



Fig. 1: Project location

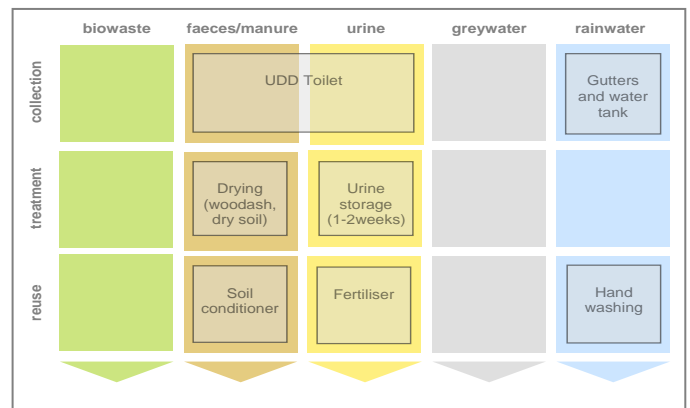


Fig. 2: Applied sanitation components in this project

1 General data

Type of project:

Rural household and school based sanitation

Project period:

Start of construction: October 2008

End of operation: May 2010

Ongoing monitoring period until Nov 2010

Project scale:

Number of installed double chamber UDDTs: 800 doors

Average number of users per door: 20 people

Address of project location:

Lake Victoria region with Nyanza, Western and Rift Valley province; Eastern, North-Eastern and Central Provinces in Kenya, East Africa

Planning organisation:

EU-SIDA-GTZ EcoSan Promotion Project, Kenya (supported by the EU, SIDA, GTZ and embedded in the GTZ Water Sector Reform Program)

Executing institution:

- Community based organisations (CBO)
- Water Services Board (WSB)
- Water Services Trust Fund (WSTF)

Supporting agency:

- European Union (EU) – ACP EU Water Facility
- Swedish International Development Agency (SIDA)
- German Technical Corporation (GTZ) on behalf of German Federal Ministry for Economic Cooperation and Development (BMZ)

2 Objective and motivation of the project

The objective of the EU-SIDA-GTZ EcoSan Promotion Project (EPP) was to reach a total of 50,000 beneficiaries with reuse oriented sanitation systems. It piloted sustainable sanitation projects through three intervention lines being (1) household sanitation in rural and peri-urban areas, (2) institutional toilets in schools and prisons and (3) public toilets in bus parks¹, markets and recreation areas. This case study reflects the activities from intervention line 1 and partly 2 with the following specific objectives:

- Introducing the idea of recycling human waste for fertilizer use to farmers as a pro-poor strategy to generate income (productive sanitation).
- Installation of UDDTs as an alternative sanitation technology in cholera prone areas of Kenya, typically with seasonal flooding in order to reduce the risk of water borne diseases, hence to improve public health.
- Targeting communities that experience challenges with the conventional pit-latrines due to high ground water table, collapsing soils, rocky underground and flooding.
- Improving hygiene and sanitation practices like hand washing and general cleanliness.



Fig. 3: Household UDDT in Bungoma (source: Moses Wakala, GTZ-Kenya, Jan. 2010)

¹ See also the case study for public toilet in Naivasha, Kenya <http://www.susana.org/lang-en/case-studies/region/ssa>

- Empower and capacity build the local communities and artisans to replicated UDDTs on their own and with institutional support of the Kenyan water sector.

With regard to the promotion of UDDT technology the rural and peri-urban areas were selected in terms of the utilization of human waste as fertilizer for farming activities without transport logistics. It was aimed at providing an alternative sanitation technology in target areas with public health problems such as outbreaks of cholera and other water-borne diseases as a main indicator of need for improved sanitation.

3 Location and conditions

The main project target areas are located around Lake Victoria with symptomatic outbreaks of cholera and farming activities as the main source of income for the population. It comprises the provinces of Nyanza to the south and Western to the north. Other areas of UDDT implementation are also found in Rift Valley, Central provinces and semi-desert areas of Eastern and North-Eastern.



Fig. 4: Household UDDT in semi-desert area of Wajir (source: Patrick Onyango, GTZ-Kenya, June 2008)

Generally, the greater Lake Victoria area is characterized by sufficient rainfall for agricultural production. The rainfall pattern is unevenly distributed throughout the year where highland regions like Kisii and Bungoma receive heavy rainfall whereas the lowland areas around Lake Victoria receive less rainfall. The rainy period is April/May and October/November.

The people in the target areas mostly use pit latrines with concrete slab. Open defecation is less common. The majority of the people are peasant farmers with an estimated average income of 30 EUR (3,000 Kenyan Shilling) per month. Health statistics in the area show that cases of cholera and other water borne diseases occur especially during rainy season, when pit latrines get flooded and pollute the drinking water resources like wells and rivers.

In Kenya, the under-five child mortality rate is currently² **128 children per 1000**, and sadly there has been a slight but consistent upward trend towards more child deaths since about 1985 when the value was 98 child deaths per thousand.

² 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/>).

4 Project history

The Ministry of Water and Irrigation (MWI) has committed itself through the Water Sector Reform Program to facilitate the improvement of water supply, sewerage and sanitation service provision in Kenya. GTZ is supporting the Kenyan Water Sector Reform Program through its Water Program with several components. One component was the EU-SIDA/GTZ EcoSan Promotion Project (EPP) that ran from end of 2006 to mid 2010.

