



Understanding sustained use of ecological sanitation in rural Burkina Faso



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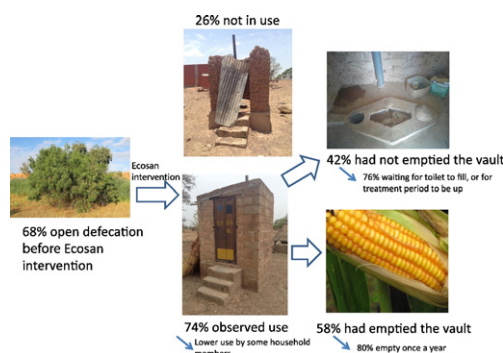
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HIGHLIGHTS

- Only 7% of residents in rural Burkina Faso use improved sanitation.
- Ecological sanitation can meet sanitation needs while contributing to food security.
- Safe agricultural reuse of nutrients provided a strong motivation for toilet use.
- Agricultural training was important for adoption of reuse activities.
- More research is needed to examine intra-household variations in toilet use.

GRAPHICAL ABSTRACT



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ABSTRACT

Access to safe sanitation services is fundamental for healthy and productive lives, but in rural Burkina Faso only around 7% of the population uses improved sanitation. Ecological sanitation (ecosan) systems that allow safe agricultural reuse of nutrients in human waste have been promoted in these areas, as a way to meet sanitation needs while contributing to food security. However, little is known about the success of these interventions in terms of both sustained use of the toilet and safe excreta reuse practices. We assessed the use of ecosan systems in 44 rural communities where such interventions had taken place. Structured interviews and observations conducted at 520 randomly selected *concessions* (residential properties), suggested a large-scale shift from open defecation to ecosan toilet use. However, only 58% of surveyed *concessions* reported ever emptying the ecosan toilet vault, which is required for optimal long-term functioning. *Concessions* that received ecosan training programmes with a greater emphasis on agricultural reuse were more strongly associated with toilet use and emptying than those that whose training focused more on sanitation access and health benefits. The findings suggest that the safe agricultural reuse of nutrients can provide a strong motivation for long-term adoption of improved sanitation among rural smallholders.

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1. Introduction

Sanitation is fundamental for sustainable development, playing a critical role in promoting human health, wellbeing and livelihoods while protecting ecosystems from degradation (Bartram and

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Cairncross, 2010). Despite growing awareness of persistent gaps in sanitation access and the associated implications for society, progress to ensure access and use of safe sanitation has lagged compared to other development challenges, particularly in rural areas. Around 2.4 billion people do not use an improved sanitation facility, and 70% of these unserved people live in rural areas (UNICEF and WHO, 2015). Furthermore, almost 1 billion people practice open defecation, of whom 90% live in rural areas. In addition to addressing these extensive needs, it is also essential to ensure the sustainability of sanitation systems – in terms of both their long-term functioning and use, and how they interact with other social, environmental, institutional and financial imperatives (Andersson et al., 2016).

In Burkina Faso, one of the least developed countries (HDI ranking 183), millions of people lack access to safe water, sanitation and hygiene (WASH) services. In 2015 only 7% of the rural population had access to improved household sanitation, and 75% practiced open defecation (UNICEF and WHO, 2015). According to the World Bank's Economics of Sanitation Initiative, poor sanitation and hygiene cause almost 20,000 premature deaths every year in Burkina Faso, with associated social costs of €136 million (WSP, 2012). This figure includes healthcare costs and lost productivity, but not the impacts of releasing untreated waste into the environment, or the missed opportunities to recover and recycle scarce resources safely and effectively.

Ecological sanitation ("ecosan") has been implemented in a number of regions in Burkina Faso, as a way of simultaneously addressing sanitation challenges and the need for agricultural inputs (Dagerskog et al., 2015). Ecosan systems are sanitation systems designed to recover nutrients and organic matter found in excreta for safe agricultural reuse (Andersson et al., 2016; Esrey, 2001). These systems may employ a range of different sanitation technologies and training strategies to promote use (Simha et al., 2017). Acceptance of ecosan systems among users and farmers is a challenge in some contexts due to socio-cultural barriers relating to reuse of excreta, such as religious practices (Andersson, 2015; Nawab et al., 2006; Simha et al., 2017). However, the potential source of nutrients can represent an important resource for agricultural communities, particularly in areas with declining soil fertility and limited access to chemical fertilizers (Is et al., 2003; Winker et al., 2009). In Burkina Faso, rural areas face interacting risks, including poor water and sanitation access, food insecurity and changing climate conditions that exacerbate these conditions. For instance, in the 2015 Global Hunger Index, Burkina Faso ranked 87th out of 104 countries, with 20.7% undernourishment (von Grebmer et al., 2015).

