

NTAKARUTIMANA et al.

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AND RESILIENT WASH SERVICES**The need of support in communities using EcoSan latrine
products in farming for safe practices**A. Ntakarutimana (Rwanda), E. Bushaija, J. Kagwiza, A. Rumenge,
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A cross sectional mixed method study was conducted in Burera District, one of the pioneer districts in Rwanda using EcoSan latrines and their products in farming, to assess the practice for community health safety. This research involved household interviews and observations, key informants interviews and focus group discussion as data collection methods. The results showed a high appreciation of the use of EcoSan latrine and products for both proper sanitation suitable for the volcanic area and farming as well among study communities. However, the communities aren't well informed about health risks related to the handling of EcoSan latrine products and this situation coupled with the lack of standard operation procedures and guidelines at community level, explains the noted inconsistency in stabilisation, handling, application of the faeces and urine in farming to prevent potential health risks.

Introduction

According to Esrey et al. (2003), Diversion Dehydration (UDD) EcoSan latrine as an alternative to conventional sanitation has an added value of optimum use of nutrients and water resources in agriculture as a zero-cost fertiliser and soil conditioner (Esrey et al., 1998; eawag, 2014).

Considering the characteristics and the microbial content of faeces (Schönning & Stenström, 2004; Gina, Holmer & Tan, 2009) and the steps involved in their use; it is theoretically possible for the handlers and the community itself to be exposed to harmful disease agents. In the study district (Burera), human waste was not used in farming before the introduction of ecosan latrines, and is locally termed as *amazirantoki* meaning 'forbidden to touch' (Ekane et al. 2012). This research assessed the practices related to the use of UDDT and their products for community health safety.

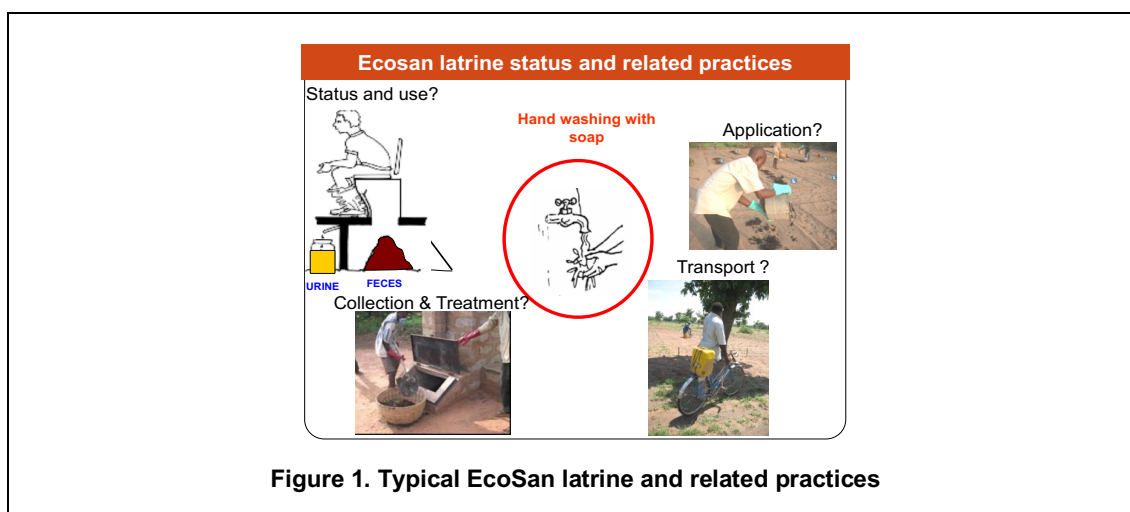


Figure 1. Typical EcoSan latrine and related practices

Methodology

Study area

In 2004, the Ministry of Infrastructure under the funding of Unicef Rwanda, introduced the EcoSan latrine (UDD) and the use of faeces and urine as latrine products in farming (figure 1) in 4 sectors of Burera district (Cyanika, Kagogo, Gahunga and Rugarama). 120 households were supported to construct their own EcoSan latrines with iron sheets, digging materials (volcanic soil hard to dig) and cement and four sanitation cooperatives members were trained at the beginning on the construction and use of the typical EcoSan latrines, one cooperative per sector.

Study design, sample size and data collection

The period of 2011 – 2012, a cross sectional mixed method study was conducted. One sanitation cooperative per sector was considered for focus group discussion, one executive secretary (local leader) and one sanitation professional per sector were considered for semi structured interview, and a sample of 73 household was purposively selected out of 120 with EcoSan latrines UDDT type for observation and the household representatives for interview. The data collection focused on (1) the hygienic practices, (2) the techniques, and (3) potential health risks related to use of EcoSan latrine products.

Sectors	Total EcoSan latrines	Selected EcoSan latrines	Sample size (%)
CYANIKA	18	10	55.6
GAHUNGA	32	25	78.1
KAGOGO	38	19	50.0
RUGARAMA	32	19	59.4
TOTAL	120	73	60.8

Results

Use and maintenance of EcoSan latrines

Among visited households with EcoSan latrine, 74% commend the use of EcoSan latrines. However, at the time of the research, 59% of latrines were poorly maintained. The reasons of poor maintenance included the latrine setup which complicates the maintenance (28.8%), the lack of follow up by local leaders or in charge (11%), and lack of local guidelines on the use and maintenance of EcoSan latrines (8.2%).

Handling and use of EcoSan latrine products

After defecation, 52.1% added ash immediately to the faeces available in the latrine stance for disinfection and desiccation. Faeces are then composted with additional ash and herbs for a period ranging from 1 to 12 months for stabilisation. However, all composting pits were not covered which made the composting poor (faeces were always wet).