The EPP was a project financed by the ACP-EU Water Facility³ (EUR 1,734,137) and co-financed by SIDA (EUR 815,842), GTZ-Kenya Water Program (EUR 100,000) and GTZ-Kenya Agriculture Program (EUR 100,000). The project was executed by GTZ.

Ecological sanitation (ecosan) is not new in Kenya. It has been implemented selectively through some NGOs over approximately the last 10 years. There were positive as well as negative examples which were used to evaluate the right strategy and approach to promote ecosan in Kenya.

Process and partners

The EPP assigned 3 sanitation officers (also called regional site managers) that were coordinating the participatory work directly with the communities and community based organizations (CBOs). A project cycle was developed to provide guidance to essential social, cultural, institutional and economic aspects of sanitation projects (see Appendix 1).

The first UDDTs were directly implemented with the CBO's and partly with the support of the NGOs KWAHO and ALDEF. After installation of more than 600 UDDT doors the EPP started to work more closely with the water sector institutions that are responsible for water and sanitation infrastructure in Kenya. The Water Services Boards (WSB) are the responsible regional institutions for infrastructure development and the Water Services Trust Fund (WSTF) is a basket fund for financing investments in low-income areas of Kenya. Other stakeholders like the Ministry of Health, Ministry of Public Health and Sanitation, Ministry of Agriculture and others were contacted and partly involved. More than 1,000 UDDT doors were constructed.

Simultaneously the GTZ Water Program and EPP entrenched basic principles of Ecological Sanitation in the national sanitation concept paper of the Ministry of Water and Irrigation (see section 13 for available documents). This mainstreaming of ecosan and other sustainable sanitation systems into governmental structures was an important development to replicate the success of small-scale implementation into sustainable structures that can provide access to ecological sanitation services beyond the duration of the EPP project.

Sanitation approach

The EPP developed a strategy on how best to approach the communities for successful implementation of UDDTs. With regard to the available best practices in household sanitation

³ ACP-EU stands for Africa, the Caribbean, the Pacific and the European Union. This project was funded under the first call of the first water facility in the category of "improving water management and governance" and "Co-financing water and sanitation infrastructure" in September 2006. <http://ec.europa.eu/europeaid/where/acp/regional-cooperation/water/>

it was clear to use a demand-responsive approach with strong participatory elements that create ownership within the community and its beneficiaries. Therefore the project worked in collaboration with Community Based Organizations (CBO) as legitimate groups representing the communities at grass-route level. The EPP developed pre-selection criteria's for the areas in which the communities should be contacted. These criteria are basically related to ground conditions that cause challenges to the users of conventional pit latrines such as frequent flooding, rocky underground, collapsing soils and high groundwater table.

The particular success of implementing ecosan units depends on orientating people's perception to view treated human waste as a useful resource. This requires a clear understanding of the people's learning culture in order to line the ecosan principles to indigenous practices and knowledge. It represents a social marketing strategy to achieve behavioral changes in various aspects of health and sanitation.

Hence the Kenyan trainers developed a special language to get people's attention on ecological sanitation like saying we are "preaching" ecosan and that we talk about "factories" that produce fertilizer instead of a toilet (see short story in section 13).



Fig. 5: Back view of household UDDT in Bungoma with faeces chambers and ventilation design (source Moses Wakala, GTZ-Kenya, Jan. 2010)

To ensure ownership, interested communities are normally led through a visioning exercise to collectively and individually assess, identify and allocate resources required for the construction and management of the units. This would involve indication of the willingness of the intended beneficiaries to contribute all locally available materials, unskilled labour and depending on the capacity of the person, the direct hardware and construction costs.

The beneficiaries were asked to provide a contribution of at least 20% of the total costs per UDDT. More than one family or households may also share one toilet, depending on cultural preferences. A maximum of 20 users per UDDT door is proposed.

In many cases the sanitation officers organized exchange visits for members of the community to other ecosan projects to see firsthand how it works and how productive ecosan can be. This approach of "seeing is believing" has worked very well. After return of the visitors they were very convinced of

ecosan and acted as strong opinion leaders to change attitude amongst the whole community.

The community will also be tasked to source suppliers (artisans, hardware shops, brick merchants etc.) and take charge of inventory and quality control under the guidance of the sanitation officer. A Memorandum of Agreement specifying the roles and responsibilities of the different players is normally developed and signed by the parties as a commitment to the roll out process. A sample of an MOA is available in section 13.

Furthermore the toilets were always constructed in clusters of 10 to 20 toilets at households and one school within the community. In the past it was often observed that numbers matter in order to achieve behavior change and increase social acceptance of new development within a community. As it is with schools that are increasingly recognized as a multiplier and being fundamental for promoting good hygiene behavior of children and their families at home.

This approach was piloted in response to the acknowledgement that traditional top-down sanitation approaches, while essential, could not on their own lead to sufficient sanitation and hygiene service improvements at household level. This is partly because such approaches disproportionately rely on vigilant law enforcement to deliver service improvements, and over-emphasize the health aspects of improved sanitation, as opposed to its economic, social and cultural benefits.