Despite the opportunities to increase community resilience by addressing sanitation and food security needs through ecological sanitation, there is limited information on the sustainability of past interventions in Burkina Faso. This study aimed to assess the current state and use of toilets, as well as the extent of reuse of treated human excreta for agricultural activities, in communities where ecological sanitation interventions were implemented from 2008 to 2014. We also examined what factors may have contributed to sustained use of the toilets and reuse over time.

1.1. Ecological sanitation implementation in Burkina Faso

Ecological sanitation is an umbrella term for a variety of sanitation systems that include confinement, treatment and safe reuse of human excreta. Different toilet technologies can be used to facilitate ecological sanitation in practice. In Burkina Faso ecological sanitation is commonly associated with a double vault urine-diverting dry toilet (UDDT) known locally as the "ecosan toilet" (Dagerskog et al., 2015). These toilets have a separate washing area next to the toilet that drains separately, which can accommodate users that practice anal cleansing. These toilets typically cost around €150–200 to build in Burkina Faso, depending on the quality of materials used.

Ecosan was introduced in Burkina Faso in 2002 as part of a regional research and demonstration programme piloted by Water and

Sanitation for Africa (WSA; formerly CREPA). Since 2006, a number of large ecosan projects have been implemented in the country, with an estimated total construction of >11,000 household ecosan toilets (Dagerskog et al., 2015) (Fig. 1). The majority of these projects were led by WSA with support from several donor organizations. However, there is very little information on the sustainability of these efforts despite its relevance to important policy dialogues. In particular, Burkina Faso has adopted a national sanitation plan for 2016–2030 in line with the Sustainable Development Goals that includes an emphasis on reuse (PN-AEUE, 2016).

The focus of this study was to understand the sustainability of ecosan projects within the Centre West, Centre East and Plateau Central region, which were implemented between 2008 and 2014. While sanitation sustainability may refer to a number of dimensions, in this study we focused on the long-term use of toilets. Three EU-financed projects were selected for study, including two projects coordinated by WSA focused on improving soil productivity and reducing food insecurity through reuse of excreta (Ecosan_EU2 and Ecosan_EU3, referred to here as EU2 and EU3) that constructed 1350 and 1648 ecosan toilets respectively, and a third project coordinated by the NGO LVIA, which focused on improving sanitation access for rural communities and local capacity to manage WASH systems (referred to here as EU-LVIA) including construction of 5012 ecosan toilets. WSA had roles in all three interventions and brought previous experience in ecosan implementation and training, including agricultural aspects.

Due the focus of EU2 and EU3 on food security, these projects included greater participation from agricultural organizations. For instance, agricultural training, which is critical to promote safe and effective reuse of waste material, was provided to the largest extent in EU2 with direct involvement of the National Institute for Environment and Agricultural Research (INERA) and the Ministry of Agriculture and Water Resources as partners (CILSS, 2012), and in the case of EU3 this was implemented with support from AGRO-ACTION, an agricultural NGO (PRO CONSULT, 2011). The EU-LVIA project also provided agricultural training through training of LVIA and local agricultural extension workers by WSA, although the key focus of the project was ensuring increased access to sanitation in rural areas to meet the human right for sanitation.

Around 65–85% of the cost of the toilet installation was covered by the projects, including doors, metal roof, and necessary pipes, as well as materials and skilled labor and training for construction of the vaults and slab in a durable material. Local masons were identified who were trained in how to construct the toilets. Households participated in implementation and were responsible for paying for and constructing components of the superstructure, such as bricks and materials needed for construction of walls. It is important to note that only one household in a concession, (a multi-household complex in one compound that is a common type of residential property in rural Burkina Faso), likely belonging to the head of the concession, obtained the ecosan toilet. However others in the concession may have participated in implementation and been given permission to use the toilet.

The project teams developed different strategies and tools to raise awareness and conduct training to support implementation of the ecosan toilets. These approaches all emphasized the benefits of ecosan systems for agricultural production as well as the potential health risks associated with open defecation to varying degrees. Project documents indicated a focus on health within the EU-LVIA project while there was a greater emphasis on agricultural reuse within the EU2/EU3 projects. Training and awareness-building approaches on health and hygiene issues associated with open defecation and toilet use such as SARAR/PHAST were used (WaterAid, 2013). These included tools such as simple diagrams and local theatre, community meetings, and household visits to train concessions receiving ecosan toilets. To train and motivate residents in agricultural use of sanitized feces and urine, tools such as simple technical information sheets prepared in the local language for agricultural training sessions, and demonstration fields were used.

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