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Experiences of urine diverting dry toilets (UDDT) in Arba Minch, Ethiopia

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Abstract: Pit latrines in Arba Minch are not good so UDD toilets were introduced in 2006 as an option to solve the problem. Nine of the first UDD toilets and a compost sites were surveyed to see their condition for this report. The number of UDDT toilets increased from 15 in 2010 to 56 in May 2012 with a loan project. However, the up-scaling is very slow because of the operation and maintenance challenges of the earlier UDD toilets and the weak marketing of co-compost. If marketing was done along, transportation would have been done at cheaper cost; up-scaling of UDDT would have been faster than these. Therefore, the current organizations working on ecological sanitation should do marketing of co-compost along with the construction of toilets.

Keywords: *Arba Minch, co-compost, sustainability, pit latrines, urine diversion dry toilet.*

Introduction

In Ethiopia only 16 percent of the population lives in urban areas (CSA, 2012). Fourteen percent of households in urban Ethiopia use improved toilet facilities that are not shared with other households and 32 % use shared toilet facilities. The large majority (54 %) of urban households use non-improved toilet facilities. The most common type of non-improved toilet facility is an open pit latrine, used by 37 % of the household in urban areas. Overall, thirty eight percent of the household do not have toilet facility and sixteen percent in urban areas and forty five percent in rural areas (CSA, 2012). Arba Minch town with a population of 101,336, projected for 2012 based on 2007 census (CSA, 2012), follows almost the same pattern. It consists of four sub-cities which are further subdivided into 11 lower administrative units. In the town, there is a rapid and uncontrolled drift by rural population in search of jobs over the past years. Poverty, ignorance about the consequences of poor sanitation led to sanitations being neglected among the poor urban dwellers.

Figure: 1 : Typical pit latrines in Arba Minch. No proper floor, wall and roof

In Arba Minch, the percent of households without any sanitation facility is 10%, close to the national, where people defecate in open fields, bushes or gorges (Teklemariam, et al. 2007). Although most of the people use pit latrines, the toilets are non improved open and unhealthy. They are often constructed to minimize the frequency of emptying and construction cost. The major constraints in pit latrine construction are either rocky or

loose soil nature of the ground. Therefore the toilets are shallow and in every rainy season flooding and demolishing of toilet is a common phenomena.

The toilets do not have superstructure like roof and wall. Most of these kinds of toilets have a temporary superstructure made of old clothes, other local materials for privacy cover (Figure 1). Therefore, many of the toilets are a breeding place for flies, insects, mouse and other vectors.

Most pits sludge are often emptied manually and damped into new pit or the old pit refilled and new pits are dug if there is space. When trucks are used for emptying pits, there is rarely any form of sludge treatment; the faecal sludge is discharged into open land on the outskirts of the town.

The problem of common pit latrines in Arba Minch is calling for new technology. In response to this, UDD toilets were introduced in 2006 by ecological sanitation Ethiopia and ROSA (Resource-Oriented Sanitation concepts for peri-urban areas in Africa) in addition to Fossa alterna and arborloo. The people were happy to contribute financially and in kind and accept the technology thinking it would curb their problem although it was brand new to the town.

However, because of the new technology of UDDT and the less interest of investment by the private sector for toilet, the users are encountering operation and maintenance problems. Besides, the low demand or market for co-compost produced from UDDT products is the main challenge for slow adoption by the community. Some owners take their own solution to the problem. This paper tries to identify the experiences and challenges of the UDD toilets users and their status during 7 years. The challenges of closing the loop will also identified by visiting nine of the UDD toilets at different settings and composting site in the town. Site visit and informal interviews were the methods used for this report.

