Jimma University, Ethiopia

Does building any type of toilet mean safe sanitation? (Ethiopian experience)

By
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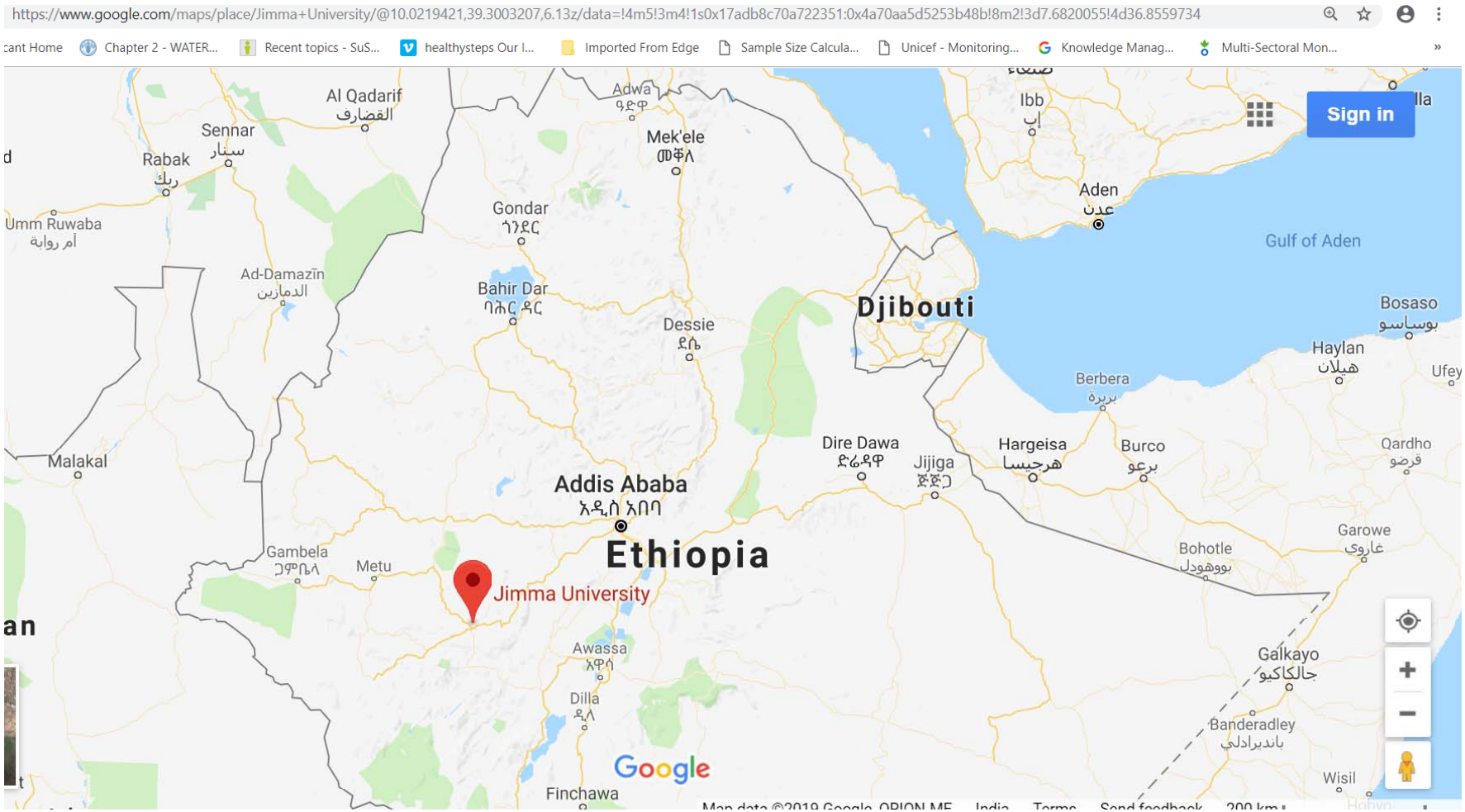
Workshop on Sustainable Rural Sanitation 26-29 March 2019



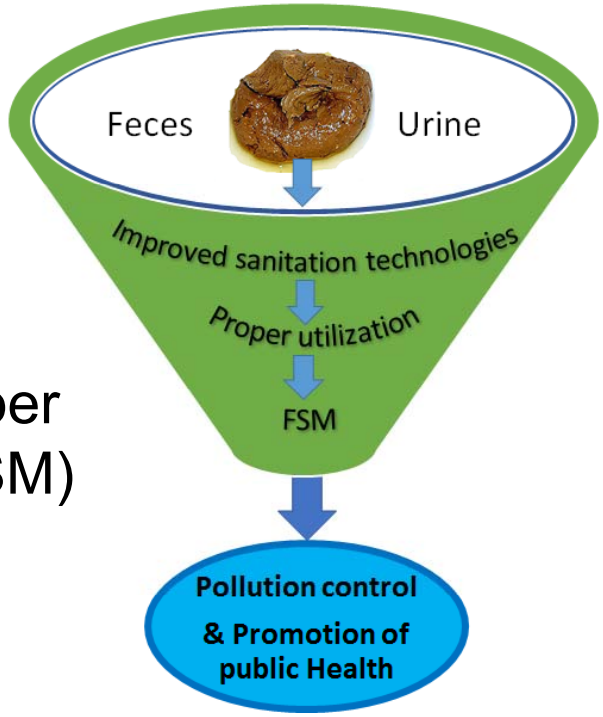
Jimma University is located Southwest of Ethiopia near to South Sudan & Kenya

Source: Dadi et al. (2018)