Fig. 6: Hand wash facility with 100 liter tank secured in concrete (source: Moses Wakala, GTZ-Kenya, Jan. 2010)

Project cycle

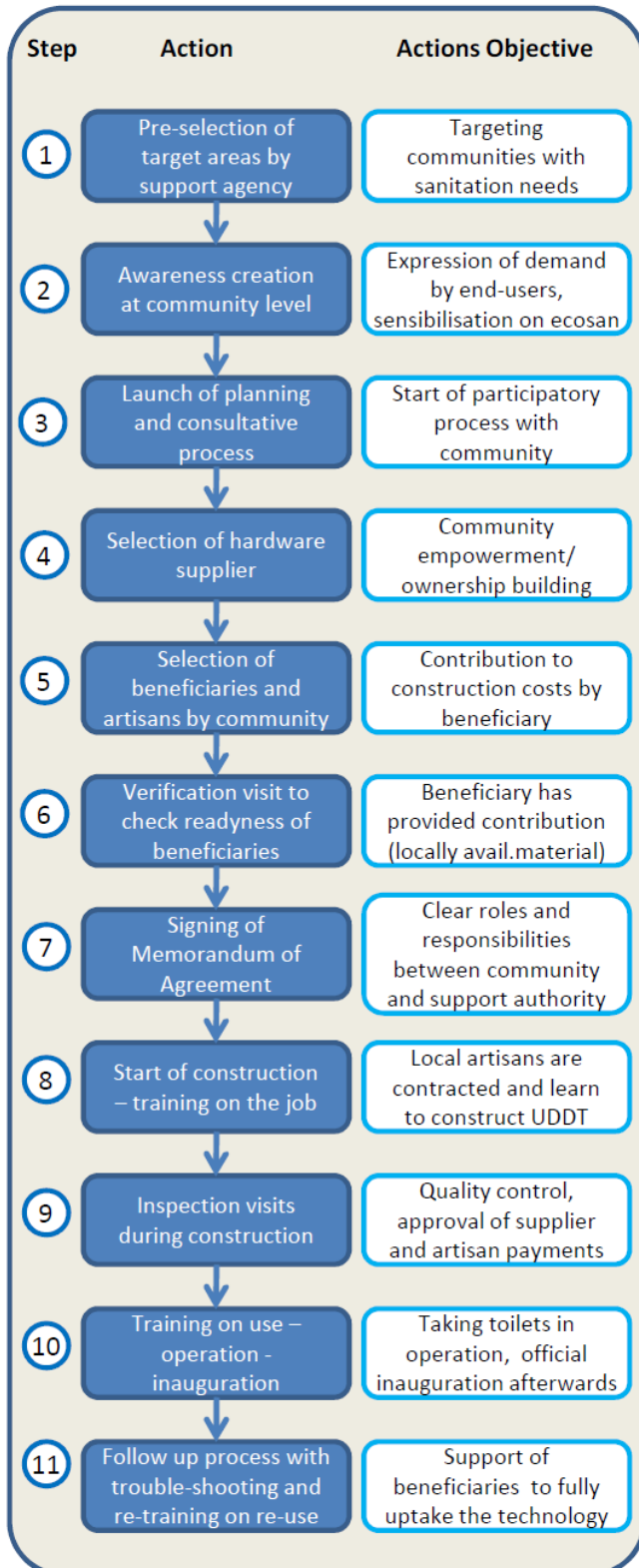
The project cycle aims to provide a structured procedure to beneficiaries, trainers and involved institutions that provides clear roles and responsibilities of partners as well as ensures participation and ownership. All financial issues are managed by the support agency or relevant executing institutions. The CBO acts as the grass-route implementing partner responsible to establish collective ownership of the process.

The detailed project cycle with all the main planning and implementation steps used in Kenya by EPP is illustrated in the figure 4 and explained in the Appendix 1.

The Water Services Trust Fund (WSTF) is one of the key institutions in the Kenyan water sector that finances water and sanitation infrastructure in poor rural and urban areas of

Kenya. It cooperates with the Water Services Boards, who are the regional authorities being responsible for implementation and asset management.

Tab. 1: Project cycle with basic steps to implement ecological sanitation projects with rural communities in Kenya



The EPP worked very close with these institutions, who incorporated the project cycle for the implementation of

UDDTs as well as other ecosan facilities like public toilets with decentralized waste water treatment. The funds were channeled through the WSTF and WSBs.

5 Technologies applied

The technology used is the double chamber urine diverting dehydration toilet. Faeces and urine are source-separated through a special plastic squatting pan. The faeces are collected in the chambers below the toilet, where they are dried. After each use the user pours ash for improved desiccation, fly prevention, ph-treatment and to cover the fresh faeces which looks more pleasant. Alternatively dry soil or dry leaves can be use, but they don't provide for pH-treatment.



Fig. 7: Faeces collection chamber half way full (source: David Watako, GTZ-Kenya, July 2009)

There are a total of two chambers per toilet, which are used alternatively and help in avoiding handling of raw or insufficiently treated human excreta. When the first chamber is full after approximately 3 to 6 months, the defecation hole is closed and switched to the other hole. By the time the second chamber has filled up, the first chamber's faeces have completed dried up.



Fig. 8: Urine collection chamber with a number of urine containers/jerry cans (source: Moses Wakala, GTZ-Kenya, Jan. 2010)

Most of the pathogens in the faeces die due to this desiccation process. Hence the handling is relatively safe.

The user and/or caretaker empties the chamber with a shovel or similar tool and transports the dried faeces to the farm for use.

The urine is diverted by an integrated funnel of the squatting pan which is connected to a flexible hose pipe leading into a urine container located in an attached urine-collection chamber. Furthermore the toilet has a hand washing facility containing a 100 liter plastic tank with tap. A rain water harvesting system is also connected to the hand washing facility to provide water and show case usefulness of rainwater.



