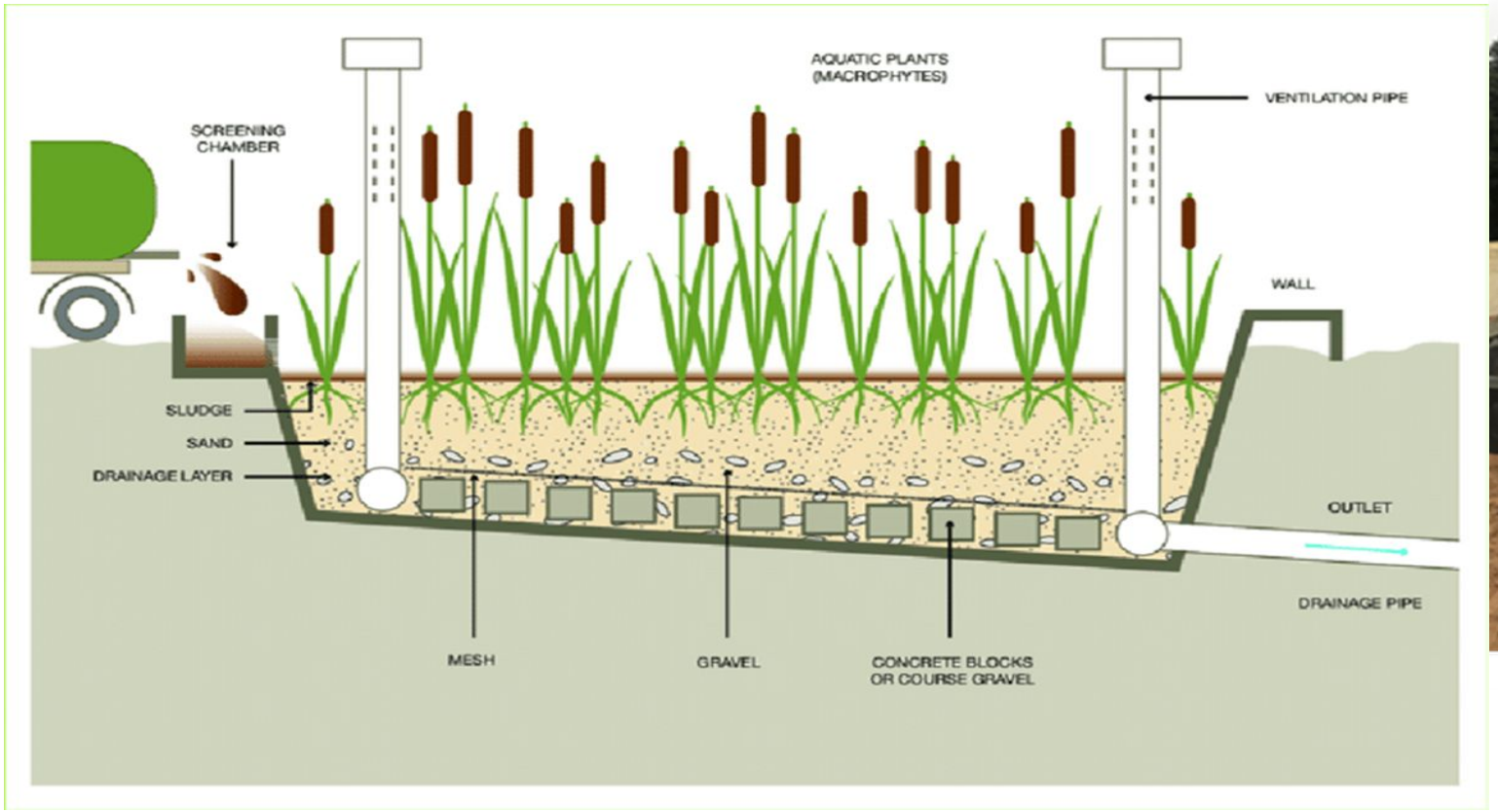


When there's space, drying beds can be used to reduce liquid content in sludge

SFD 4 – Treatment – Constructed Wetlands



SFD 4 – Treatment – Constructed Wetland



Constructed wetlands can be small (onsite) or large (for offsite/community) applications; they have the advantage of enhancing ecosystems while treating wastewater such as removing nitrates

