Case Study of Sustainable Sanitation Projects

Urine diversion dehydration toilets in rural schools
Huye and Ngororero Districts, Rwanda

Fig. 1: Project location (country shown in circle)

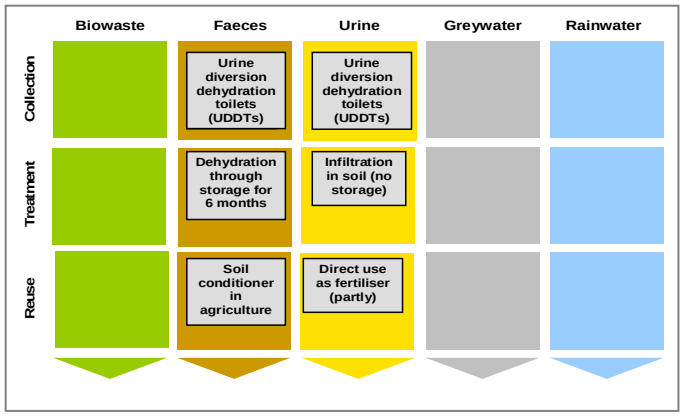

Fig. 2: Applied sanitation components in this project

1 General data

Type of project:
Demonstration project at rural schools

Project period:
Start of Planning: Nov. 2006
Start of construction: Jan. 2007
End of construction: March 2007
Start of operation: July 2007
Project end: April 2007 (end of GTZ-Rwanda project, but toilets are still in use)

Project scale:
- Target group: 2800 Pupils in 2 rural districts of Rwanda (Huye and Ngororero)
- 24 UDDTs built in two primary schools: in Kiruhura (Huye District) and Kiziguroro (Ngororero District)
- Total investment: EUR 19,200

Address of project location:
- Kiruhura Primary School Huye District, Western Province, Rwanda
- Kiziguro Primary School, Ngororero District, Southern Province, Rwanda

Planning Institution:
- German Technical Cooperation (GTZ), Programme on Health Cooperation, Rwanda
- School of Public Health (ESP), part of the National University of Rwanda, Kigali, Rwanda

Executing Institutions:
GTZ-Rwanda (Program "Health Cooperation") and DED (German Development Services)

Supporting Agency:
GTZ-Rwanda and GTZ program "Disease Control and Health Promotion" on behalf of German Federal Ministry for Economic Cooperation and Development (BMZ)

Further supporting partners: Christoffel Blindenmission (CBM, Germany), Population Services International (PSI), Foundation for Water and Sanitation (FEA, Rwanda)

2 Objective and motivation of the project

The overall objective of this demonstration project (which was a component of a much larger project led by GTZ-Rwanda called Health Cooperation) was to:
- Build urine diversion dehydration toilets (UDDTs) as a pilot and demonstration project to test the new concept of ecosan (ecological sanitation) with UDDTs in rural primary schools and provide a healthy school environment.
- Assess the scope and reduce the burden of disease for rural primary school children in a resource-poor environment through cost-effective and sustainable school health interventions.
- Sensitise and train pupils and teachers by using skill based behaviour change towards good practice of hygiene at school.

3 Location and conditions

The school health intervention project was undertaken in four rural schools located in the districts of Huye of Southern Province and Ngororero of Western Province (see map in Fig. 4). Whilst four schools were covered in the project, only two of them received UDDTs and these two schools are the focus of this document.

Fig. 3: The photo shows Kiruhura primary school classrooms. It was the holiday period, so only the headmaster was there. All photos in this document taken by: E. Dusingizumuremyi, Nov. 2009.

Urine diversion dehydration toilets in rural schools Huye and Ngororero Districts, Rwanda

Rwanda is a small landlocked country situated in the Great Lakes Region, covering an area of 26,338 km^2. Based on the administrative reforms in 2005, the country is now divided into five regions/provinces with 33 administrative districts.