Access to sanitation, pit emptying & chain of FSM

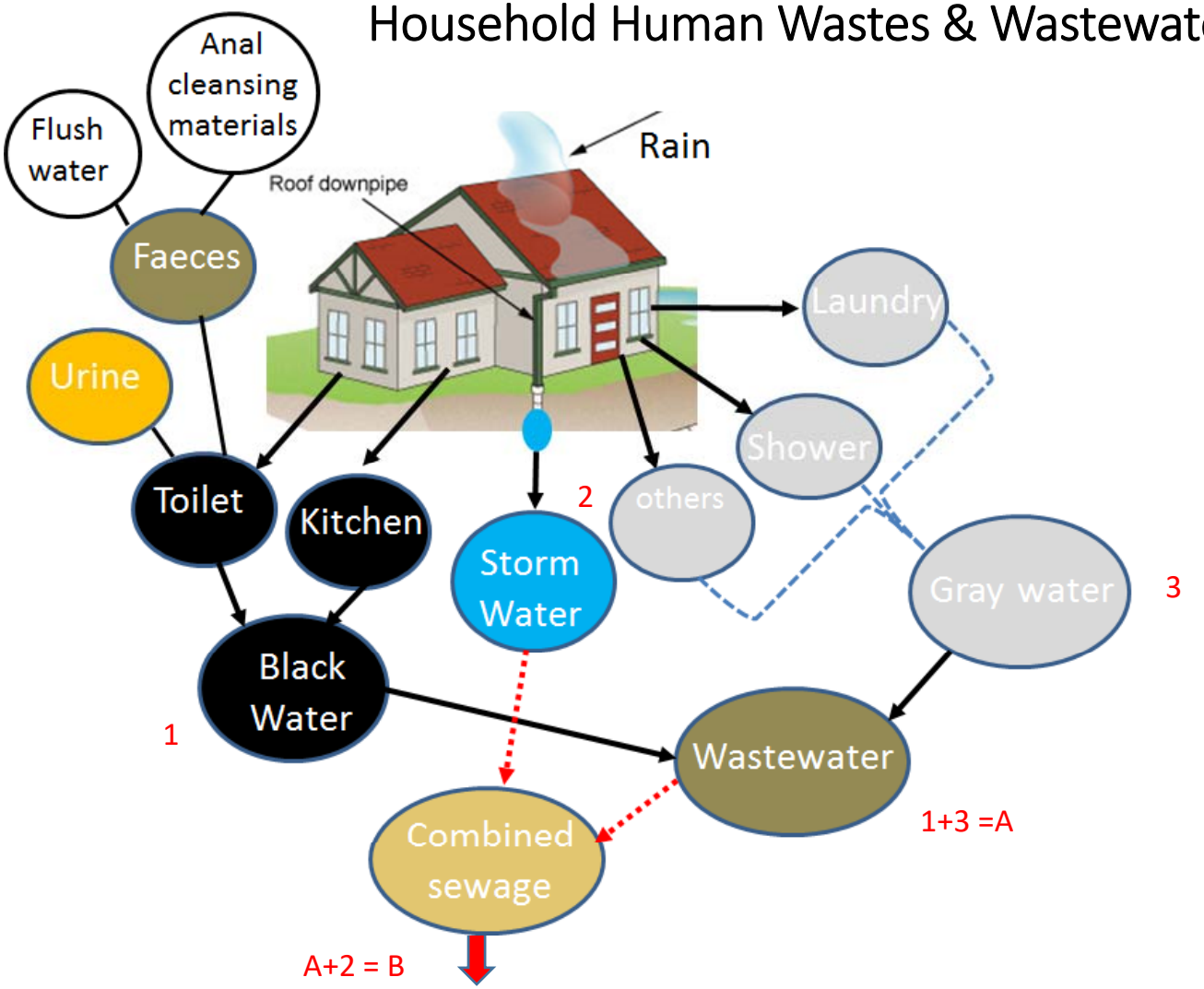
❖**An improved sanitation facility** is defined as one that hygienically separates excreta from human contact (WHO/UNICEF, 2010).

❖**Access to improved sanitation** with proper utilization & Fecal Sludge Management (FSM) system as defined by WHO/UNICEF



❖Monitoring of the progress of access to sanitation worldwide has been mainly focused on household-level inventory of type & number of toilet facilities ignoring proper utilization & user behavior (Kvarnstrom et al., 2011), & complete chain of FSM.

Household Human Wastes & Wastewaters



Where it goes?????

Source: Modified from **Sobsey, M.D. (2006)**

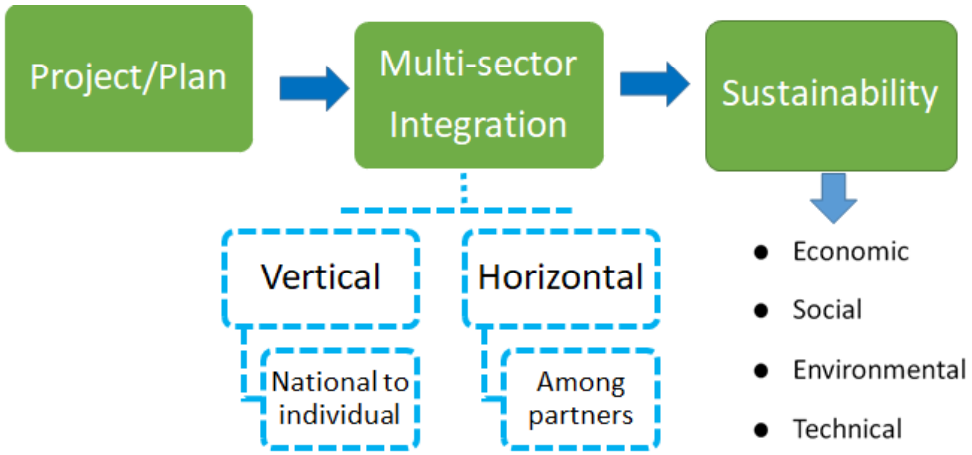
Ethiopian experience on promoting sustainable sanitation