SFD 4 – Treatment – Biogas (community or household)

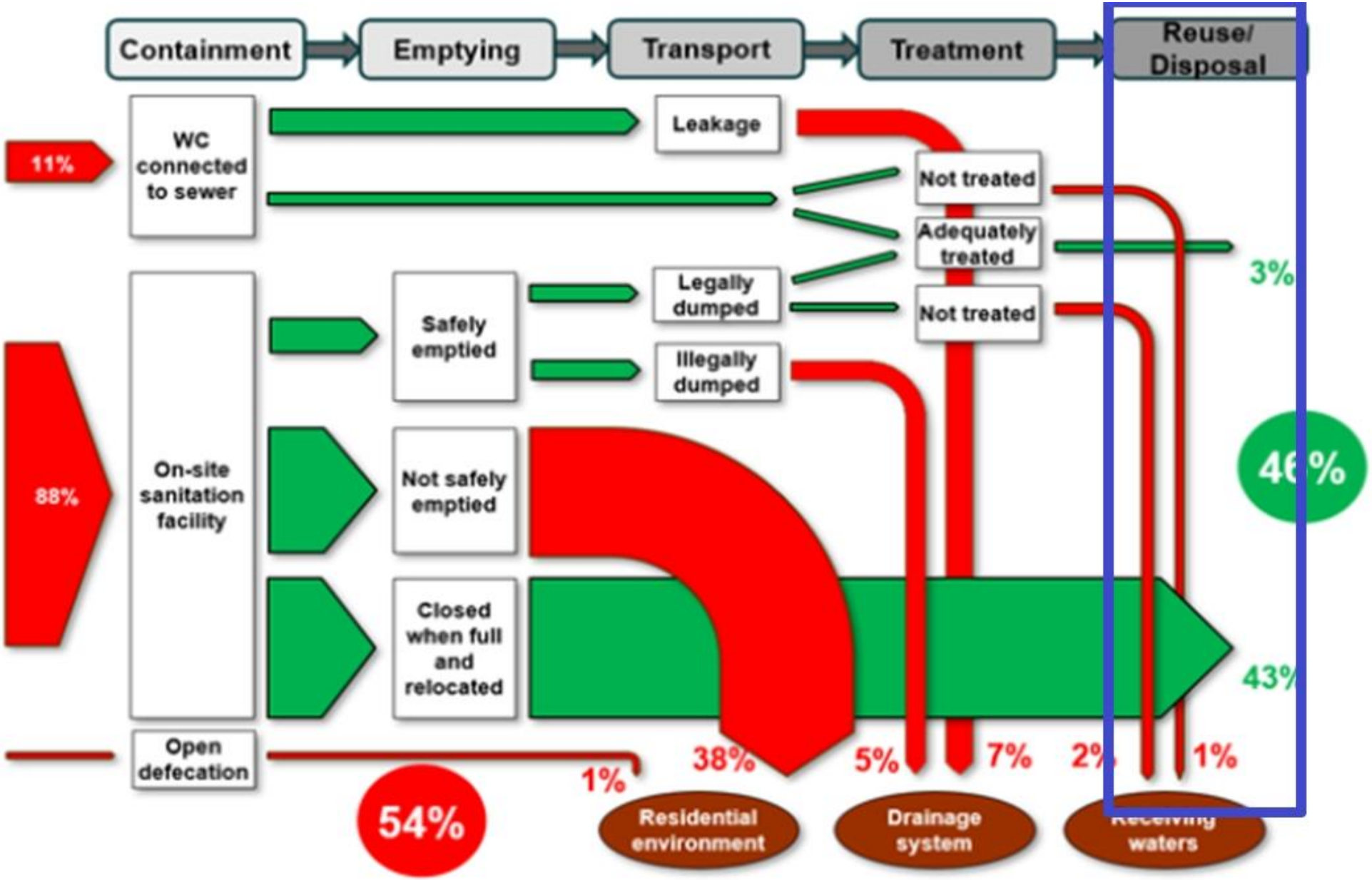
Indicated:

- For households cattle is required, US$ 300-400, toilet connection increases gas and slurry yields
- For community other waste (cow dung / organic) is needed, costs vary according to size

SFD 4 – Treatment – BioMethane Plant

Indicated:

- More centralized, seldom connected by pipe - different streams, costs vary widely. (Left) plant only sells slurry (!)
- (Right) plant requires mixed inputs & more capital


Containment
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Transport
Treatment
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Safely emptied
Legally dumped
Illegally dumped
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Closed when full and relocated
Not treated
Adequately treated
Not treated
3%
43%
1%
38%
5%
7%
2%
1%
Residential environment
Drainage system

SFD 5 – End Use / Disposal

1. Urine as fertilizer – household use, barter – can also be sold
2. Soil amendment (humus) – from vermicompost, dry/compost toilets or 2-vault leach/pit toilets
3. Fuel briquettes – combine biomass & dried feces, binder, compressed

- Businesses Opportunities:
  - Toilet construction – street business, marketing, training, hiring, business plan
  - Pit emptying (small & truck), sludge drying (FSM)
  - Nursery – grow & sell plants, trees, farm starters
  - Farm crops (higher profit but needs extra care, potential stigma of buyers)
  - Efficient stoves using “new” briquettes (less deforestation, replace charcoal @ lower price)
  - Biogas installation, sale of partly-treated liquid fertilizer
  - Water filter sales + carbon credit income (5 yrs, e.g. ACK)

SFD 5 – End Use / Disposal - Co-Compost

Raw Faecal Sludge

Dried Faecal Sludge

Segregated organic waste

Co-composting in Windrow method

Final Product

SFD 5 – End Use / Disposal - Co-Compost

SFD 5 – End Use / Disposal - Co-Compost

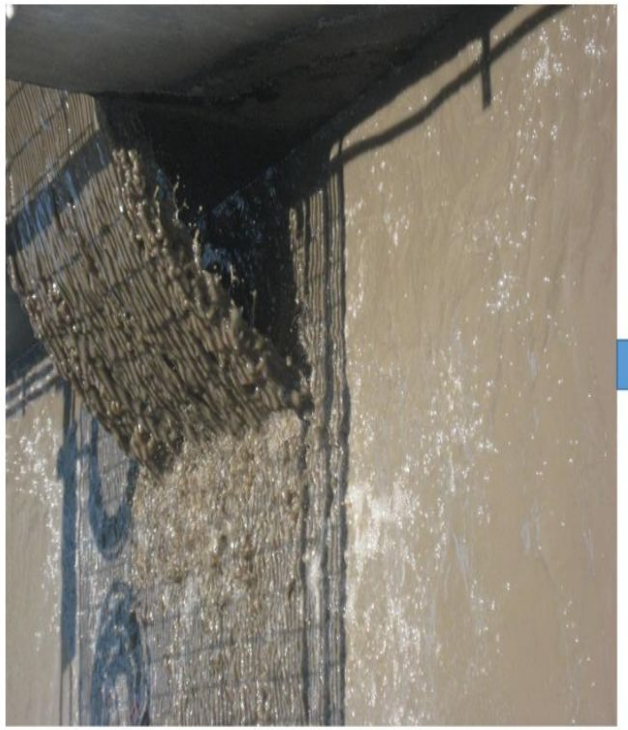
SFD 5 – End Use / Disposal - Briquettes, biochar, flies

Indicated where:

- heavy deforestation, charcoal is banned, or both
- regional agriculture yields significant biomass waste
- regional/local government willing to enforce, partner, change
- population is better educated, willing to learn, change, reduce stigma

