

Urine diversion dry toilet (UDDT) for one household Arba Minch, Ethiopia (draft)



Fig. 1: Project location

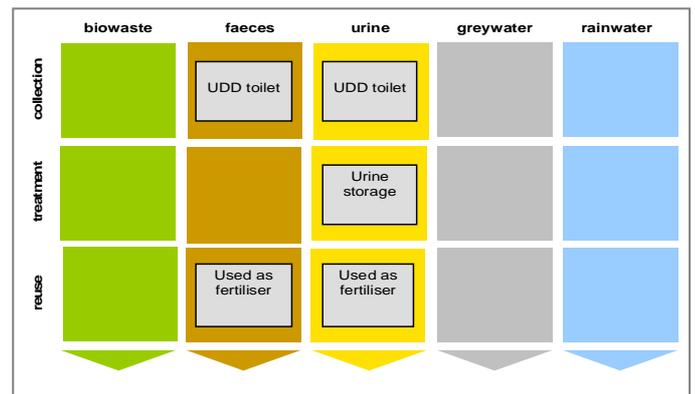


Fig. 2: Applied sanitation components in this project

1 General data

Type of project:

Replacement of pit latrine with urine diversion dry toilet (UDDT) for one household in Arba Minch, Ethiopia

Project period:

Start of construction: June 2007

End of construction: July 2007

Start of operation: August 2007

Ongoing monitoring period: the following 3 months

Project end: completed

Project scale:

Number of inhabitants covered: 10 persons use the UDDT and on average, 30 donkey owners spend a night in the compound.

Total investment: EUR 325

Address of project location:

Abaya kifleketema, kebele Dulfana, nearby the big market and the River Kulfo, Arba Minch, Ethiopia

Planning institution: ROSA, Arba Minch

Executing institution: ROSA, Arba Minch

Supporting agency: European Union



The work was carried out within the project ROSA (*Resource-Oriented Sanitation concepts for peri-urban areas in Africa*; Contract No. 037025-GOCE; duration: 1.10.2006 – 31.3.2010), a Specific Target REsearch Project (STREP) funded within the EU 6th Framework Programme, Sub-priority "Global Change and Ecosystems".

2 Objective and motivation of the project

A household had a problem of repeated collapses of the pit latrine. The owner approached ROSA, Arba Minch for a solution. So the objective of the project was

- to reduce the repeated pit collapse and solve the toilet problem and
- to replace the toilet conditions with low odour and flies.



Fig.3: Mr. Agafari's new urine diversion dehydration toilet (source: Wudneh Ayele, 2007)

3 Location and conditions

The UDDT is located in Arba Minch, Ethiopia. The town has a total population of 75,000 and is characterised by flood during rainy season and unstable soil conditions. There is also a shortage of water all over the town. The head of the family has an irrigation farm more than half a hectare at the bank of the River Kulfo. The river is flowing cutting the town in two parts.

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The owner's compound is more than 1000 m² in size, and most of the area is covered by mud houses. The remaining space is left for keeping donkey, mules and horses during the night for rural merchants. A lot of dung is collected from the animals every morning which the owner is accustomed to take to his farm as fertiliser. The rent is 1 birr per night per animal. The nature of the soil in the compound is loose soil.

In Ethiopia, the under-five child mortality rate is currently¹ **104 children per 1000**, and this is a significant change, since in 1990 the value was 210 child deaths per thousand.

4 Project history

The house owner approached ROSA which is working in Arba Minch in resource oriented sanitation. ROSA provided him several options and he decided to have a UDD toilet. This toilet was among the first demonstration toilets in Arba Minch. ROSA paid full cost and trained local masons in the mean time. Local masons constructed the toilet. The owner was very happy and applied the urine and faeces after composting in his farm which is located by the side of his compound. ROSA still monitors the activity of the toilet and reuse activity.

5 Technologies applied

The urine diversion dehydration toilet constructed has 1 vault where faeces are collected in a half cut 200 litre barrel. ROSA Arba Minch followed up on the planning and engineering construction and also paid the labour charges and the cost of construction materials. The sub-structure is built in masonry while the superstructure with corrugated iron sheets. PVC pipes are used for urine collection and vent pipes while plastic water storage tanks are used for storage of urine.

6 Design information

The UDDT toilets are built in such a way that the operator can empty them from the rear side of the toilet (Figure 3). The toilet has an elevated concrete floor with plastic squatting pan produced in Addis Ababa [by?](#). The squatting pan leads to a vault for dehydration along with the anal cleansing material. Every user applies ash on the faeces after use. Urine is led to a subsurface tank which is situated behind the toilets in the vault.

