

Advancing the Clean and Green rural sanitation framework to improve health and agricultural production: Insights from Burkina Faso

Discussion brief, March 2023

Photo by Megan Hodges on Upsplash

Summary

Clean and Green is a new implementation framework for rural sanitation, designed to strengthen both health and agricultural production. Once basic access to sanitation and hygiene is achieved, ambitions are raised to address a wider range of local contamination risks (Clean), while also encouraging the safe reuse of a range of local wastes and residues (Green).

This discussion brief presents the Clean and Green framework, and gives an overview of tools developed for diagnostics, awareness raising and monitoring that support the implementation in Burkina Faso.

Introduction

Sanitation and hygiene interventions in rural communities usually have a strong focus on human excreta (i.e. urine and faeces), promoting the construction and use of toilets as well as handwashing at critical times. However, a growing body of research shows the need to address a wider range of local contamination risks to achieve significant health improvements in these contexts (Ercumen et al., 2017; Vila-Guilera et al., 2021). Addressing these wider risks requires reducing exposure to animal excreta and strengthening food hygiene and water management practices (WHO, 2018). At the same time, to significantly enhance agricultural production and environmental sustainability in the face of climate risks and resource constraints, all major household and community waste flows containing nutrients, organic matter, or water should be safely reused to the extent possible.

To support such comprehensive management of waste-related risks and resources the Stockholm Environment Institute (SEI) developed the Clean and Green framework, aiming to promote progress in sanitation and hygiene while enabling households to benefit from safely recycling resources found in local waste flows (Dagerskog & Dickin, 2019). This framework is currently being piloted in Burkina Faso in collaboration with WaterAid and Eau Vive International (EVI). We here present an updated version of the Clean and Green framework, and an overview of tools for diagnostics, awareness-raising and monitoring that support implementation in Burkina Faso.

The Clean and Green framework

Eliminating open defecation at the village level through a community-led total sanitation (CLTS) approach is part of sanitation policy and practice in many countries, aiming to raise rural sanitation coverage. Attaining open defecation free (ODF) status is also the recommended first step in the Clean and Green framework because it reduces the health hazard of faecal exposure while creating community cohesion and engagement around sanitation. Beyond this step, the second step of the Clean and Green framework has two main tracks with a parallel focus on risk and resource management (Figure 1):



Figure 1. Overview of the Clean and Green framework. Level 0 is the typical baseline situation in many rural communities. Level 1 is often part of rural sanitation interventions, including eliminating open defecation and adopting basic hygiene practices. At Level 2, the ambitions are raised, with more comprehensive management of local risks on the Clean track and the safe and productive management of waste resources on the Green track.

- The **Clean track** aims to further reduce sanitation-related health risks, such as managing faecal sludge and other wastes generated in the community, including animal excreta, organic and solid waste and greywater¹. In addition, the approach emphasizes the hygienic handling of domestic food and water. The Clean track is inspired by the phased approach to rural sanitation development adopted in the Philippines (DoH, 2019; Robinson & Gnilo, 2016).
- The **Green track** aims to promote safe reuse of wastes generated at the household and community levels containing plant nutrients – nitrogen (N), phosphorous (P) and potassium (K) – and/or water and organic matter. In many rural contexts, this implies the productive use of human and livestock excreta (urine and faeces), greywater, wood ash and other organic wastes.

The components of the Clean and Green tracks need to be addressed at the household level and outside the household in institutions such as schools, and in public areas such as markets. Households, institutions and public areas can be recognized individually when they achieve Clean or Green status, while recognition as a ‘Clean and Green Village’ requires that all households, institutions and public areas achieve both Clean and Green status.

To help ensure long term sustainability and equity, the guiding principles include “local acceptability and participation” to create ownership and engagement; “leave no one behind” to emphasize inclusion and support of the most vulnerable; and “shared work and benefits” to promote the fair distribution of potential burdens and benefits, e.g. within households.

Operationalizing the framework

SEI has been collaborating with WaterAid and EVI in Burkina Faso since 2020 to operationalize the Clean and Green framework. WaterAid and EVI are working with more than 700 villages to achieve ODF status, and three ODF villages are piloting the Clean and Green framework in a second phase. In these pilot villages, various participatory tools are used to diagnose the most prevalent risks and resource challenges, raise awareness and build capacity in reducing health risks and enhancing the safe and productive management of local waste streams (Figure 2 and Table 1).

Clean and Green implementation strategies are preferably technology neutral. This means they should focus on the desired outcomes – such as reducing risks of human and ecosystem exposure to untreated excreta and the productive and safe reuse of resources – rather than from the outset promote a specific technology or mode of reuse. This allows identification of the most locally appropriate and sustainable solutions. In Burkina Faso, such an approach has led to consideration of a broader range of options that can enable safe recycling, see examples in Figure 3.

