



Fig. 1: Project location

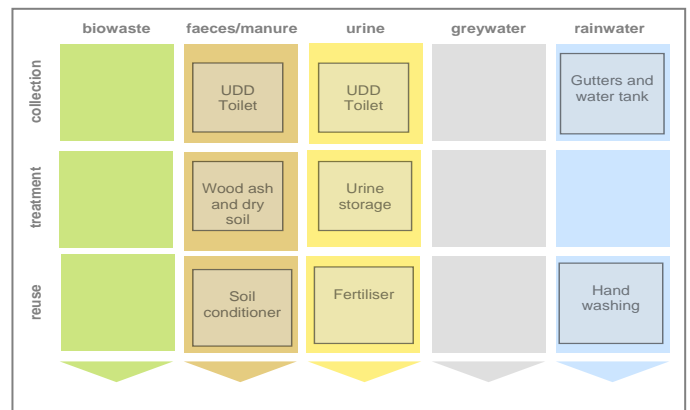


Fig. 2: Applied sanitation components in this project

1 General data

Type of project:

Rural household and school based sanitation

Project period:

Start of construction: October/2008

End of construction: February/2009

Start of operation: March/2009

Ongoing monitoring period planned for: 8 months

Project end: October 2009

Project scale:

Number of inhabitants covered: 3,040

Total investment: EUR 58,183

Address of project location:

Ugunja Town, Rambula Magoya

Planning & supporting institution:

GTZ EcoSan Promotion Project Kenya

Executing institution:

Community Based Organisations

Financing agencies:

European Union

Swedish International Development Agency (SIDA)

German Technical Corporation (GTZ)

2 Objective and motivation of the project

The overall objective is to increase access to sustainable sanitation in rural households and therefore improve public health and generate income for farmers.

The project is being implemented by the Community Based Organisation (CBO) Rambula Magoya Development Network. The CBO is supported by the EcoSan Promotion Project (EPP), which is an EU-SIDA-GTZ financed component of the GTZ Water Sector Reform Programme in Kenya. The EPP aims to reach 50,000 beneficiaries with reuse oriented sanitation systems until 2010. One focal area of the EPP is provision of safe dry sanitation systems which generate fertiliser- so called Urine Diverting Dehydrating Toilets (UDDTs) - to people living in rural and peri-urban areas.

3 Location and conditions

Rambula Magoya is located in a cholera hotspot where access to safe sanitation has been a challenge. During the rainy season, flooding occurs often and as a result the content of pit latrines mixes with and pollutes surface and ground water. The people in Rambula Magoya are generally peasant farmers with an average income of Kenyan Shilling (KSH) 3,000 per month.



Fig. 3: Completed UDD toilet in Ugunja (source: GTZ EcoSan Kenya; photo taken in March 2009)

4 Project history

The community was invited to a meeting at the Rambula Chief's camp where they were taken through a problem identification process by the GTZ staff, following which needs assessment exercise was done. The EcoSan team promoted the EcoSan philosophy and tied it to poverty reduction by providing sanitation that reuses the human waste to improve soil fertility and thus increase agricultural production. The community was also advised to save the extra income from agriculture and use it to create wealth. The sanitation principle of washing hands after using the toilet was also promoted. Trainings on building the EcoSan facility were given by the site manager.

The EPP implements rural household sanitation projects through Community Based Organisations and regional clusters using the following general procedure:

In the beginning of the project cycle the CBOs may decide to sign a Memorandum of Agreement (MoA) stating the beneficiaries, their contributions, and resulting amount of subsidies per toilet. The preparation of the MoA requires the CBO to identify community members and plots where the subsidized UDDTs are to be constructed.

After signing of the MoA, the EcoSan Promotion Project organises a training for local artisans selected by the CBO. It also provides the technical drawings and the Bills of Quantities (BoQs) and supervises the construction; these procedures are jointly executed with the CBO. After completion of construction, the EPP trains the beneficiaries, users, and other important stakeholders such as local health officers, on the use and maintenance of the facility. A follow-up training is undertaken after the first months of operation in order to ensure proper use of the facility and re-use of the human waste.

During the construction period, materials that cannot be provided by the beneficiary are sourced by the CBO from three different local hardware suppliers who hand in quotations. Then the CBO recommends one hardware supplier and sends all the quotations and the rationale for the one suggested hardware supplier to the EPP. Thereupon the EPP checks the hardware supplier for reliability and professionalism. After approval, the hardware supplier is assigned to deliver materials to the construction site through a local purchase order. Complete delivery is verified by a signature from the respective EPP regional site manager on a delivery note. Then the supplier issues an invoice for each toilet, which is sent together with the delivery note to the EPP office for payment. The invoices are verified with the agreed Bills of Quantities as per the MoA and a cheque is issued accordingly.

5 Technologies applied

The technology being used is the double vault urine diverting dehydration toilet. Faeces are collected in two vaults underneath a plastic, urine separating squatting pan, where they are dried. There are two chambers, which are used alternatively and help in avoiding handling of unsanitised human excreta. When the first vault is full, the defecation hole is closed, and the squatting pan is transferred to the second vault. The urine is diverted by a funnel or specially designed toilet into a urine container underneath the toilet. A rain water harvesting system is also incorporated to provide water for hand washing.