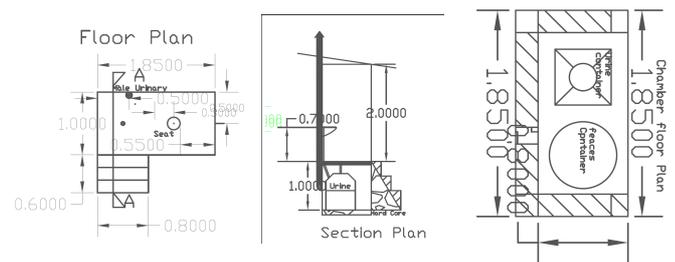


Fig. 4: the floor and section plan for Agafari's UDDT (source: ROSA Arba Minch; 2009)

7 Type and level of reuse

The possibility of reuse was one of the main motivations for ROSA (Figure 4). The team supports the toilet owner in reusing the toilet products in his farm irrigated by a river called Kulfo. He has applied doses of urine for the banana, mango and lemon plants and the dried excreta were co-composted along with the organic material in his farm land. The yield was not estimated and the preparation of the compost was as the faeces container fills.



Fig. 5: Maize fertilised with urine (source: ROSA project in 2007)

8 Further project components

This project is a one amongst the other components of the ROSA project. Solid wastes like green plants and animal wastes are also used by the owner for co-composting. Research on operation and maintenance are being done for 15 UDDT toilet products in the town like crop trial and reuse aspect.

¹ The under-five mortality rate is the probability (expressed as a rate per 1,000 live births) of a child born in a specified year dying before reaching the age of five if subject to current age-specific mortality rates (<http://www.childinfo.org/mortality.html> and <http://www.childmortality.org/>).

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9 Costs and economics

Table 1: Bill of quantities for UDDT for Agafari’s household

Description	Price in Euro (2007 price)
1. Excavation and earth work	1.6
2. Superstructure	138
3. Concrete work	24
4. Carpentry and joinery	64
5. Roofing	33
6. Sanitary Installation	64
Total in Euro	325

10 Operation and maintenance

Up to now ROSA has been assisting the owner for the maintenance of any of the damaged components of the toilets. The owner operates and maintains storage of excreta, urine, hand wash, cleaning of toilets and provision of drying agent like ash.

11 Practical experience and lessons learnt

All the family members and the tenants admire this new toilet type and the concept of reusing which is observed from their positive response. During visit ROSA staff complained that hand washing water is not regularly kept nearby the toilet. Guests, who do not have any knowledge about toilets at all, visit the house every day and tend to misuse the toilet holes.

12 Sustainability assessment and long-term impacts

A basic assessment (Table 1) was carried out to indicate in which of the five sustainability criteria for sanitation (according to the SuSanA Vision Document 1) this project has its strengths and which aspects were not emphasized (weaknesses).

Table 1: Qualitative indication of sustainability of system. A cross in the respective column shows assessment of the relative sustainability of project ('+' means: strong point of project; 'o' means: average strength for this aspect and '-' means: no emphasis on this aspect for this project).

Sustainability criteria	collection and transport			treatment			transport and reuse		
	+	o	-	+	o	-	+	o	-
• health and hygiene		X			X			X	
• environmental and natural resources		X			X			X	
• technology and operation		X		X			X		
• finance and economics		X		X				X	
• socio-cultural and institutional		X			X			X	

Sustainability criteria for sanitation:

Health and hygiene: The technology reduce odour and flies.

Environment and natural resources: The excreta collected and reused for watering the seedlings which improves the crop yield, natural resources yield and modify the ver warm weather.

Technology and operation: The technology is accepted even by small kids and rural residents who are not used any toilets before but construction the whole structure need trained local mason. It is being copied by the local mason.

Financial and economic issues: The toilet owners has farmland and he has started reusing excreta, fruit yield increase his income.

Socio-cultural and institutional aspects: The toilets are accepted by male and female users. There is no complaints and it is expected that they will inform their extended families residing in different part of the zone. The Arba Minch health bureau needs excreta to be treated and safe for handling and as they assured of that, they may accept and institutionalized it. However, this takes time.

With regards to long-term impacts of the project, the main expected impact of the project is improved public health and good condition of toilets. As a lot of guests visit the toilets it is also possible to say that tenants and landlords disseminate the knowledge, technology and concepts to Arba Minch town and other towns.

13 Available documents and references

1. ROSA AMU, ROSA ARB (2009) Arba Minch Town ROSA Project booklet, Arba Minch, Ethiopia, <http://www2.gtz.de/Dokumente/oe44/ecosan/en-rosa-project-booklet-arba-minch-2009.pdf>
2. General project information:
<http://ROSA.boku.ac.at>
<http://www.amu.edu.et>

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Case study of SuSanA projects

Urine diversion dry toilet (UDDT) for Agafari´s household

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