Key features of the Clean and Green framework

Integrates risk and waste resource management: Clean and Green goes beyond human excreta to include management of a wide range of other waste flows. This multiplies the benefits and avoids fragmented efforts.

Sustained engagement: Recognition for progress on household and community level provides opportunities to celebrate while keeping up momentum. Certification can also be periodically reviewed and renewed.

Benchmarking potential: Clean and Green can stimulate friendly competition at different levels.

Locally adaptable: Clean and Green emphasizes participatory approaches to identify waste and residues relevant in the local setting and appropriate ways to deal with risks and resources.

Technology-neutral: By linking certification to outcomes (indicators for reducing risks and managing resources) rather than specific technologies, Clean and Green gives flexibility with regard to preferred technological solutions.

Contributes to a range of SDGs: Managing local risks and resources has the potential to contribute to multiple sustainability goals and targets.



Figure 2. Piloting Clean and Green in Burkina Faso: a) Transmission pathways for animal excreta; b) Resource mapping exercise; c) The human excreta circuit exercise; d) Construction of urine diverting toilets; e)+f) Farmer field school on applying sanitized urine and faeces and evaluating crop production. (Photos: WaterAid Burkina Faso).

¹ Greywater is household wastewater not containing toilet flush water, so mainly wastewater from shower, kitchen and laundry.

Table 1. Participatory tools for diagnostics, awareness-raising, and capacity building that can be used in the Clean and Green tracks.

	Participatory Tool	Objective and tool description
Clean track	Rapid Risk Assessment	Diagnostics: Cards illustrate hygiene and sanitation practices ranging from unsafe to safe practices for different risk situations. Focus group participants estimate the proportion of households in the village using different practices. The results point towards the main local risk issues and help orient the intervention.
	Three pile sorting of cards ²	Awareness/capacity: The participants classify three cards as unsafe/somewhat safe/safe for different risk situations. Discussions follow on the reasoning for the proposed classification and what constitutes good hygienic practices and a clean local environment.
	Transmission pathways for human excreta (F-diagram) ³	Awareness/capacity: Illustrated cards are placed by participants to map out the faecal-oral pathways from human excreta. Discussions follow and how to break these pathways through sanitation and hygiene measures.
	Transmission pathways for animal excreta (adapted F-diagram) ⁴	Awareness/capacity: Illustrated cards are placed by participants to map out the faecal-oral pathways from animal excreta. Discussions follow on how to break these pathways through sanitation and hygiene measures.
Green track	Resource Flow Mapping	Diagnostics: A resource flow map is drawn in a focus group illustrating the local production and use of food, fodder, water, fuelwood and construction material on household level. Each resource use results in waste flow(s), so current management and destinations of these waste flows are also mapped out. Weaknesses are identified, and different possible solutions are discussed. The results help orient the reuse interventions. Awareness: The same tool can also be used to raise awareness at the implementation stage on the links between agricultural production and waste management and identify areas for improvement.
	Excreta fertilizer calculation	Awareness: : Using the methodology of Jönsson and Vinnerås (2003), it is possible to estimate the amount of nutrients excreted based on protein intake. Hence, each year the average Burkinabè excretes plant nutrients equivalent to what is found in ~5.2 kg of urea and ~9.2 kg of NPK (15:15:15), which are two common commercially sold fertilizers in Burkina Faso. This quantity is explained (and preferably displayed with fertilizer bags) in a village meeting to trigger further discussions: What is the yearly monetary value of the nutrients in a person's urine and faeces? What is the excreta fertilizer quantity and value produced by a family of 5 or 10 people? What if we extrapolate to the whole village?
	The Human Excreta Loop	Awareness/capacity: The sanitation chain of collection, treatment, transport, and application is illustrated on cards, and participants place them in a circuit to close the loop. Discussions follow about practices that protect health and conserve resources at different steps in the chain. Different sanitation technologies need different illustrations.
	Farmer Field Schools	Capacity: A group of interested farmers learn how to safely apply hygienized urine and faeces and evaluate the impact on crop production on a demonstration field, often under guidance from an agricultural extension agent.
	Exchange sessions on modes and doses	Capacity: Sessions are held to discuss doses and modes of application of different waste resources for different crops. This is facilitated by guiding documents from agronomists.