Fig. 9: Inside of a Urine diversion dehydration toilet (UDDT) with ash container, scoop and instruction posters

6 Design information

The toilet building is made of masonry from locally available burnt bricks, concrete blocks or in some cases hydraform blocks (see point 8). A few examples are also known to have used sun-dried clay bricks. On the outside the masonry is keyed, on the inside plastered and painted in light colors.



Fig. 10: Inside of a Urine diversion dehydration toilet (UDDT) using 2 single hole squatting pans near Wajir done by ALDEF (source Paul Mboya, GTZ-Kenya, June 2008)

The plastic squatting pan is from the local manufacturer Kentainers (www.kentainers.com) and was designed in cooperation with GTZ. It is a double hole urine separation squatting pan made from plastic in various colors. Two lids are offered. One lid has a handle for the active chamber and can be operated either by foot or hand. The other lid without a handle is used to cover the inactive chamber. On the downside of this lid one can tie a heavy stone so nobody

removes the lid by accident. Alternatively a stone or heavy item can be placed on top. The urine pipe is a flexible hose pipe, size 1" (inch) that leads directly to a plastic container in an attached urine collection chamber.

The container, or so called jerry cans, is of standard size (20 liters) and is widely used in Kenya for water collection and other purposes. About two to three can fit in that chamber that has a lockable door. On top of the chamber sits the 100 liter plastic water tank with tap for hand washing purposes.

The faeces collection chambers have each a size of approx. 560 liters (length, width and height: 0.75 x 1.1 x 0.75 meter). They are plastered inside and have a concrete floor. The chamber doors were initially made of a wood frame and cover with a flat iron sheet, but termites quickly damaged the same. Later a metal frame and lid were commonly used due to better durability. They can be closed by locks, wire or other local methods. They are inclined and painted black to absorb heat from sunshine for desiccation enhancement.

Each toilet has an ash container with a scoop and a laminated instruction poster inside the toilet. The adoption of anal cleansing was not integrated in the design, since nobody practiced it in the target areas. The technical drawings and BOQ can be downloaded (see section 13).

7 Type and level of reuse

The beneficiaries were trained on reuse of urine as fertiliser and sanitized faeces as soil conditioner in agriculture. The urine is directly used in the farms once the jerry cans are full. This means that the user apply the urine approximately once in every week or longer periods depending on the number of storage containers.

A dilution of urine with water is widely practiced as shown during trainings at a rate of 1:1 to 1:10. The user is digging a small shallow depression next to the crop, pours the urine and covers the depression again with soil. Thereby the nitrogen is not lost due to evaporation and volatilisation. The crops which have been fertilised using the urine include kales, spinach, maize, mangos and bananas.



Fig. 11: Urine fertilised banana trees in Ugunja District (source: Paul Mboya, GTZ-Kenya, June 2009)

The EPP has distributed grafted mangos and tissue culture bananas to some beneficiaries to initiate the commercial production of agro products with urine. The positive effect of

ecosan fertiliser on production was easily seen by the users as compared to the plots that didn't use urine as a fertilizer.

The faeces are used directly in the farm after a drying period of 6 months. No further treatment is applied. It was advised to use the dried faeces for fruit trees like bananas and mangos. At this moment of the case study preparation the first households have started using faeces. There is no exact data available on increased yields.

Over a period of 3 months various samples of urine and dried faeces were collected and analysed at University of Egerton. The results show a sufficient rate of pathogen die off in faeces to the levels required by WHO if the toilets are used properly. However some households are not using the UDDTs the right way, resulting in insufficient treatment and cross-contamination of urine. Hence the users are advised to apply health-risk reducing measures like wearing gloves and rubber boots. See the download of the study under section 13.

8 Further project components

During implementation, the EPP team trained local artisans in the construction of the Urine diversion dehydration toilets. This qualification might create the possibility of income generation for local artisans in a growing sanitation market. The artisans were invited to a follow up workshop in Ugunja in March 2008 and each received a certificate from EPP about the successful attendance. This will help them in acquiring work in the sanitation business.



Fig. 12: Production of hydra -form blocks (left side), ready-made hydra-form blocks (right side)

There were also UDDTs being constructed in primary schools of each cluster to consolidate impact in the community and to reach families that were not benefiting from the construction of household UDDTs. This component is described in another case study (see section 13).

Furthermore, the project promoted the training of an innovative technology, called hydraform blocks, which can be a source of income for youths and also help in making affordable construction of decent housing and sanitation facilities. The machines are from the Ministry of Housing and were used to train youths and government officials.

The advantage of hydraform blocks as compared to burned bricks is that no firewood is needed. This way it can reduce pressure on the limited firewood resources that are widely used for cooking. The forest cover in Kenya which is crucial for local climate and water catchment has dramatically reduced from more than 10% to less than 2 % in the last 50 years.

9 Costs and economics

The investment in one toilet is about 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 and mango 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.

The costs for a conventional pit-latrine range from Ksh 5,000 to 25,000 (EUR 50-250) depending on soil condition, depth of pit, required lining and design. Hence the current costs per door of UDDT are considerably higher than the local standard. However the UDDT can be made cheaper by using different materials, avoiding painting and other simplifications. See the study on costs and economics of UDDTs under section 13.