Beside, the urine is collected separately in jerry cans and moved into bigger plastic tanks for stabilisation. From the focus group discussions, it was noted that the storage period of urine varies between 0.5 and 3 months.

From the households' users of faeces and urine, self-protection was practiced at 28.8% of respondents during the storage-composting stage but could as well reach 45.2% during their application in farms. The technique and period of application of composted faeces and treated urine onto the farms for Irish potatoes, maize, beans, sorghum, banana, cabbage, tomatoes and onions are not harmonised (Table 2) and (Table 3).

Period of application	Faeces	Urine
Before planting	30.1%	6.8%
After	1.4%	13.7%
At the same time	1.4%	1.4%
Before and after	6.8%	12.3%
No specify	60.3%	65.8%

Application techniques	Faeces	Urine
Dig	19.2%	-
Spread	2.7%	80%
Dig and spread	73.6%	1.4%
Control insects	-	25%
Control rodent	-	1.4%

Appreciation of the use of EcoSan latrine products

The study results revealed that EcoSan latrines helped to solve problems of hygiene because the volcanic soil and rocks were not suitable for pit latrine or ventilated improved latrine. Sanitation Cooperative members confirmed the use of the latrines helped to double even triple the Irish potatoes and maize production by applying faeces and urine as soil conditioner and plant fertilizer respectively (Claver and Jacqueline).

Furthermore, people compete to buy faeces and urine in studied communities at considerable cost up to Rwf 5000 and Rwf 2000 (1 \$ US=850Rwf) a full faeces latrine pit and one 20 liter jerrycan of urine respectively

However, many people do not aware of the health risks associated with the use of faeces and urine in farming and how to avoid them. Some practices reveal the communities being driven by benefits with less attention to possible health risks, hence some people steal partially composted faeces “*We are vigilant because some people steal our faeces even fresh one for their application in farms*” said Nyarwondo sanitation cooperative members.

According to the members of sanitation cooperatives, there is no precautions and self-protection during handling and application of the EcoSan products. It was noted a lack of guidelines on stabilization and application of faeces and urine and sanitation professionals and local leaders are less involved in supporting households using EcoSan latrines products.

Discussion

There is inconsistency in composting of faeces in terms of techniques and period of composting/stabilization of faeces and urine before application. Kyansem (2011) proposes 6-8 months for faeces and 30-45 days for urine in tropical hot regions. This is a potential source health hazard since the faeces are often applied without self protective equipment for growing Irish potatoes, maize, beans, sorghum, banana, cabbage, tomatoes and onions mainly. The application technique through spreading the products on the soil constitutes a potential for contamination of soil, crops and surface water.

The hygiene risks associated with diverted urine is mainly a result of poor separation and contamination of urine by faeces and vice versa, which was possible in many ways. Since the population (through focus group discussions) confirmed the use of EcoSan products in farming had improved the economic status of

community members who had doubled or tripled their harvests (live testimonies), there may be a risk-benefits misconceptions between health risks and economic benefits.

Indeed, the poor stabilisation coupled with early application of faeces and urine have been noted and constitute a potential factor for contaminating people, fields, crops and water points in studied communities. The self protection which is not practiced is also a risk for users of EcoSan latrine products and their family members to faecal contamination.

The lack of local guidelines contributes also to increased human exposure to faecal contamination through mal practice. Since many people did not know specifically the health risks associated with the use of faeces and urine in farming and how to avoid them, guidance, supportive supervision and monitoring are necessary to maximize the social support for optimal and safe use of EcoSan latrine products.

Conclusion

The use of EcoSan latrine products in study communities is being appreciated by the users. The results of the study call for improvement on the maintenance of the EcoSan latrines, handling and application of EcoSan latrine products (hygienic practice).

The support by sanitation stakeholders should include clear local guidelines, health education; community based monitoring (follow up) to prevent health risks associated with the use of faeces and urine in farming. The health education should include skills transfer in terms of stabilization of EcoSan latrine products (composting of faeces and storage and dilution of urine). Innovations for optimal use of EcoSan latrine products in farming including reduced composting period for faeces would be an added value.

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References

- EICV3 DISTRICT PROFILE North – Burera, (2010-2011). Retrieved from:
<http://statistics.gov.rw/publications/rphc4-thematic-report-population-size-structure-and-distribution>.
- ESREY, Steven, ANDERSSON, Ingvar et al. (2003): “Closing the Loop – Ecological sanitation for food security”.
- NISR (2010). GIS Database, Burera district map. Retrieved from:
<http://www.statistics.gov.rw/publications/burera-district-map>
- GINA, S. I., HOLMER, R. J., & TAN, M. L. B. (2009). The public health safety of using human excreta from urine diverting toilets for agriculture: the Philippine experience.
- SCHÖNNING, C., & STENSTRÖM, T. A. (2004). Guidelines on the Safe Use of Urine and Faeces in Ecological Sanitation Systems.
- EKANE N, KJELLÉN M, NOEL S, FOGDE M. (2012); Sanitation and Hygiene, Policy, Stated Beliefs and Actual Practice; A Case Study in the Burera District, Rwanda, Stockholm Environment Institute, Stockholm, Sweden, available on <http://www.sei-international.org/mediamanager/documents/Publications/SEI-Working Paper-Ekane-SanitationHygieneRwanda.pdf>, accessed 12/5/2015
- TILLEY, E., ULRICH, L., LUTHI, C., REYMOND, Ph. and ZURBRUGG, C., 2014. Compendium of Sanitation Systems and technologies. 2nd Revised Edition.
- KYANSEM, A. (2011). Formation à Distance / Module GBV / 2iE / 2011, International Institute of Water and Environmental Engineering

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