Fig. 4: Urine separating squatting pan and bucket with ash

6 Design information

The basic design parameters include waste production for sizing of the chambers. Faeces chambers have a volume of approx. 560 liters (length, width and height: 750 x 1,100 x 750 mm). Construction materials include burned bricks for the superstructure and iron sheets for roofing. The design drawings are available at the project offices in Nairobi.



Fig. 5: Toilet chambers almost full **Fig. 6:** Urine canister

7 Type and level of reuse

The beneficiaries have been trained on reuse of urine as fertiliser and sanitised faeces as soil conditioner in agriculture. The crops which have been fertilised using the urine include kales and bananas. The positive effect of EcoSan fertiliser on production can be seen in the fields.



Fig. 7: Urine fertilised banana trees in Ugunja District

8 Further project components

During implementation, the EPP team trained local artisans in the construction of the sanitation systems. This qualification might create the possibility of income generation for local artisans in a growing sanitation market.

Furthermore, the project promoted the training of an innovative technology - hydraform block production - which can be a source of income for youths and also help in making affordable construction of decent housing.



Fig. 8: Production of hydraform blocks



Fig. 9: Ready-made hydraform blocks

9 Costs and economics

The investment in one toilet is KSH 50,000 (approx. EUR 500) with minimal operation costs since it is the owner who collects the products from the toilet. The project is linked with banana production, which after two years would start returning about KSH 5,000 (EUR 50) net per year. Using a basic calculation, this would require about 12 years to generate “profit” from the toilet. The toilet design life is 20 years and so the profit would continue for another eight years.

A total subsidy of EUR 5,000 per implementation cluster is provided by EPP. Generally, a subsidy of approx. EUR 400 is allocated per UDDT (equals 80% of the total construction cost). However, depending on the amount of contribution by the beneficiaries, around 10 to 20 units can be constructed per cluster and CBO.

Each beneficiary is required to make a contribution in kind to the construction of the toilet such as locally available construction materials and unskilled labor. Ideally, the provided contribution has a value of approx. 20% or above of the total construction costs.

Table 1: Costs of a typical double vault UDDT

Component	Costs in KSH	Costs in EUR
Foundation	4,525	45
Chambers	6,350	63
Toilet slab	8,789	87
Water tank slab	1,750	17
Urine chamber	3,080	30
Steps	1,425	14
Walls	7,174	72
Roofing	3,868	39
Water harvesting	1,570	16
General fitting	2,505	25
Labour	10,000	100
Total grant	51,036	510

10 Operation and maintenance

The beneficiaries are responsible for the operation and maintenance of the toilets. Regular maintenance includes cleaning of the toilet and checking for urine pipe blockages.

11 Practical experience and lessons learnt

The project has already created more interest in agricultural production as most people were not aware of reuse of human excreta as fertiliser. As a result of the project, the community members have formed a revolving fund where the extra income from the use of the EcoSan facilities is used for construction of more toilets for the members of the community based organisation.

The experience has shown that contributions by the beneficiary are essential for ownership of the facility.

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).

The contribution of some materials and labour for construction by the beneficiaries has created a sense of ownership. This, together with the involvement of the CBO in the planning and execution of the project, is expected to lead to sustained use and maintenance of the toilets and its products.

The expected long term impacts of the project include reduced waterborne diseases and increased agricultural production.

Table 2: Qualitative indication of sustainability of the 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 include the risk of exposure to pathogens and hazardous substances and improvement of livelihood achieved by the application of a certain sanitation system.

Environment and natural resources involve the resources needed in the project as well as the degree of recycling and reuse practiced and the effects of these.

Technology and operation relate to the functionality and ease of constructing, operating and monitoring the entire system as well as its robustness and adaptability to existing systems.

Financial and economic issues include the capacity of households and communities to cover the costs for sanitation as well as the benefit, e.g. from fertilizer and the external impact on the economy.

Socio-cultural and institutional aspects refer to the socio-cultural acceptance and appropriateness of the system, perceptions, gender issues and compliance with legal and institutional frameworks.

For details on these criteria, please see the SuSanA Vision document "Towards more sustainable solutions" (www.susana.org).

13 Available documents and references

- Study on costs and economics of UDDTs
<http://www.susana.org/images/documents/07-cap-dev/a-material-topic-wg/wg02/blume-2009-cost-optimization-uddts-kenya-final-draft.pdf>
- Draft version of engineering drawings (from April 2009) is available here:
<http://www.susana.org/images/documents/07-cap-dev/e-visual-aids-drawing/technical-drawings/uddt-double-door-kenya.pdf>
- Bill of quantities for construction draft version is available here:
<http://www.susana.org/images/documents/07-cap-dev/a-material-topic-wg/wg02/blume-2009-boq-main-document-simple.xls>
- Photos on the photo share-platform www.flickr.com
<http://www.flickr.com/photos/gtzecosan/sets/72157616661477861>

Other relevant documents are available at the project implementation base in Nairobi, Kenya. Please note the material underlies a constant process of development and therefore it is recommended to ask for the latest version.

- Detailed construction drawings
- Construction manual
- Training manual
- Memorandum of agreement with the CBOs

14 Institutions, organisations and contact persons

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Case study of SuSanA projects

Implementation of UDDTs by Community Based Organisations, Ugunja District, Western Kenya

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