

UDD toilets for Nelson Mandela private school  
Arba Minch, Ethiopia



Fig. 1: Project location

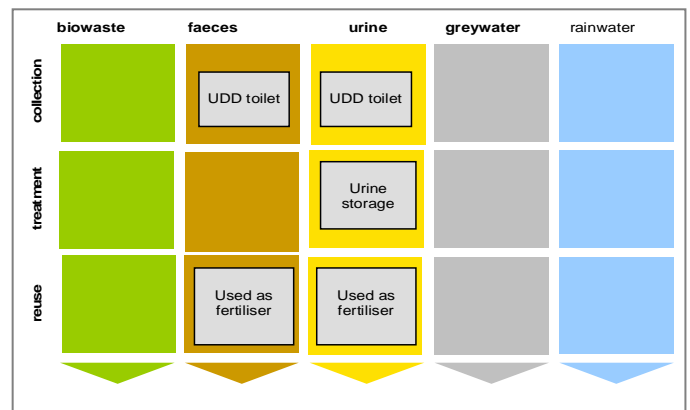


Fig. 2: Applied sanitation components in this project (UDD stands for urine diversion dehydration)

1 General data

**Type of project:**

Replacement of pit latrines with a urine diversion dehydration toilet block (UDDT) for Nelson Mandela School

**Project period:**

Start of construction: August 2008  
End of construction: December 2008  
Start of operation: December 2008  
Ongoing monitoring period planned for: December 2008-March 2010  
Project end: March 2010

**Project scale:**

Number of people covered: about 200 students and teaching staff

**Address of project location:**

Secha kifleketema, kebele chamo  
Arba Minch, Ethiopia

**Planning institution:**

Nelson Mandela School

**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

The Nelson Mandela School had problems of frequent collapses of pit latrines and the school approached ROSA Arba Minch for a solution. So, the objectives of the project were:

- to reduce the repeated pit collapses and to have a sustainable toilet condition.
- to improve the toilet conditions with less odour and flies.

3 Location and conditions

Nelson Mandela School is a private school from grade 1 to 9 with a total number of 200 students and teachers. The school is located in Arba Minch in the southwest of Ethiopia. Arba Minch town with a total population of 75,000 and annual growth rate of 4.5% is one of the fast growing towns in Ethiopia. The region is characterised by floods during rainy season and unstable soil conditions. There is also a shortage of water all over the town. The nature of the soil is loose and the water table is high during rainy season. So, in the rainy season groundwater enters the pit latrines. The School had two pit collapse problems in its history since its establishment and the last pit latrine collapsed completely before the construction of the UDDT. The students and their families were in great worry and the administration was in a worry of losing their students for another school. So, the administration approached ROSA Arba Minch for a solution. Initially, the UDD toilets were constructed for girls, later on boys were also given three of the cubicles.

4 Project history

The project came into existence since Arba Minch is one pilot city of the EU funded project "Resource-Oriented Sanitation concepts for peri-urban areas in Africa (ROSA)", which took place in four countries in East Africa. ROSA provided options and advice so the school administration decided to construct a UDD toilet block. The students are very happy and created a theater play about the toilets' proper use. Recently, the school in cooperation with ROSA has established an environmental club to promote reuse of excreta and proper toilet use besides other environmental issues. ROSA still monitors the use of the toilet and the students are coming to the ROSA crop trial site to see urine fertilised crops which is located about 2 km from the school. The trial site was used as

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demonstration site for those people who have negative feeling against urine as fertilizer. They are now applying urine to their seedlings.

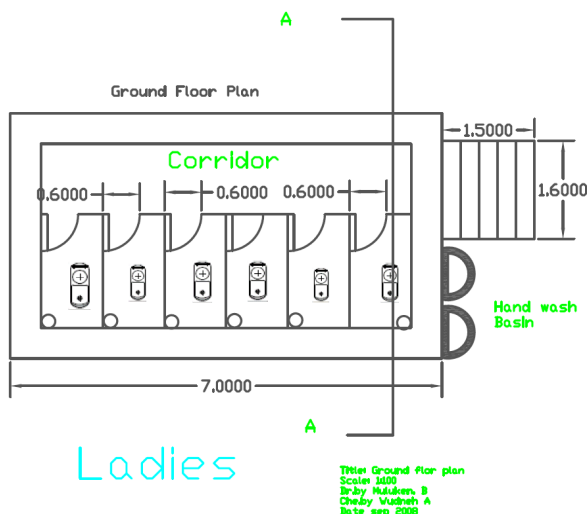
### 5 Technologies applied

The urine diversion dehydration toilet has six vaults and six toilet cubicles which were planned for girls first. Later on 3 of them were used for boys. The toilet type was chosen because they do not collapse and the school has enough space to take care of their toilet products.