Community Approaches to Total Sanitation (CATS) approach

Two approaches to communal behaviour change

- Participatory Hygiene & Sanitation Transformation (PHAST) &
- **Community-Led Total Sanitation (CLTS)**

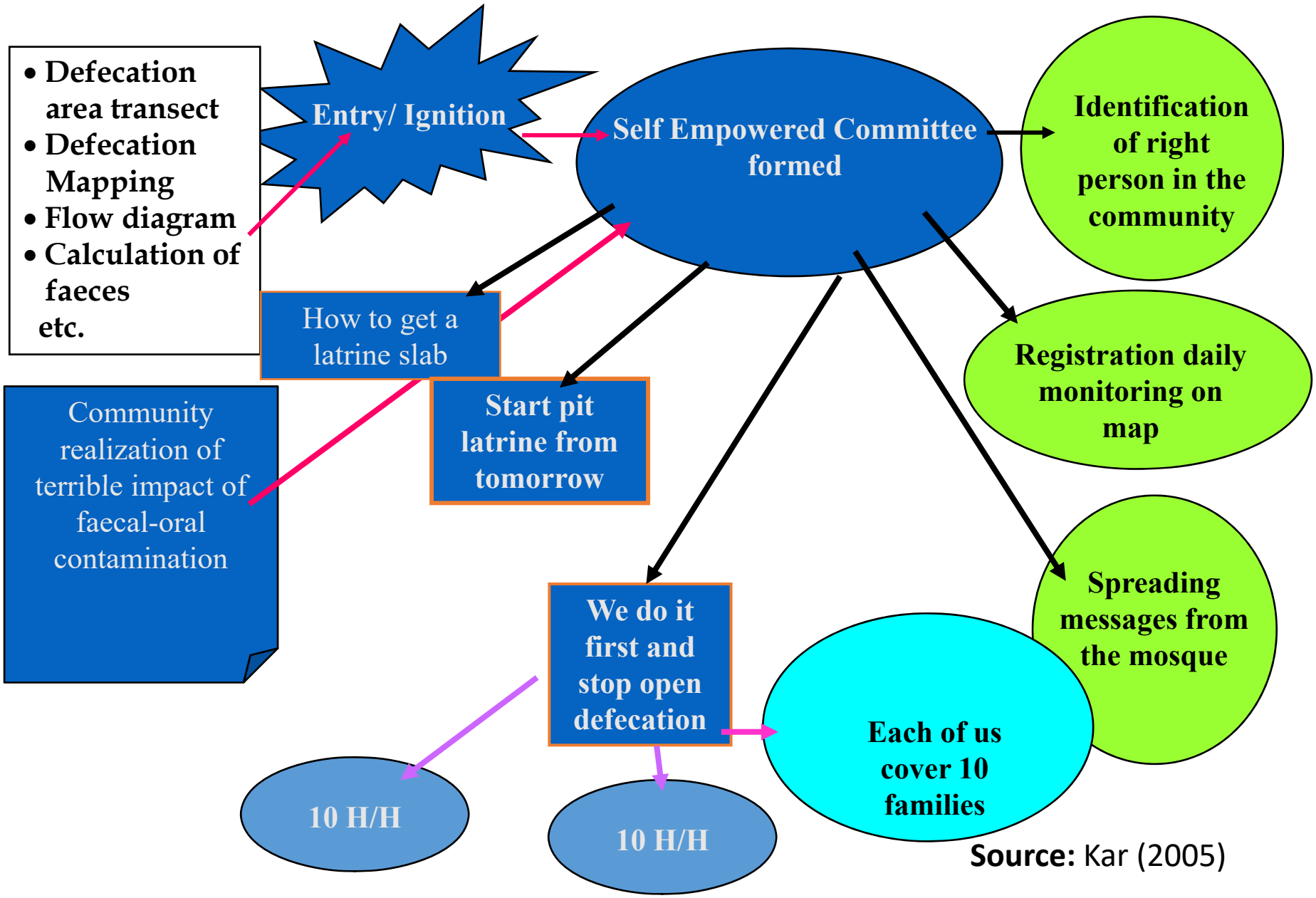
Recently One WASH programme was initiated for multisector integration



Essential elements of Community Approaches to Total Sanitation (CATS)

- Aim to achieve 100% ODF communities through affordable, appropriate, acceptable technology & behaviour change
- Engagement with diverse members of the community, including HHs, schools, health centres and traditional leadership structures
- Communities lead the change process and use their own capacities to attain their objectives
- No direct subsidies (should not be given directly to households).
- Support communities to determine for themselves what design and materials work best for sanitation infrastructure rather than imposing standards
- Building local capacities to enable sustainability
- Government participation from the outset – at the local and national levels – ensures the effectiveness and the potential for scaling up.
- Greatest impact when they integrate hygiene promotion into programme design
- An entry point for social change `& a potential catalyst for wider community mobilisation

Diagrammatic presentation of Community- Led Total Sanitation (CLTS) Ignition



Source: Kar (2005)

History

- The CLTS approach was first introduced in Ethiopia in October 2006 in Arba Minch area by an Irish NGO.
- Later, in February 2007, Plan International Ethiopia invited Dr. Kamal Kar to conducted training for selected WASH and Health staff members from Government, NGOs and Plan
- Large scale implementation was initiated in 2009
- In 2015 about **4,912 kebeles/communities**, with a total population of 24.56 million declared ODF