SFD 5 – Input & Output from Wastewater Treatment Plant

WWTP-Guheshwori



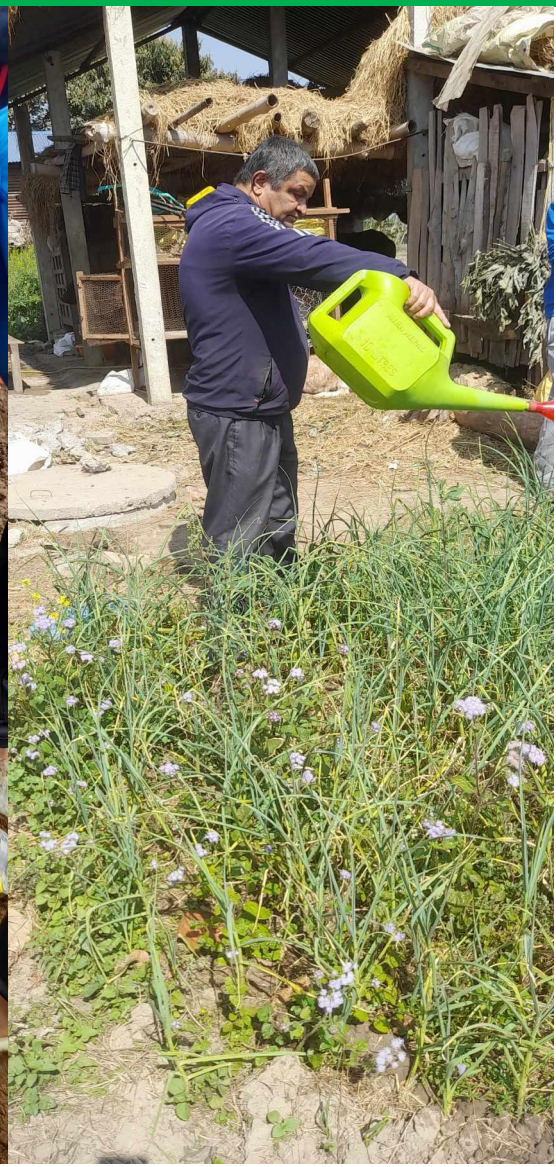
Influent

Treated Water

Bio-Solids

Energy

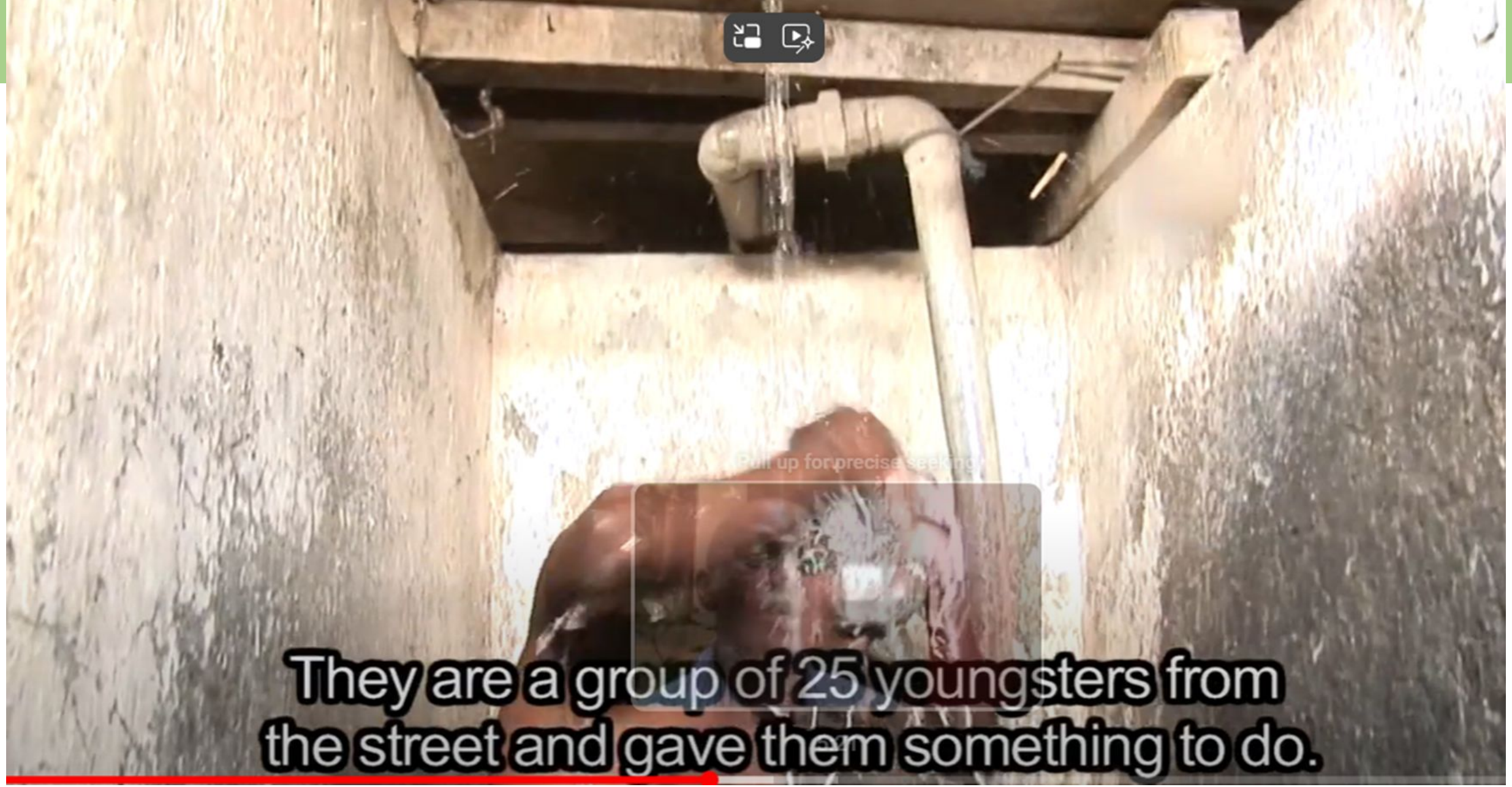
SFD 5 – Agriculture application: Reuse of Urine