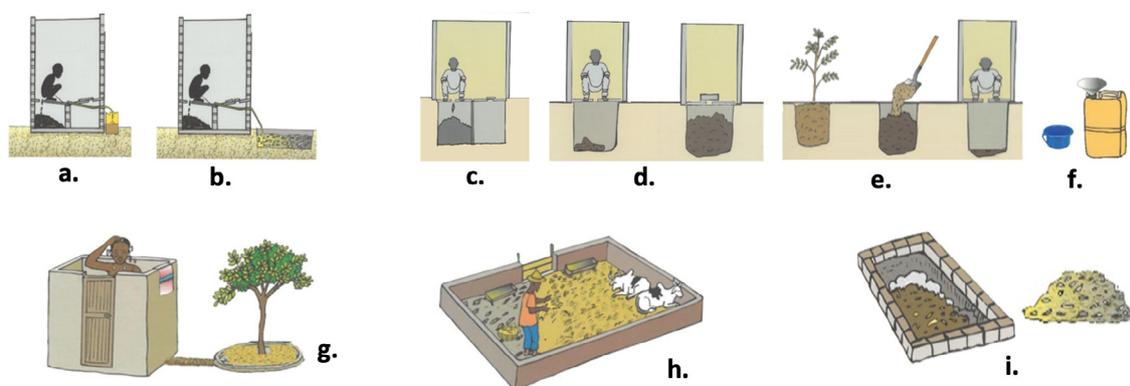


Figure 3. Some examples of technological options enabling reuse in the context of rural Burkina Faso: a) Double vault urine diverting dry toilet – faeces can be emptied after six months if ash has been added. b) Urine can be diverted directly to a composting pit to make urine handling easier. c)+d) Two types of latrines using alternating pits that can be emptied after >2 years. e) “Arborloo” with composting and tree planting in former pits. f) Simple urinal complementing the non-urine diverting latrines to enhance nutrient recovery. g) Example of shower water infiltrated in a mulch bed around a tree. h) Use of bedding to absorb livestock urine. i) A composting pit and/or pile are common for organic waste composting in Burkina Faso. (Illustrations: WaterAid Burkina Faso/SEI).

2. Three pile sorting is a participatory tool often used in sanitation and hygiene interventions, see e.g. Wood et al. (1998)

3. The F-diagram is a classic tool and refers to the transmission of fecal pathogens through fingers, flies, fields, fluids and food.

4. For an adapted F-diagram for pathogen transmission from animal excreta, see for example the Animal Excreta Transmission Route Activity at www.cawst.org

In the same vein, the use of hygienized faecal compost or urine can be done in different ways, some illustrated in Figure 4.

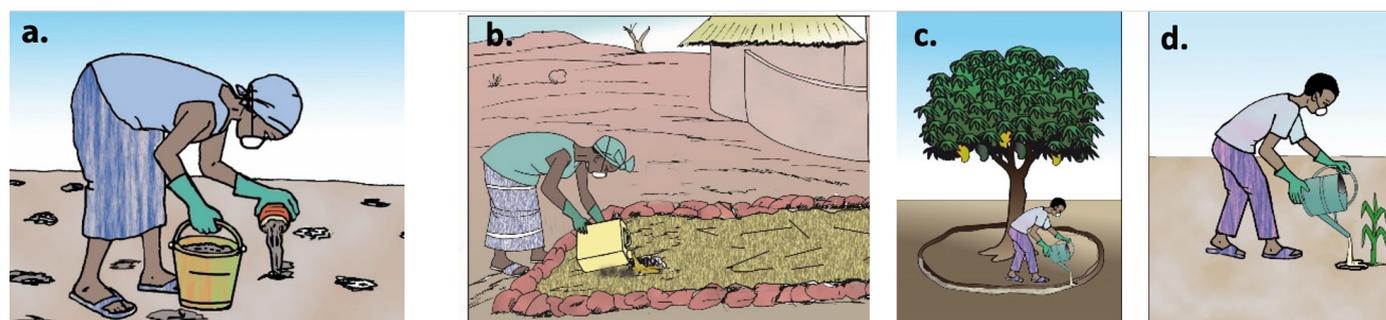


Figure 4. Examples of some possible reuse options for hygienized faeces and urine in rural Burkina Faso: a) application of sanitized faeces as a base fertilizer in planting pockets and incorporation into the soil before planting; b) addition of urine to the traditional composting pit to enhance the composting of carbon rich agricultural wastes; c) addition of urine to fruit-trees in a furrow at the dripline; d) urine fertilization next to the plant as a top dresser given the richness of nitrogen in urine. (Illustrations: WaterAid Burkina Faso/SEI).

Monitoring

Monitoring Clean-track progress is based on verifying several indicators for each component. The green light is assigned when all indicators are fulfilled for a given component (Table 2). A yellow light is assigned if all except one indicator are fulfilled for a given component, while a red light is assigned when two or more indicators are not reached.