Dr. Kamal Kar

Ending open defecation in Asia, Africa & Latin America

Lifetime Sanitation Achievement Award

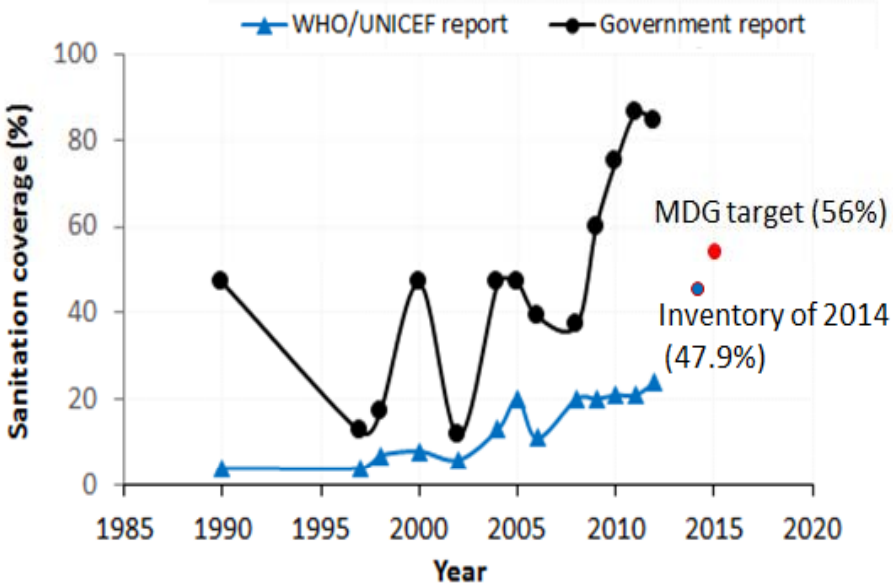
Achievements …

- Ethiopia is estimated to be at 63% ODF
- It is estimated that about 37% of the population (over 35 million people) still don't have access to any form of toilet
- There are disparities b/n the rural & urban context, with 43% of people living in rural area defecating in the open compared to 8% in urban areas

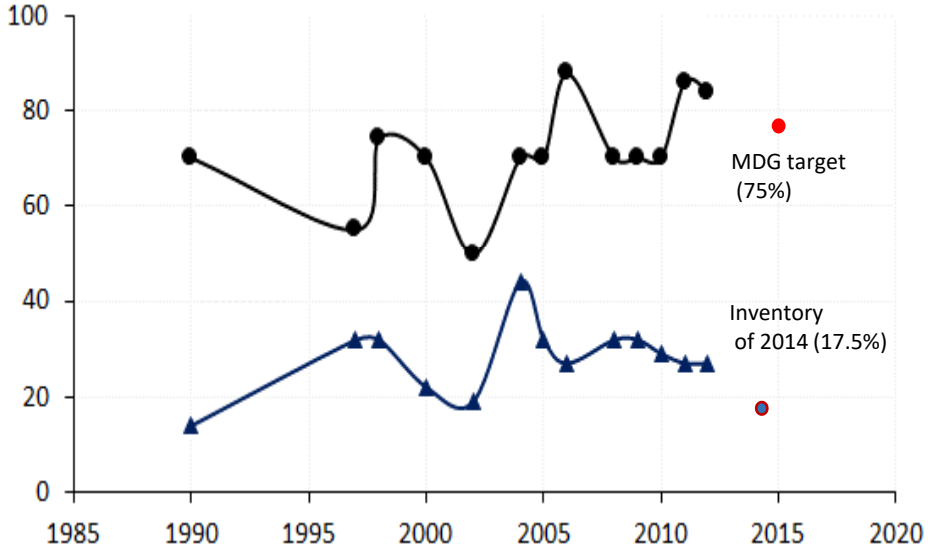
Source: Ethiopian Ministry of Health, 2015

Sanitation in Ethiopia

National



Urban



- Trend of access to sanitation coverage in Ethiopia increased but falls short of the MDG target of 75%
- Discrepancies in the trend analyses by the AGR and the JMP