Experiences of Urine Diversion Dry Toilet (UDDT) in Arba Minch

Urine diverting dry toilet in Arba Minch is a raised concrete floor with plastic or cemented squat seat with urine diverted into a 100 litre plastic container and faeces placed either in a metallic barrel or basket for a household (Figure 2) and concrete vault for schools (Figure 3). The squatting pan leads to a vault for dehydration along with the anal cleansing material except water. The user is supposed to apply firewood ash on the faeces after use to support dehydration and sanitation. Most of the superstructures are made of corrugated iron and the operator can empty the receptacle from the back side of the toilet.

Figure: 3~~2~~ Faeces collected in basket

Figure: 2~~3~~ UDDT vault in Arba Minch

The initial arrangement for the reuse of UDD toilet products was to transport to a co-composting site with donkey cart provided that the UDDT owner does not have a composting land. The compost producers in the town use the urine as additive along with

organic solid waste and dry faeces. Payment to transporters is made by toilet owners and the compost producers sell compost and seedlings.

Initially the toilets were constructed for demonstration and full, partial payment by the owner and technical assistance was offered by ROSA. Fifteen UDDT were constructed till February 2010. As up-scaling project, forty-one additional UDD toilets were constructed till May 2012 by introducing a two year loan system by SPA (sustainable sanitation for peri-urban areas in Africa). Follow up work of the former ROSA projects is done by CLARA (Capacity-Linked water and sanitation for Africa's peri-urban and Rural Areas). In spite of all these the UDDT up-scaling is slow.

Challenges during the introduction of UDDT

When UDD toilet were introduced, a number of problems were identified. The behaviour of the UDDT user observed during operation included: pouring of anal cleansing water in faeces container, seat in the wrong pith hole, not keeping wash water, adding ash in urine pipes. Most househod UDD toilets had odour and get wet because they were not adding enough ash to cover the excrement after use for fear that their faeces barrel fills too quickly.This behaviour had been changed through training and awareness creation efforts. Most of these problems were created by persons who had never used the toilets.

The design of the toilet had caused the following operational problems: Urine pipes clogged and rain sometimes enters vault and wet faeces because the design disregard wind direction. Orientation of some of the toilets also results in blowing of ash on the toilet user.

Above all, the major operation problem by the users was transportation of urine and faeces; however, the owners had learned to pay for organized women and youth group then which had involvement with ROSA. The range of payment offered by owners for urine transporters in 2008-2010 was from about 0.3 to 2 euro based on the amount of urine and distance to the composting site.

UDD toilets status after seven years in Arba Minch

Besides Fossa Alterna and Arborloo, UDDT is one of the best options to solve the problem of the town but the low demand for co-compost produced from UDDT products is the main challenge for slow acceptance by the community (affects sustainability and cost). Because of that the organized youth groups who produce co-compost are not getting enough income to support them, they tend to search for alternative or additional jobs. This makes the market chain weak and reduces rate of the new UDDT construction in the town although there is loan opportunity.

To support the above argument, UDD toilets were surveyed in May 2012 to see condition of their operation. Three of them were households; one garage, two schools, one low cost house site, two governmental offices, and a composting site, refer Table 1 for details.

Generally, during the survey, we have not seen any hand wash water in all toilet sites although it was given as package during startup. Ash was not available except in two cases. Two reasons were mentioned for this, however: ash is not available as it used to be because fire wood is expensive and people shift to electricity for their energy needs, secondly most of the new users and care takers do not know its importance as a desiccant. Owners do not know who is going to maintain their toilet, the trained personnel are changed their addresses.. It is observed that toilet owners are simply waiting. Maintenance could have been done by a meson that construct any other common toilet in the town but the owners still feel UDDT is special.