Urine as Fertilizer

Left: The maize plant on the right is being fed with a 3:1 mix of water and urine (0.5 litres) three times per week. The maize on the left is irrigated with water only. The difference is striking. Right: Urine treatment also improves maize cob yield significantly. The total yield of cobs from maize planted in three 10 litre basins is shown. On the left the maize was fed 1750mls urine per plant over the 3.5 month growing period, resulting in a crop of 954 gms. A reduced crop resulted from reduced input of urine (middle). Maize plants on the right were irrigated with water. This is a very high rate of urine application, but one happily accepted by the maize plants in the containers which were irrigated frequently with water to keep the maize plants healthy.

Additional Learning on SFD Technologies


They are a group of 25 youngsters from
the street and gave them something to do.


Pull up for precise seeking
5:32

SFD 5 – End Use / Disposal

Scaling opportunities with Partners:

1. Local/Regional Govt
    1. collection site to compost & recycle urine (a la SOIL in Haiti)
    2. designated disposal sites" for manual/small machine emptiers to legally empty
2. Larger farms, produce pack houses – build (elite?) demand for organic & diverse produce, demonstrate safety
3. Govt & Fuel resellers – enforce charcoal ban, build new demand then sell efficient stoves plus biomass-fecal briquettes (advantages: cost, low soot)
4. University R&D + engineers + machinery mfrs. – together refine, build & sell more low-cost sludge pump-tank units – develop regional distribution
5. Government + Investors "Cause Marketing" to Transform Regions