Source: Beyene et al., 2015

National ONE WASH

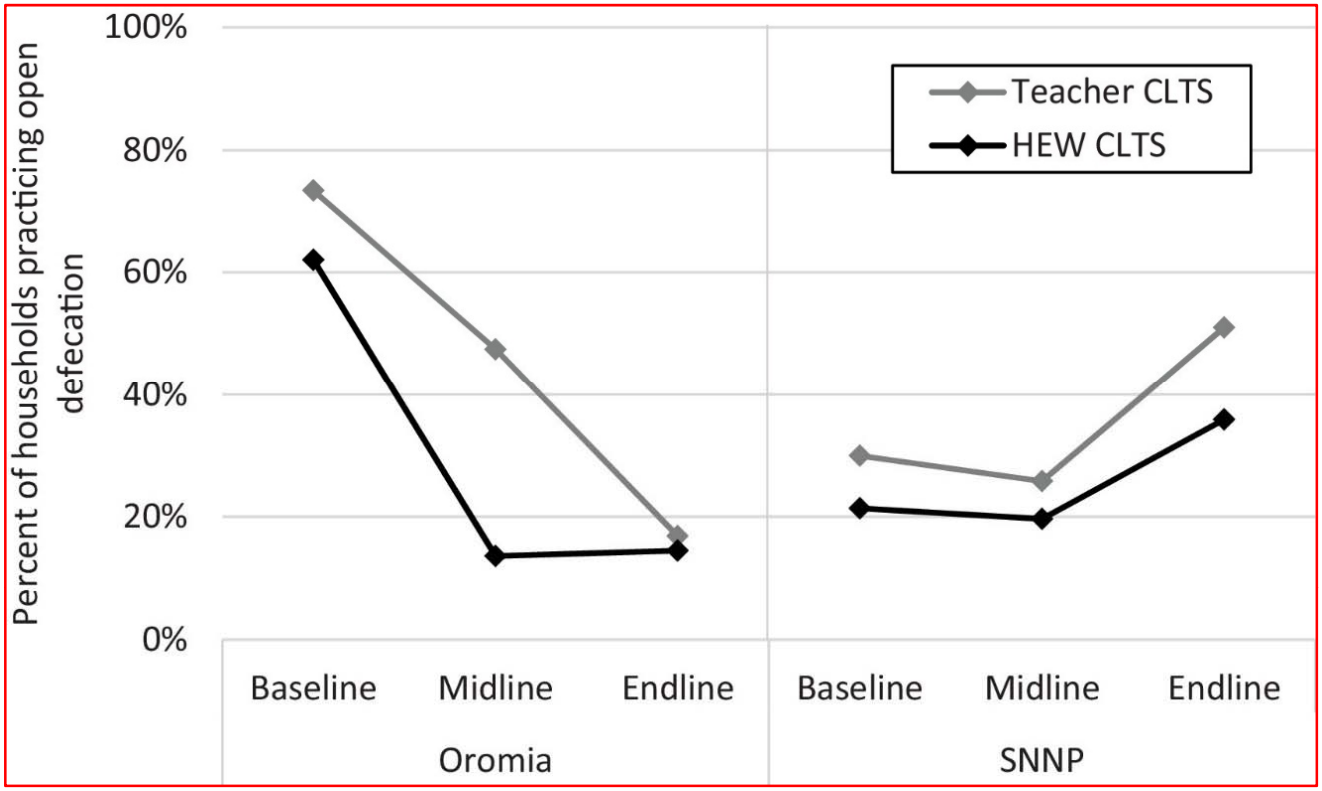
Since 2013, Ethiopia has established a unique Water, Sanitation, and Hygiene (WASH) sector-wide approach (SWAp) under the umbrella of the ONEWASH National Programme (OWNP), which brings together ministries, development partners, academia and civil society organisations (CSOs) to a common goal of one plan, one budget, and one report.

According to the OWNP phase I results, during the period from October 2013 to July 2017:

- 11 million people became Open Defecation Free (ODF) and the practice of open defecation reduced from 44% to 29%
- 1,280 school WASH facilities were constructed under the OWNP-Consolidated WASH Account

- EDHS 2016 also reported declining trends of proportion of HHs using improved latrines from 8.8% in 2011 to 6.7% in 2016 (EDHS, 2018)

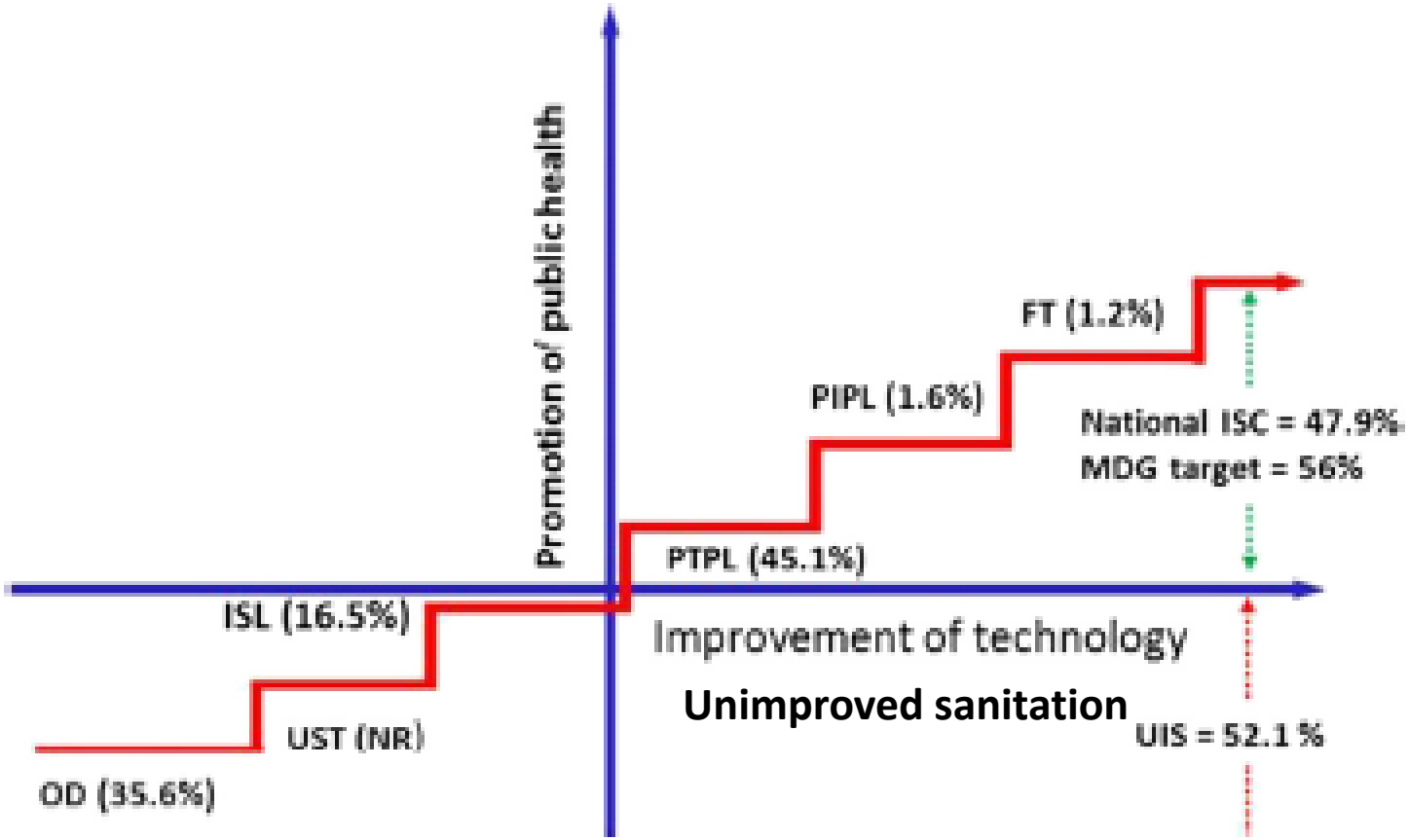
Open defecation in villages receiving CLTS interventions in Ethiopia