Table 2: Costs of a typical double chamber UDDT in Kenya

Item category	Costs in Ksh	Costs in Euro
Concrete works		
- Sub-structure	19664	197
- Superstructure	10276	103
Sanitation ware	4580	46
Ventilation	600	6
Doors	7700	77
Roofing	3418	34
Painting	1025	10
Rainwater Harvesting	2420	24
General	570	6
Total	50.253 Ksh	EUR 503

Each cluster of about 10 to 20 UDDTs was provided with a total subsidy of EUR 5,000 by EPP. Generally, a subsidy of approx. EUR 400 is allocated per UDDT (equals 80% of the total construction cost). Ideally, the provided contribution by the beneficiary has a value of approx. 20% or above of the total construction costs.



Fig. 13: Mango and banana plants were distributed to the users of UDDTs to support economic gain from urine and faeces use (source: Johannes O. Odhiambo, GTZ-Kenya, 2010)

10 Operation and maintenance

The beneficiaries are responsible for the operation and maintenance of the toilets. Regular operation includes cleaning of the facility, provision of wood ash and toilet paper, checking for urine pipe blockages and removal of dried faeces. The maintenance is minimal with regard to minor repairs of the water tap (hand washing unit), chamber doors (due to rusting, termites), roofing, rainwater harvesting and repainting.

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 being a fertiliser. The beneficiaries have been very interested in the UDDTs especially because of the fertilizer production and the higher agricultural output. As a result some communities 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 organization (check with Paul Mboya). In other cases beneficiaries have joined hands by using urine from their toilets for commercial farming on hired plots.

The experience has shown that the contributions by the beneficiaries are essential for ownership of the facility. It could be further enhanced by requiring the beneficiary to plant a few bananas or fruit trees as part of his/her contribution before construction starts.

There are also ideas to further improve the procedures of the project cycle in terms of participation of the community. For example the community can help in drawing a sketch of the village showing houses, toilets, roads, wells, rivers, pipelines as a shared community activity. It can be put up as a poster in the village and generate pride and the sense good cooperation within the community.

In addition it is advisable to offer more technical options in terms of user preferences and costs. Apart from UDDTs there are also simple composting toilets like Arborloos and Fossa Alterna as well as UDDTs with various design options like cheaper superstructures (different materials, less plastering and painting, urinal). Moreover the beneficiaries might be also interested in the combination of sanitation facilities with showers, soak pits, grey water recycling for irrigation purposes or modification of existing toilets or showers. Thereby the people shall be enabled to innovate the structures as per their own context, ability, requirement, resources except for some non-negotiables (e.g. layout of substructure).

It has been observed that the beneficiaries require a continuous follow up after they have started using the toilets. The EPP did not always have the resources and time to deliver this service as laid out in step 11 of the project cycle. Hence a number of households experienced problems with urine pipe blockages, leakages of the faeces collection chamber, breakage of water taps from the hand wash facilities and uncertainties about appropriate treatment and reuse of urine and faeces. However the GTZ sustainable sanitation program plans to provide for further follow up after closure of the EPP at the end of May 2010.

Design lessons:

- The slanted doors of the faecal collection chamber, so called “solar panels”, have not showed the desired effect of absorbing heat. In most cases the toilet was located and orientated according the beneficiary’s demands and wishes. Hence the alignment to the sun is rarely achieved. It was also observed that the roof overhang has shaded the chamber doors considerably in this region close to the equator. There were also problems with leakages of rainwater into the chamber due to poor craftsmanship and insufficient material quality (e.g. untreated wood frame was eaten by termites). In order to address this problem it was decided to use a straight back side which will also be cheaper to construct.
- The UDDTs as they were built have no urinals for men. This is a disadvantage for men who don’t want to squat for peeing. Hence there is a risk of users misusing the toilet and urinating in the faeces hole. However this problem was not widely noticed, since men seem to use the urine funnel of the squatting pan to pee. But this causes unhygienic conditions and odour due to splashing. Therefore it is recommended to fit a urinal for men outside or inside the toilet.
- The flexible hose pipes of 1” for urine collection have blocked very often due to accidental use of ash in the urine section. Many times the flexible pipe develops sharp bends that can easily block as well. Therefore it is recommended to use standard straight PVC pipes with a diameter of 2” or 3”. These pipes are also commonly stocked in local hardware shop as compared to the flexible hose pipe which could only be found in bigger cities.
- The rainwater harvesting system with gutters and down pipe didn’t proof to have a great impact. First of all the roof area is too small to provide a sufficient amount of water and the 100 liter tank is too small to store enough rainwater. The beneficiaries have also shown the habit to wait for the rain to fill the tank instead of manually refilling it. To save investment costs and to accustom the users to the manual operation of the hand washing facility (refilling) it is recommended to avoid rainwater harvesting for the toilets.
- The plastic tank of the hand washing facility needs to be secured in a concrete ring to avoid theft and misuse by the beneficiary. It was often witnessed that the tanks were missing or used in the household for other purposes.

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 emphasized.