Table: 1 Status of surveyed households with UDDT in Arba Minch, May 2012

Name	Ownership	Users	Care Takers	Status	Remark
Hibret Lelimat	School	About 50 girls	A teacher with training	Very Good	Urine transportation is done solid waste collectors (CLARA)
Chamo school	School	Teaching staff	Director	functional, no ash, door broken	They bury the faeces and urine
Low cost house	None	Construction workers & passersby	No operation and maintenance	Bad	Neighborhood complaining of smell
Agafari	Private	Owner and tenants	Owner	Functional, but locked and new pit latrine dug nearby	Complaining of the weight of faeces to carry to his farm. He is afraid the toilet is abused.
Yigebahal	Private	Owner family	Owner	Functional, but urine pipe is leaking	Compost on site, no urine transport service. Use it for their garden
Bogale	Private	Owner and tenants	Owner	functional, urine pipe leaking and faeces barrel corroded away.	Bury the faeces and soak the urine is drained into the ground, constructed additional pit latrine for kids.
Unity Garage	Organized youth group	Employee and customers	owners	Functional, but the urine hole blocked with cigarette butt and paper	They have buried the faeces and urine when filled.
Water supply main office	The office	employee		Functional, urine pipe from the tank is directed to open ground.	
Water supply, Secha office	The office	employee	guard	Good condition	Faeces and urine transport is done solid waste collectors (CLARA)
Egannew mayet composters	association	members		Good condition	Production of co-compost increased with extra workers. Consume a lot of solid waste. But market for compost is poor, so compost is piling up.

The solid waste collectors and CLARA are not able to satisfy pickup of urine and faeces of all UDDT toilet users in the town because of facility shortage and the bad road condition which makes donkey cart movement difficult. The owners are also complaining of expensive pickup service. So the owners are taking their own solution by burying the faeces and urine in their garden. Besides the users do not know whom to contact for service because the trained user do not transfer knowledge to the new one. This was observed at the Chamo School in Table 1.

In the low cost house UDD toilets, which was constructed for construction workers in 2006, do not have ownership after the completion of residence houses project. Since there is no ownership now, the sustainability of UDD toilets fails, as the toilet users are passersby who are new and not responsible for the toilet. Because of its mismanagement, the vault is like a common pit latrine on land and the urine hole is completely blocked. The nearby government office is complaining of the toilets smell.

From the survey and questions of owners of the toilets, new tenants are the main problem creator. Although information is posted on the UDDT wall, they do not want to read or they can't read or understood the picture. Agafari for example locked his toilet for fear that it will be abused by visitors who are not used to such kind of toilet and he has even constructed a new common pit latrine nearby. From the Table 1, the Garage, the urine hole was blocked by cigarette butt and paper because every day new customers are visiting the toilet. At least they can read and write but they are careless to know about the toilet. With regard to UDDT products, the Garage owners bury it as they are not able to get collection services.

The co-compost producers are producing compost using solid waste collected from some parts of the town and they piles up the compost because they do not have enough market. Had the composters have market, they would have paid for toilet waste transporters and the price paid by the toilet owners would have been cheaper and collection of UDDT waste would be a success.

Despite the value of compost as an agricultural input to improve soil fertility and reduce the need for chemical fertilizers, selling compost remains a challenge and the youth group cannot get sustainable income. This is because marketing approaches are rarely applied; this is not attributed to a lack of interest or business mindedness, but simply to a lack of available information for the compost user (Rouse, et al. 2008). For the economically viable compost there is no ready market. The local subsistence farmer has less knowledge of compost and the big farms do not know compost production exists nearby and they do not believe the product is enough for their farm. Availability of market will enable complete the cycle of UDDT products. All problems regarding transport of toilet product is directed to low compost demand by the farmer.

In spite of the problem observed, most of the UDD toilet still working.

Conclusions

From the survey, UDDT owners are trying to use their own means of removing UDDT products although it is not in ecological way. This is because the waste collectors do not have capacity and the composters do not have enough customers to sell their product. When the composters get market then the market chain is moving and closing the loop enhances and the demand for UDD toilets would increase and up-scaling would be better than this.

Besides, the urine concentration pilot research by CLARA might also improve the operation and maintenance if they search for market for urine concentrates as fertilizer. This has a direct impact improving the collection and transportion of urine and increase demand for the UDD toilet.

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