,
Midline was after CLTS interventions ended (12-months post-baseline in Ethiopia). Endline was 1-year after midline.

- slight increases in open defecation from midline to endline
- 38% of latrines used at the midline were unusable at the end line for SNNP

❖ Kebele leader, teachers & health extension workers are the main facilitators of CLTS in Ethiopia



Access to improved sanitation 47.9%

FT = Flush toilets

PIPL = Private improved pit latrine

PTPL=Private Traditional pit latrine

Access to Unimproved san. (16.5%)

ISL = Improved shared latrine

UST = Unsanitary toilets

OD = Open defecation (35.6%)

52.1%

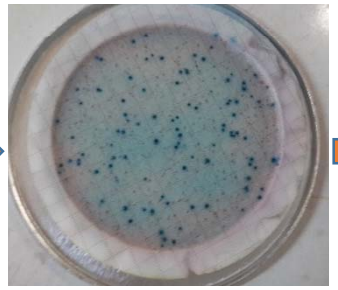
The national percent sanitation coverage along the sanitation ladder

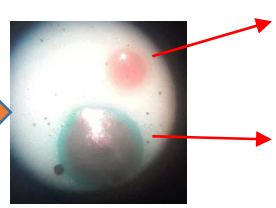
Source: Beyene et al., 2015

Ethiopia’s Paradoxical Narratives of Sanitation Reports

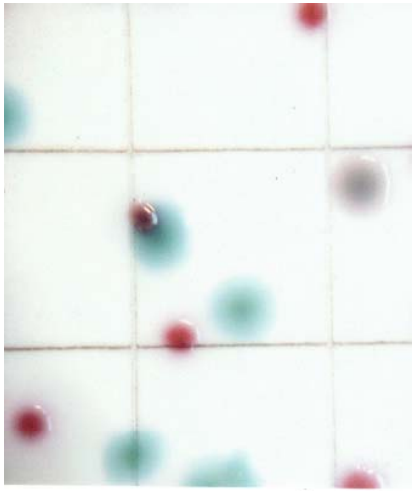
Level of Environmental Pollution in Addis Abba & Rural Kebeles

Biological indictors (TC, FC, E-coli)





Membrane Filtration



Chemical indictors

- ❖ Chloride
- ❖ Nitrate

Source: Debela et al., 2018

$\bar{x}$

Level of ground & surface water contamination using chloride & nitrate indicators

Type of sample	NS	Chloride (mg/L)		NO_3 (mg/L)	
		Mean(SD)	Range	Mean(SD)	Range
Deep well (84-250m)	16	15.4(9.0)	(4.1-33.9)	20.8 (36.5)	(0.6-152.3)
Shallow well (1.5-20m)	6	41.5(65.2)	(3.8-169.3)	79.7(124.5)	(0.3-298.1)
Protected spring	5	16.0(20.8)	(3.8-52.8)	8.1(16.1)	(0.1-36.8)
Upstream (Rural)	7	29.0(5.7)	(10.0-49.1)	2.0(1.7)	(0.3-4.7)
Midstream	5	62.0(20.4)	(41.5-94.7)	7.5(5.8)	(0.2-12.4)
Downstream	6	124.1(75.8)	(74.6-275.8	5.9(6.7)	(0.2-15.0)

In polluted surface water in midstream and downstream, nitrate was low because of anoxia

Source: Debela et al., 2018

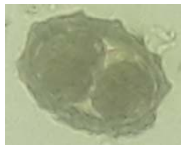
Level of ground & surface water contamination using microbial indicators

Type of sample	NS	TC (CFU/100ml)		FC (CFU/100mL)		E. coli (CFU/100mL)	
		%P	Mean (SD)	%P	Mean (SD)	%P	Mean (SD)
Deep well (84-250m)	16	50	97 (132)	25	16 (30)	25	2 (5)
Shallow well (1.5-20m)	6	50	150 (184)	50	55 (61)	50	11 (20)
Spring	5	40	90 (124)	40	42 (58)	40	3 (4)
Upstream (Rural)	7	100	274 (98)	29	26 (50)	14	4 (11)
Mid-stream	5	100	1424 (8120)	100	432 (335)	100	102 (76)
Downstream	6	100	1603 (796)	100	567 (389)	100	93 (70)

$\bar{x}$

Source: Debela et al., 2018

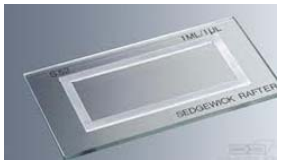
Level of soil pollution using Ascaris ova indicators