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		

The contribution of some materials and labour for construction by the beneficiaries 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, the main impacts are:

- reduced waterborne diseases through installation of UDDTs and improved awareness on proper hygiene practices like hand washing amongst beneficiaries
- increased agricultural production through use of fertilizer from UDDTs by beneficiaries on their plots
- enhanced ability of beneficiary communities to replicate the ecosan facilities on their own
- increased capacity at water sector institutions like WSTF and WSBs to implement ecological sanitation in rural and peri-urban areas

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

The following documents are available:

Photos from this project are available on flickr:

- <http://www.flickr.com/photos/gtzecosan/sets/72157616661477861>
- <http://www.flickr.com/photos/gtzecosan/sets/72157623181078999/>

Videos from this project are available on youtube:

- Project examples from EU-GTZ-SIDA EcoSan Promotion Project (part 1-3) (is uploaded soon) <http://www.youtube.com/user/susanavideos#p/a>
- Opap Group, Nyanza province, by Tembea Youth Center for sustainable development 2009 <http://www.youtube.com/watch?v=qeW9ZR97bIM>
- Johannes Orodhiambo explains the advantages of UDDTs at a new toilet in Ugunja http://www.youtube.com/watch?v=w_Msluz50eo

Drawings:

- Drawings of revised Urine diversion dehydration toilet incorporating lessons learnt (2010) <http://www.susana.org/images/documents/07-cap-dev/e-visual-aids-drawing/technical-drawings/uddt/UDDT-Schools-Feb-2010.dwg>
pdf files of this drawing .dwg file are also found in the same section <http://www.susana.org/lang-en/cap-dev/technical-drawings/uddts>
- Drawings of first design of Urine diversion dehydration toilet (2009) <http://www.susana.org/images/documents/07-cap-dev/e-visual-aids-drawing/technical-drawings/uddt-double-door-kenya.pdf>

Publications:

- Study on costs and economics of UDDTs including BOQ (S.Blume, GTZ, 2009) <http://www.susana.org/images/documents/07-cap-dev/a-material-topic-wg/wg02/blume-2009-cost-optimization-uddts-kenya-final-draft.pdf>
- Final sampling report for products from double-chamber UDDTs (Laura Kraft, GTZ, 2010) <http://www2.gtz.de/Dokumente/oe44/ecosan/en-eu-sida-gtz-ecosan-promotion-project-final-report-2010.pdf>
- Instruction poster (Jeff Miyoma, Kenya, 2008) <http://susana.org/images/documents/07-cap-dev/e-visual-aids-drawing/posters/en-using-ecosan-toilet.pdf>
- Sample of a Memorandum of Agreement (J.O.Odhiambo, GTZ-Kenya, 2009) <http://www2.gtz.de/Dokumente/oe44/ecosan/en-memorandum-of-agreement-2009.pdf>
- Map of all UDDT toilets and other ecosan projects executed under the EPP (P.Mboya, GTZ-Kenya, 2010) (being awaited from EPP)
- Technical Guide to EcoSan Promotion (P.Onyango, J.O.Odhiambo and A.Oduor, GTZ-Kenya, 2010) <http://susana.org/images/documents/07-cap-dev/e-visual-aids-drawing/technical-drawings/en-technical-guide-ecosan-promotion2.pdf>
- "Ecosan storying telling" -preaching ecosan of Johannes O.Odhiambo (being uploaded)
- Case study of UDDTs in schools, Kenya (in preparation)

- The Water Sector Sanitation Concept – WSSC (Ministry of Water and Irrigation/MWI, Kenya, August 2009) ([being uploaded](#))

14 Institutions, organisations and contact persons

Technical Planning and Implementing Support

EU-SIDA-GTZ EcoSan Promotion Project (EPP), Kenya
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Executing organisation:

Various Community Based Organisations (CBOs)

Executing institutions:

Lake Victoria South Water Services Board, Kisumu

E: <http://www.lvswaterboard.com/>

Lake Victoria North Water Services Board, Kagamega

E: <http://www.lvnwsb.go.ke/>

Athi Water Services Board

E: <http://www.awsboard.go.ke/>

Tanathi Water Services Board

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Case study of SuSanA projects

Urine Diversion Dehydration Toilets (UDDTs) implemented by CBOs and the water sector institutions, Kenya

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Appendix 1

Project cycle

The project cycle aims to provide a structured procedure to beneficiaries, trainers and involved institutions that provides clear roles and responsibilities of partners as well as ensures participation and ownership. All financial issues are managed by the support agency or relevant executing institutions. The CBO acts as the grass-route implementing partner responsible to establish collective ownership of the process. The detailed project cycle with all the main planning and implementation steps used in Kenya by EPP is illustrated in the figure 4 and explained in the Appendix 1.

Step 1

Pre-selection of target areas by support agency. In the first step the support agency(-ies) (SA), here EPP, WSBs and WSTF, who offer financial and/or implementation support have to pre-select target areas, where demand for improving sanitation is expected.

In case of ecological sanitation technology the selection criteria have to be more specific, since the social acceptance and necessary habit change for this new technology requires target communities in areas who are open-minded to alternative sanitation options. Generally communities are favorable that experience problems with the conventional pit latrines mainly due to seasonal flooding, rooky underground, collapsing soils and high groundwater tables. Another rational can be poor soils in agricultural areas, where peasant and subsistence farmers welcome cheap and cost-free sources of fertilizer to improve their income. Open defecation is less of a problem in Kenya but could also be a good reason for communities to change habits and directly adopt ecosan.

Step 2

Awareness creation at community level. Secondly the communities are contacted directly or through the relevant Water Service Boards and/or Provincial administration and invited to an awareness creation meeting on carried out by the sanitation officer(-s) of the support agencies. A convenient location within the community (e.g. schools, church) is used for the half day meeting. The community is taken through a problem identification process, followed by a needs assessment exercise and general awareness creation on hygiene and sanitation education. The EcoSan philosophy is tied to poverty reduction by providing productive sanitation that reuses the human waste to provide fertilizer and improve soil fertility thus increase agricultural production. This process is described as wealth creation. Then the communities may send a letter of interest to the support agency. In order for the communities to be supported, they need to be registered as a CBO.