Similarly, each Green-track component has several indicators to verify progress (Table 2, lower part). Monitoring Green-track progress emphasizes the consistent collection of each type of waste product or residue, and safe and efficient management from collection to reuse:

- **Quantity:** The household collects the majority of each type of waste generated (targeting > 75% of the quantity generated);
- **Safety:** Measures are in place, and knowledge is acquired to reduce health risks. For human excreta reuse, safety indicators are based on the multibarrier approach recommended by WHO (2006);
- **Efficiency:** Measures are in place, and knowledge is acquired to reduce nutrient losses from collection to application. This includes knowledge on doses and modes of application of local fertilizers, including faecal compost and urine, to reduce the risk of damaging plants and environmental impact from excessive fertilization.

These three objectives are evaluated for each green component through indicators to be verified with the household or public areas and institutions.

Table 2 Monitoring framework for the seven clean components and seven green components. All indicators for a given component must be fulfilled for a green light. The indicators can be used for self-evaluation or external evaluation.

	😊	😐	😞
Clean components			
1. Toilet use/sludge management (9 indicators)			
2. Solid waste (6 indicators)			
3. Animal excreta (6 indicators)			
4. Greywater (1 indicator)			
5. Drinking water (5 indicators)			
6. Handwashing (5 indicators)			
7. Food hygiene (4 indicators)			
Summary			
Green components			
1. Animal faeces (5 indicators)			
2. Animal urine (3 indicators)			
3. Human urine (6 indicators)			
4. Human faeces (6 indicators)			
5. Other organic waste (3 indicators)			
6. Wood ash (2 indicators)			
7. Greywater (2 indicators)			
Summary			

Each monitoring indicator is explained in simple language to enable accurate verification. The summary scorecard is useful at the local level to track household progress and allows benchmarking within and between villages. Monitoring can be done by households themselves as a self-assessment, by local facilitators, by NGOs or by agricultural or sanitation agents. The type of recognition for a household attaining Clean or Green status needs to be determined locally, as well as any other incentives.

The importance of a close collaboration with the agricultural sector

Close collaboration with the agricultural sector is needed to support safe and efficient reuse. In Burkina Faso, locally made guidelines provide useful information on doses of faecal compost and urine for different crops, for example. Also, the Farmer Field Schools, where appropriate reuse is explored with the local farmers, are led by agriculture extension agents from NGOs and local authorities. If the reuse step is not emphasized and properly considered, both health and productivity benefits can be undermined. On the other hand, a strong engagement from the agricultural sector can also boost sanitation, as reuse benefits can incentivize a more conscious collection and safe management of local waste flows (Dickin et al., 2018).

In many settings, traditional agricultural practices for reuse may already exist, and it is important to understand the social and cultural aspects of such practices to optimize them where needed to be included in Clean and Green implementation.

Outlook for Clean and Green

Climate change, land use degradation and resource constraints are growing challenges facing many rural environments that present risks of water, food, and health insecurity. While sanitation programmes increasingly consider technological improvements to toilets to improve climate resilience, few efforts think systemically when it comes to interventions that can address these disruptions while also promoting health and livelihoods (Kohlitz & Iyer, 2021). The Clean and Green framework offers opportunities to not only achieve SDG 6.2 on safe sanitation, but also significantly contribute to many other related targets for sustainable development such as SDG 2.3 on small holder productivity, SDG 2.4 on sustainable food production systems and SDG 1.2 on reducing poverty.

Moving forward, we are planning further piloting activities as well as content improvements to strengthen the Clean and Green framework. A Clean and Green guide based on the experience in Burkina Faso is planned for 2023, as well as looking for new collaborations to improve the Clean and Green framework and gather more evidence. In terms of strengthening the approach, a formal certification process for achieving the Clean and Green Village status needs to be defined. An important next step is aligning the framework with Gender transformative approaches (GTA) to improve health and livelihoods while also addressing structural inequalities (FAO, IFAD and WFP, 2020). This is captured in the Clean and Green principles of shared work and benefits, and leaving no one behind, but requires further operationalization.

Going beyond pilot experiences will require political will such as support for the safe reuse of local waste streams in policies and programs, accompanied by guidelines at the national level. Such policy changes take time, but a paradigm shift from 'waste disposal' to 'resource recovery' is gaining momentum in the sanitation sector. This shift is influenced by circular economy ideas and recognition that safe and productive waste management contributes to health, crop production, environmental protection and climate resilience. Therefore, the Clean and Green framework along with the tools described in this brief, could be an important enabler in moving the resource recovery paradigm from vision to reality in rural contexts.

Authors: Linus Dagerskog and Sarah Dickin, SEI Headquarters, Saïdou Savadogo and Danièle Sebgo, Water Aid Burkina Faso.

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