Concentrating

Straining, flotation & Sieving

Identification & counting

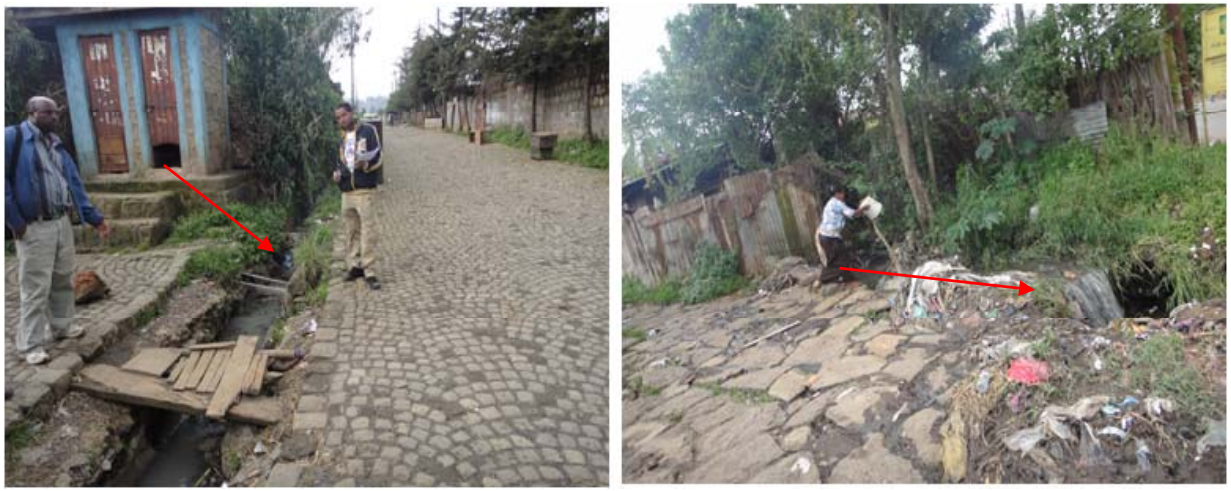


Quantitative microbial risk assessment
(Eisenberg et al., 2008)

WHO tolerable health risk

Soil Samples	No. of sample	% positive	Number of Ascaris ova/100g of soil	
			Total	Embryonated (live)
Yard/garden	50	48 (96%)	28	19 (68%)
Road banks	20	16 (80%)	21	13 (62%)

Full pit latrines & the residents are forced even to use the slab for defecation (Photo taken by Beyene, A., 2013).



Pit latrines connected to flood diches and liquid & solid waste dumped into flood diches (Photo taken by Beyene, A., 2013).

Typical rural latrine types advocated through CLTSH

Photos Source: Pam Furniss, Abera Kumie, Worku Tefera

Is it possible to prevent pollution & promote public health using this type of toilets?

Impact evaluations of WASH interventions have demonstrated lower than expected health gains

This is due to low uptake and unsustained adoption of interventions at a community level

International Journal of Environmental Research and Public Health

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Int. J. Environ. Res. Public Health **2018**, *15*(10), 2139; https://doi.org/10.3390/ijerph15102139

Open Access | Article

Collective Efficacy: Development and Validation of a Measurement Scale for Use in Public Health and Development Programmes

Maryann G. Delea [1,2,*], Gloria D. Sclar [2], Mulat Woreta [3], Regine Haardörfer [4], Corey L. Nagel [5], Bethany A. Caruso [2], Robert Dreibelbis [1], Abebe G. Gobezayehu [3], Thomas F. Clasen [1,2] and Matthew C. Freeman [2]

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Full-Text | PDF [667 KB, uploaded 28 September 2018] | Figure

Disease & death related to poor sanitation & the need for sustainable sanitation solution

An estimated 801,000 children younger than 5 years of age perish from diarrhea each year (Liu et al., 2012: 2015)

Measuring the health-related Sustainable Development Goals in 188 countries: a baseline analysis from the Global Burden of Disease Study 2015

GBD 2015 SDG Collaborators*

Summary

Background In September, 2015, the UN General Assembly established the Sustainable Development Goals (SDGs).

Lancet 2016; 388: 1813–50

Lancet. 2016 Oct 8; 388(10053): 1813–1850.
Available at doi: 10.1016/S0140-6736(16)31467-2

Summary

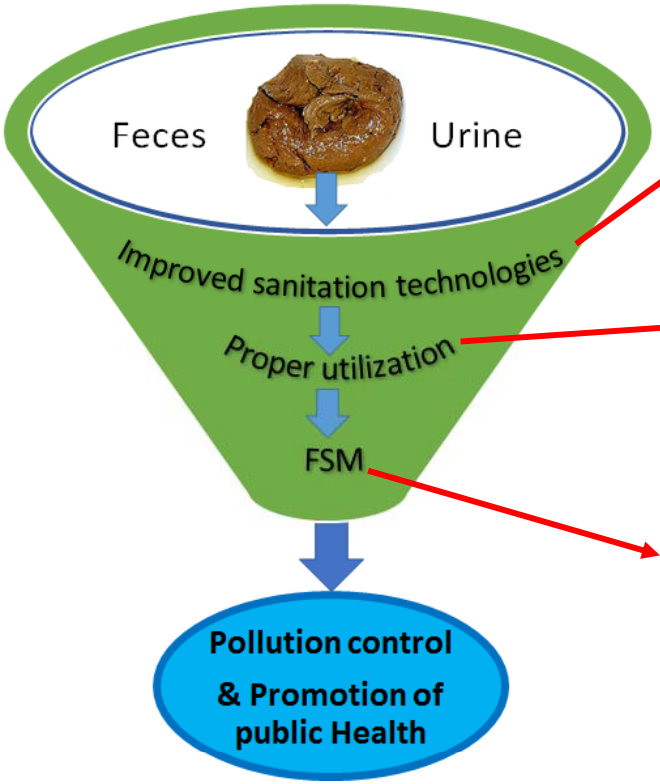
- In **Ethiopia** more than 250,000 children die every year from **sanitation** & **hygiene related diseases**
- About 60% of the **disease** burden is **related** to poor sanitation & hygiene
- Latrines in Ethiopia were lower quality than those in Ghana
- Most latrines remained unimproved (containment without considering standards & guidelines)