### 6 Design information

The floor was made by masonry and the superstructure was made of corrugated iron as a hollow block wall which was very expensive. PVC pipes were used for urine collection and as vent pipes while a 250 litre storage tank is used for storage of urine.

The UDD toilets are built in such a way that the operator can empty them from the back side of the toilet. Each toilet has an elevated concrete floor with plastic squatting pan produced in Addis Ababa by AQUASAN. The squatting pan leads to a vault for dehydration along with the anal cleansing material except water. Every user will apply ash on the faeces after use. Urine is led to a tank which is situated behind the toilets in the vaults.



**Fig. 3:** Floor Plan of the UDDT (source: ROSA Arba Minch; 2009)

### 7 Type and level of reuse

The possibility of reuse was one of the main motivations of the ROSA project. The team supports the school administration in reusing the toilet products. One of the possibilities was to use the urine directly for the plants in the school compound. They have applied doses of urine for the seedlings. The dried excreta were co-composted along with organic solid waste material.

### 8 Further project components

The construction of this UDDT is only one part of several interventions towards improvement of sanitation in Arba Minch. Solid waste like green plants is also used by the school for co-composting. Research on operation and maintenance of the toilets, handling, reuse of the toilet products for crop trial and transporting is ongoing on 15 UDD toilets in the town. Women groups organized to collect town solid waste are also involved in collecting and transporting the excess urine from the school to the co-compost producing youth group which is located in a distance of about 5 km.

### 9 Costs and economics

ROSA paid labour cost and advice while the school administration purchased all the construction materials. Local masons constructed the toilet.

**Table 1:** Material costs for six UDDT cubicles at Nelson Mandela School

Description	Price in Euro
1. Excavation and Earth work	56
2. Concrete work	652
3. Walling	1083
4. Carpentry and Joinery	182
5. Finishing	8
6. Roofing	212
7. Sanitary Installation	172
<b>Total</b>	<b>2365</b>

### 10 Operation and maintenance

ROSA is assisting the school staff in maintenance of all the components of the toilets. The operation of the toilets are done by the staff of the school (storage conditions of excreta, urine, hand washing facilities, cleaning of toilets, provision of drying agent like ash). Responsibility of providing drying agent has the school janitor who is cleaning class rooms.

### 11 Practical experience and lessons learnt

All the students like the toilet type and the concept of reusing which is seen by their positive response. Such new concepts like UDDT may be successful if started with students for attitude change compared to grown-ups who are full of conventional ideas. Students have complained that hand washing water is not regularly kept nearby. Some of the students are complaining of ash blowing on their clothes while applying on faeces hole after defecation. Thus, orientation of

the vault and wind blowing direction should not be in the same way while constructing UDD toilets.

## 12 Sustainability assessment and long-term impacts

A basic assessment (Table 2) 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 emphasised (weaknesses).

**Table 2:** 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 reduces odour and flies when properly handled.

**Environment and natural resources:** The excreta is collected and urine shall be reused for fertilising the seedlings which improves the natural resources yield.

**Technology and operation:** The technology is accepted even by 8 year old kids who can use the toilet. Construction of a whole structure needs trained local masons. It is being copied by the local masons.

**Financial and economic issues:** The school do not have farmland now but the ornamental seedling trees might pay back the school by beautifying the compound and attracting more students (increase income).

**Socio-cultural and institutional aspects:** The toilets are accepted by male female students from age 7 to 16. There are no complaints and it is expected that students will inform their family about this sanitation technology. 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. It is also possible to say that students disseminate the knowledge about the technology and concept to the society in the 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>

## 14 Institutions, organisations and contact persons

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### Squatting UDD toilet pans producing companies in Ethiopia

- AquaSan Manufacturing Ethiopia PLC. for UDDT pan made of plastic
- Ethio Fiber Glass Factory- Ethiopia for UDDT pan made of fiberglass
- Hawassa Tabor ceramic Factory Ethiopia- UDDT pan made of ceramic
- Locally produced by Masons from cement.

Case study of SuSanA projects

*UDDT for Nelson Mandela School*

SuSanA 2010

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