

Long-term acceptability of urine-diversion dry toilets: a case study in rural Malawi

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Key Words: Urine-diversion dry toilet, acceptability, health, agriculture.

1. INTRODUCTION

A urine-diversion dry toilet (i.e., UDDT) is an approach used to improve sanitation as well as to promote food security through the use of sanitized human excreta and urine for agriculture. Despite the widespread of the approach in low-income countries, long-term acceptability through continuous use has been rarely investigated. Therefore, this study evaluated long-term acceptability and its influential factors in Malawi.

2. METHODOLOGY

About 277 households (HHs) were surveyed in TA Malengachanzi, Nkhotakota district and TA Kayembe, Dowa district, where UDDTs were introduced from 2008-2012 by a Japanese NGO, called Nippon International Cooperation for Community Development. Through interview and observatory check, the following were investigated: 1) Household attributions, 2) Water use, diarrhea and agriculture concern 3) toilets use and operation conditions, 4) use of human manure/urine, 5) before-use expectation and after-use perception of human manures/urine effect on agriculture, 6) before-use expectation and after-use perception of diarrhea frequency reduction.

3. RESULTS

Out of 277 HHs interviewed, 221 HHs (80%) were still using UDDTs. The main reason for the remaining households (20%) not to use the toilets was collapse due to heavy rains. Among UDDT users (221 HHs), 216 HHs were spontaneously recovering human manure for agriculture. As opposed to human manure, only 79 HHs (36%) were still using urine in agriculture. Out of 221 HHs, 82 HHs (37%), 62 HHs (28%) and 37 HHs (18%) moderately, highly and very highly expected to harvest more due to using of human manure, respectively. Moreover, after-use perception of human manure to increase yield was also found to be high to very high by 45 HHs (20%) and 160 HHs (72%), respectively.

Although 103 HHs (47%) did not expect yield increase due to urine use (before-use expectation), after-use perception of urine was high by 51 HHs (23%). Out of 221 HHs, 62 HHs (28%) and 80 HHs (36%) highly and very highly expected diarrhea risk reduction by UDDTs, respectively. Moreover, after-use perception of diarrhea frequency reduction by UDDTs was also found to be high to very high by 95 HHs (43%) to 86 HHs (39%), respectively. When HHs using urine and HHs that had stopped using urine were compared, HHs using urine perceived to have more yield due to use of urine than HHs that had stopped using urine ($p=0.0026$, Kruskal-Wallis rank sum test). In addition to that, their fertilizer demand was significantly higher than HHs that never used urine ($p<0.001$).

On UDDTs' operation conditions, eight out of ten parameters were more than 80% correct. A significant difference was found between availability of soap for handwashing (parameter) and levels of diarrhea risk perception among UDDT users.

4. CONCLUSION

Long-term acceptability in the study area was likely to be high. Agriculture concerns (high perception of yield increase by human manure) was the major contributing factor to a continuous use of UDDTs. Therefore, for a continuous use of UDDTs, further awareness of the fertilization effect of both human manure and urine should be raised among users. Moreover, since physical damage was the major reason for stopping using UDDTs, durable toilet design should be considered and self-repair training among UDDT users could be suggested as a countermeasure for a sustainable UDDT system in Malawi.