Recently the Ethiopian government realized that building any type of toilet does not mean safe sanitation

Key attributes of WASH in SDGs

Conclusion & Recommendations

(sanitation in relation to level of pollution and promotion of public health)



- Current system of sanitation technology is not convenient & there is a need to innovate or adopt with indigenous knowledge
- Mass education & awareness creation
- Promoting the use of waste as resource (valorization)

In SDG era: access to sanitation should be measured in terms of 3 indicators (**technology, utilization & FSM)**

A revolutionary waterless toilet powered by the Sun, developed to help some of the 2.5 billion people lacking safe and sustainable sanitation around the world, will be unveiled in India in 2014

https://www.news18.com/news/india/worlds-first-solar-powered-toilet-set-for-india-launch-674009.html

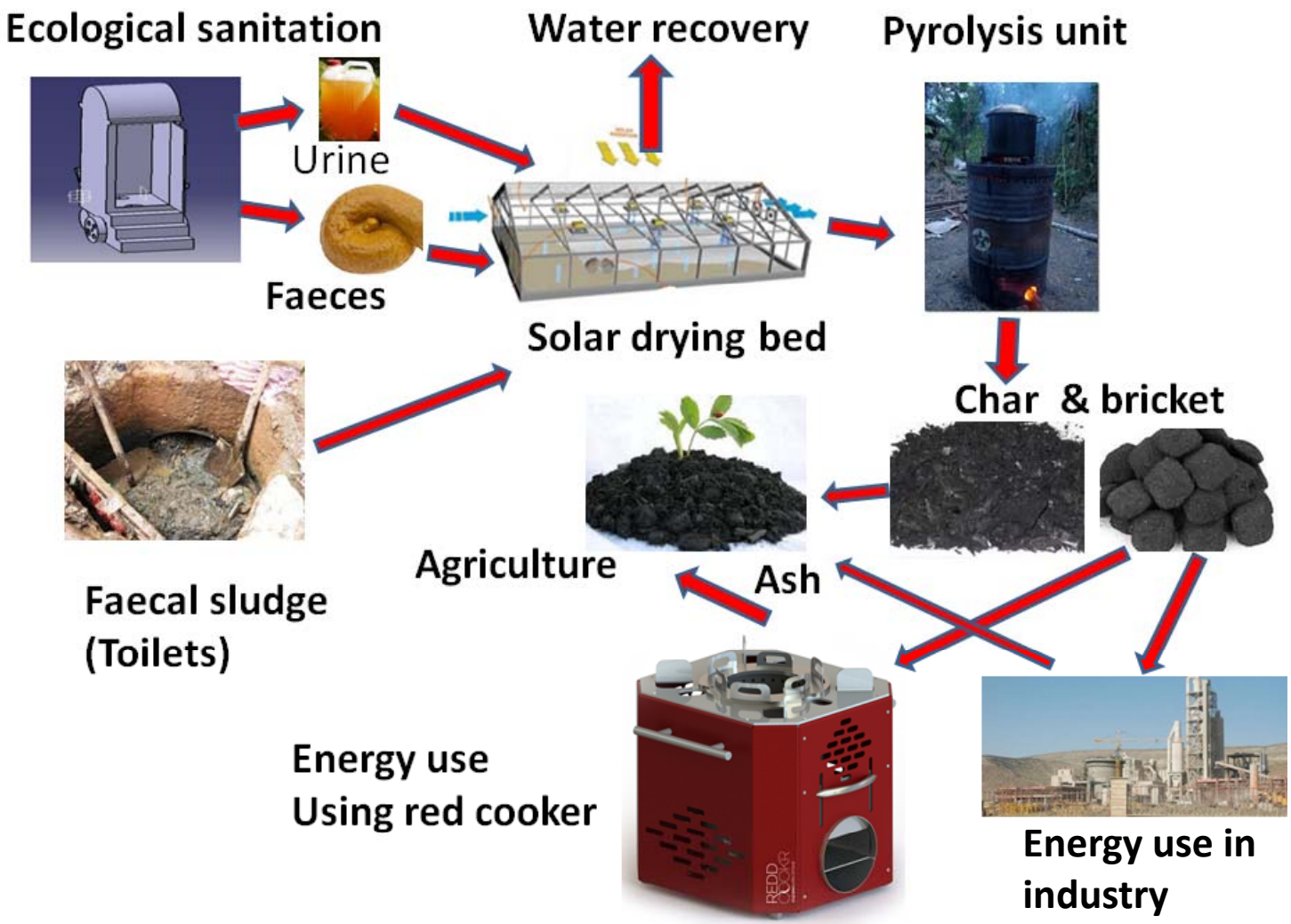
SANI SOLAR consists of urine-diverting user interface that automatically separates urine and faeces.

SANI SOLAR has a comfortable seat.
Just above the seat is a lever (see picture), which users turn after every long call.

The faeces in the containers are quickly dried and stabilized by a combination of directional airflow and solar radiation in the drying chamber
Achieve 95% mass reduction

Source:
https://raha.solutions/reduce-rainwater-contamination/#top

Developing closed-loop sanitation



Future prospect

- ❖ Innovation on alternative sanitation technology
- ❖ Pilot field scale demonstration of the closed-loop sanitation solution

- ❖ Integrating FSM with solid waste management
  (not only for biochar but for animal feed, biomethane, biofuel & compost)

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Source: Global Media foundation

Thank you for listening