Step 3

Launch of planning and consultative process. Once the community expresses their interest for ecological sanitation, the sanitation officer returns for a workshop on how the planning, design and implementation stages of sanitation projects works. It is important to provide the community with all the necessary information on the process and the options so that they can make informed decisions. The community analyses their situation through discussions and walks through the village, so called transect walks. Furthermore the sanitation officer emphasizes on the necessary ownership of

the future toilets, which is the very basis for the success of a sanitation project. It is built through active participation of the community during the whole project process and the contribution of each beneficiary to the construction costs. The community is informed about the next important steps in the project cycle like the signing of a Memorandum of Agreement (MOA) which is the basis of cooperation.

It is also recommended to organize an exchange visit for members of the community to other ecosan projects to see firsthand how it works and how productive ecosan can be. This approach of "seeing is believing" has worked very well so far. When they return from the exchange visit they can pass on the message much better to the community and act as opinion leaders.

Step 4

Selection of hardware supplier. The materials for toilet construction that are not locally available from the beneficiaries are provided as a subsidy by the SA and have to be sourced from local hardware suppliers. The CBO is tasked to get quotations from three different local hardware suppliers. Then the CBO recommends one hardware supplier and sends all the quotations and the rationale for the one suggested hardware supplier to the support agency. This is part of the participatory and ownership building process and it also meant to support the local economy. Thereupon the SA checks the hardware supplier for reliability, professionalism, costs and capacity to deliver in bulk.

It is important to know if the hardware supplier has sufficient financial capacities to deliver in advance because the materials should be delivered for one toilet at once or in two charges. This makes the accounting and payment process easier as well as construction faster. After approval of hardware supplier by SA and signing of MOA (step 7), the hardware supplier is assigned to deliver materials to the construction site by issuing of a local purchase order.

Step 5

Selection of beneficiaries and artisans by community. The preparation of the MOA requires the CBO to identify community members and plots where the subsidized UDDTs are to be constructed. The selection of beneficiaries is done independently by the community with the aim of selecting needy families and local champions as well as opinion leaders. More than one family or households may also share one toilet, depending on cultural preferences. A maximum of 20 users per UDDT door is proposed. The beneficiaries is asked to provide a contribution of at least 20% of the total costs per UDDT. The contribution of the beneficiaries can be either done through their allocation of locally available materials like stones, sand, wood, and/or in-kind support of unskilled labor and/or cash. The contribution is indicated in a Bill of Quantity, which shows all the necessary materials and labor costs for UDDT construction, and is signed by the beneficiary and CBO.

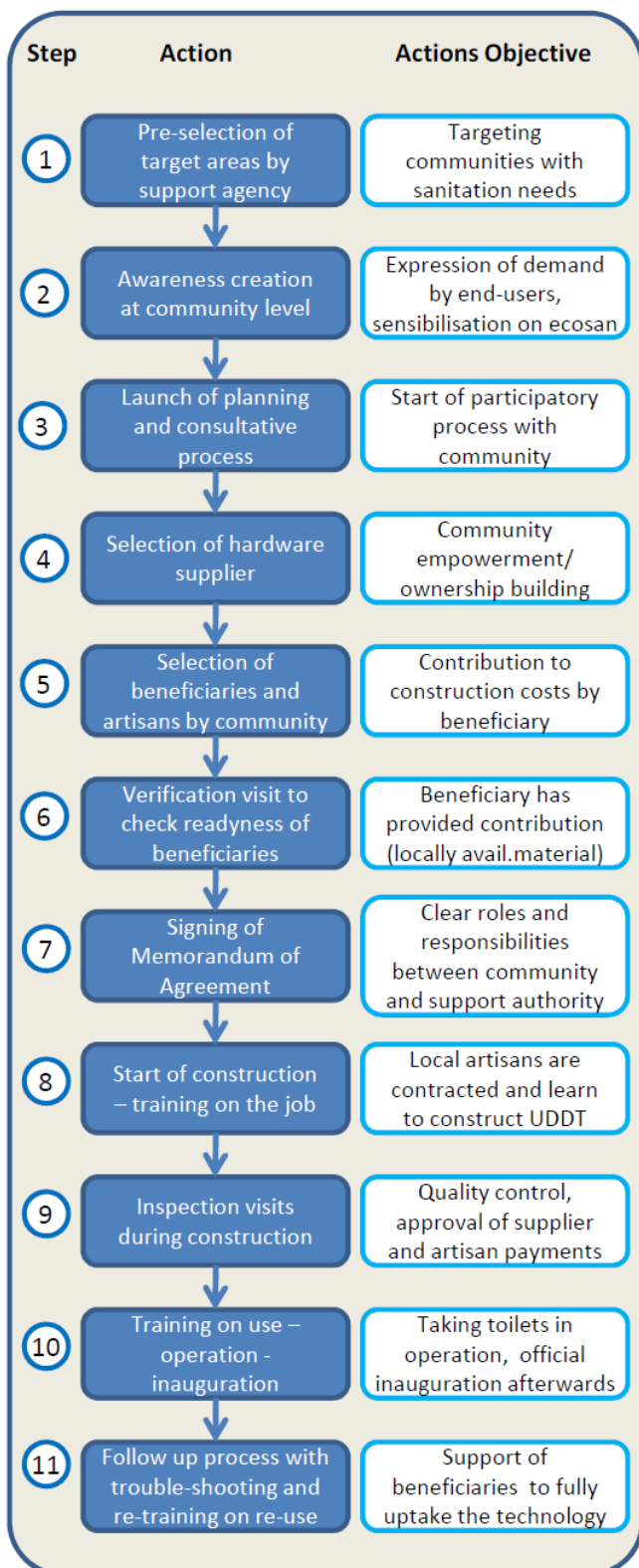
Moreover the community is required to select a number of local artisans, who will be trained on the construction of UDDTs. The reason is to build capacity on the technology within the community and the artisans that will foster ownership and future replication of the technology.