SFD 5 – End Use / Disposal

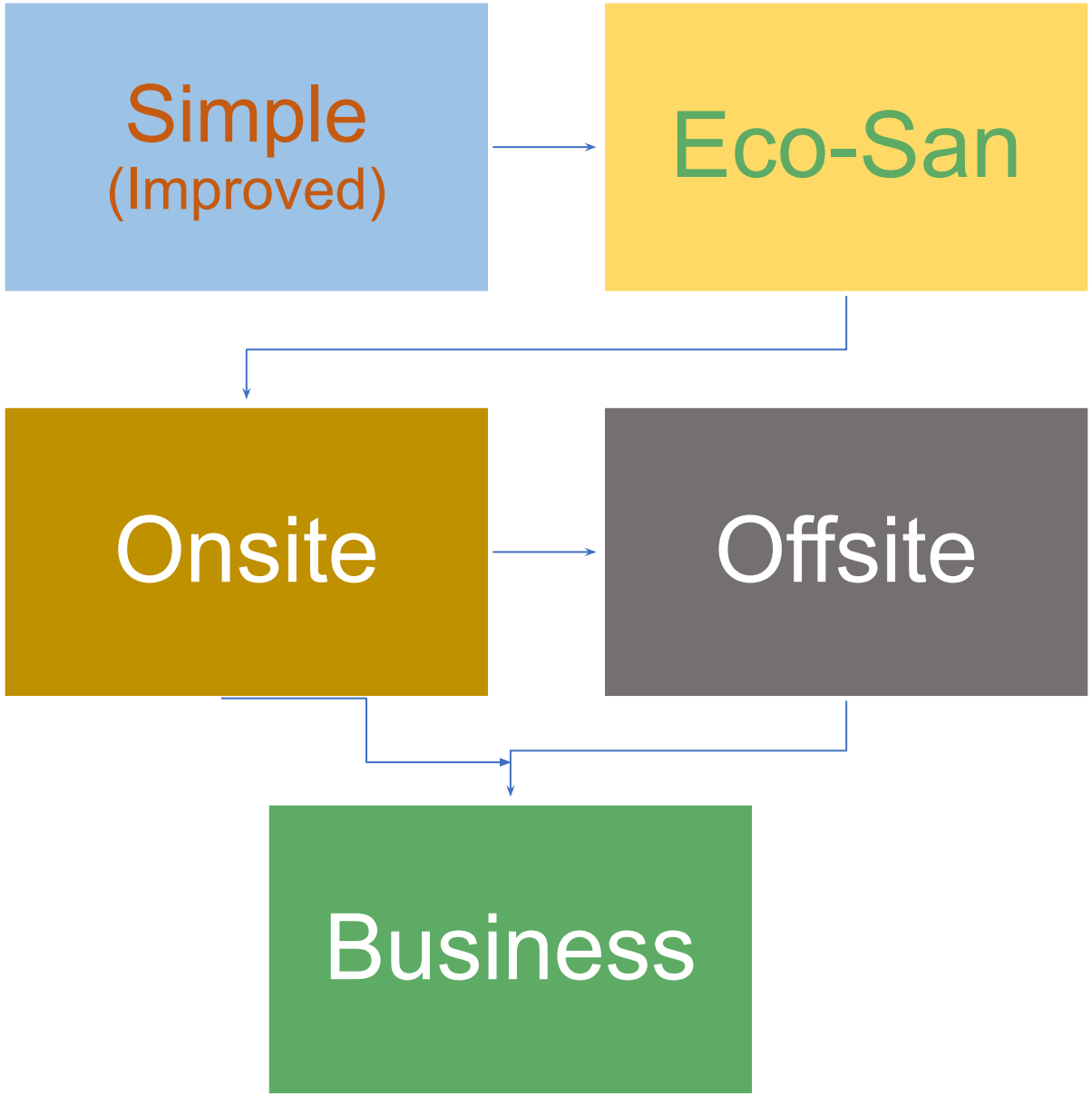
Scaling opportunities with Partners:

6. Standards for reuse human waste (global, adopt nationally, promulgate)
7. Policies supporting organic origin products including licensing and bylaws at local levels
8. Develop climate finance markets (green climate fund, adaptation funds etc.)
9. Factor the true cost of disposal in _____

SFD 5 – Incubating Sanitation Business

Last Thoughts, Insights, Tips:

- Culture is Key: Learn, understand it, daily living (open-ended Qs)
- Consider options – ask, get feedback
- Consider separate urine & feces processes, markets or safe disposal
- Do small demos, Trials – gain acceptance (or not), observe use, cleaning etc.
- Availability, distribution of equipment
- Existing entrepreneurs … others can be converted
- Training + Business Plan + Marketing knowhow = Possible Profits
- Consider all scales – small biz, medium, collaborate with Govt
  - Which is best to start? Stimulate excitement?
  - What will the strategy be, to grow, scale, build collaboration, find investment funds



Questions?

Other Solutions?