Step 6

Verification visit to check readiness of beneficiaries. After the community has selected beneficiaries, artisans and hardware suppliers the sanitation officer comes to check if the beneficiaries have provided their contribution of locally

available construction materials. In this stage the sanitation concept is further developed jointly with the CBO according to the feedback from the beneficiaries and community. This leads to the preparation of the MOA.

Tab. 1: Project cycle with basic steps to implement ecological sanitation projects with rural communities in Kenya



Step7

Signing of Memorandum of Agreement (MOA). This document clearly indicates all the rules and responsibilities between the CBO, as a representative of the community, and the support agency. It lists all the beneficiaries, their contribution, the resulting amount of subsidies per toilet, the names of the selected artisans and the costs for the hardware supply for each toilet (from selected hardware supplier). In order for the entire process to be transparent and effective enough checks and balances need to be included in the MOA. The payment process of the artisans and hardware suppliers need to be very clear and transparent for everybody. At last the MOA is jointly signed during a formal meeting. (see the sample of MOA in section 13).

Step8

Start of construction – training on-the-job. Before construction starts, the hardware supplier must deliver the materials for each toilet, either all at once or in two charges. This is verified by a signature from the sanitation officer and beneficiary on a delivery note. The beneficiary is responsible for the security of the materials. The supplier issues an invoice for each toilet, which is sent together with the delivery note to the SA office for payment. The invoices are verified with the agreed Bills of Quantities as per the MOA and a cheque is issued accordingly.

In preparation for the construction the selected artisans are first jointly trained on the construction of one toilet. Technical drawings, the Bills of Quantities (BoQs) and manuals are distributed. They learn the skills of construction and also the background of the technologies. Later each artisan will construct a certain number of toilets on his/her own as agreed in the MOA. Ideally the artisan shall have the ability to build UDDTs on his own as a business venture. The construction is closely supervised by the beneficiary who usually helps with the construction being the contribution of unskilled labor.

Step 9

Inspection visits during construction. The supervision of the construction is jointly executed by the CBO, sanitation officer (support agency) and beneficiary. There are two stages of construction. First the artisan constructs up to the floor slab level which takes approximately 7 days. He then receives the first down payment in cash after the sanitation officer, CBO and beneficiary have confirmed quality on a half-completion certificate by signature. After approximately another 7 days the toilets should be finished and ready for use. Now a completion certificate is signed and the remaining payment handed over to artisan by sanitation officer. It often happens that the construction delayed due to delayed delivery of materials. That is why it is very important that the hardware supplier is providing the materials on time and also that the beneficiary has all his materials (contribution) ready prior to start of construction. All payments to the artisan are done directly through the support agency to ensure transparency and avoid money dispute at community level.

Step10

Training on use – operation – inauguration. After completion of construction, the sanitation officer should immediately provide an individual training for the beneficiaries and users of each toilet. This takes approximately 1 hour and includes all main issues on use, operation, maintenance and reuse. It is not recommended to wait for an official inauguration or a joint community training since this can delay the process starting the use of toilets. It needs to be clear from the start that the toilets are directly used after completion

and individual training. The official inauguration with CBO, local administration like public health officers, politicians and other stakeholders only comes once all toilets are in use (should be stated in MOA). This procedure is necessary to build the confidence and ownership among the beneficiaries who must understand that they fully own their toilets. A lot of disturbing influence can come from certain stakeholders at the inauguration meetings who may use the publicity for their benefit and thereby unintentionally risk the long-term success of the sanitation project. However the support of these stakeholders is very crucial to gain support, instill pride and promote the ecosan approach in the region.

Step11

Follow up process with trouble shooting and re-training on reuse. After approximately 1-2 weeks of operation the sanitation officer shall re-visit each beneficiary to ensure proper use of the facility and safe re-use practice of the urine as well as provide confidence and pride of ownership.

This entails individual re-training on certain issues and assistance in trouble shooting. It is crucial to provide such a timely follow up support since during the first days and weeks of operation when the beneficiaries might experience problems and adjustment difficulties. The re-use of urine and proper use of are the most crucial issues. A documentation of the follow up should be done for future reference. In general the follow up process should be carried out for about 1.5 to 2 years in order to complete the full re-use cycle. The use of the dried faeces as soil conditioner begins after approx. one year (6 months filling chamber, 6 months drying) when a follow up visit is commonly necessary. A few months afterwards the beneficiaries can witness the positive effects on crop production. Once the beneficiaries understand the benefits of the fertilizer and a clean, odorless toilet they will fully appreciate UDDTs as a source of income, good health and comfort. Therefore the sanitation officer shall initially agree on a follow up schedule with the CBO with regular visits and community meetings every half a year or so. In the end the beneficiaries will become UDDT experts and strong opinion leaders for this alternative sanitation technology and approach.