The population of Rwanda was 9.31 million in 2008. The under five mortality rate caused by diarrhoea is 11.3% which makes this sanitation-related disease the 3rd biggest killer of children under five after malaria and pulmonary infections[1]. In Rwanda, the under-five child mortality rate is currently **112 children per 1000**, which is very high but at least there is currently a downward trend towards fewer child deaths[2].

The annual rainfall varies from 700 mm in the eastern plateau, to between 1200 mm and 1400 mm in the central plateau. This good rainfall is a sign that rainwater harvesting has potential in the country as a water resource including for schools. Rwanda has a moderate climate with an average temperature of 18°C.

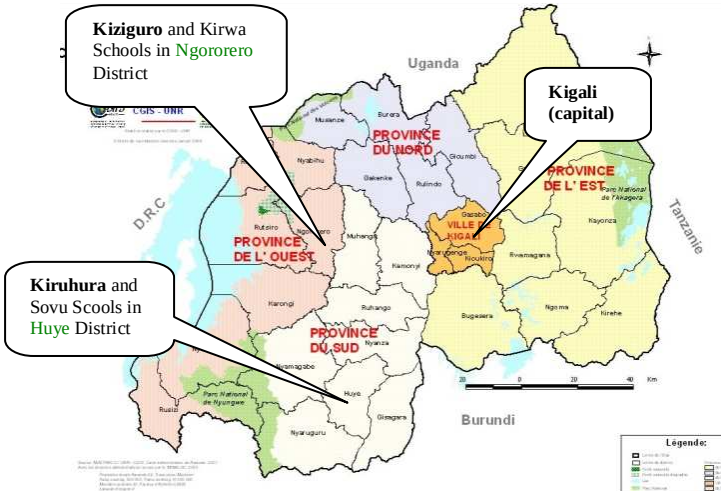

Fig. 4: Map of Rwanda, showing the location of the four schools covered by the project; in bold the two schools with UDDTs. Distance from East to West of the country: approx. 150 km (source: http://cgisnur.org/maps_admin.php3).

Generally, the sanitation infrastructure in rural districts, including school sanitation, is under the supervision of the districts due to Rwanda's decentralisation policy. The district has personnel in charge of health, education and social affairs. This unit is coordinated by the social development coordinator. At the national level, there are three ministries which are concerned with public health, child-friendly school environment and adequate sanitation infrastructure. Those ministries are the ministry of health, ministry of education and the ministry of infrastructure, respectively.

With a population density of 329 people/km^2, Rwanda is one of the most densely populated countries in the world (similar value to the Netherlands and India). The fertility rate of women is 5.8, and a very high percentage of 49% is under 15 years of age.

Rwandan education policy is emphasising primary school education for all, where all Rwandans will have free access to 9 years universal primary education starting from February 2010. But inadequate sanitation and poor hygienic conditions at schools result in high drop-out rates due to illness.

4 Project history

The work of the German-Rwandan Health Program[3] under the title "Intersectoral cooperation for school health" consisted of two phases: (i) situation analysis and (ii) implementation of action plan. The situation analysis consisted of definition of target groups and responsibilities as well as conducting school surveys.

There were five partners in this project which was called "School health initiative":

1. GTZ-Rwanda (under the program called "Health Cooperation") in collaboration with DED provided technical support and funding.
2. The School of Public Health (ESP), part of the National University of Rwanda, was the implementing partner of the baseline assessment including a knowledge, attitude and practice survey, medical check-ups and deworming campaigns.
3. Christoffel Blindenmission[4] financed and executed the eye treatment as well as the eye survey.
4. The leading global health organisation "Population Services International" (PSI) was in charge of sensitisation[5] of teachers, pupils and parents as well as the distribution of Sur Eau for clean drinking water.
5. The organisation "Fond de l'Eau et Assainissement" (FEA, Foundation for Water and Sanitation)[6] was in charge of construction of water and sanitation facilities and the sensitisation of pupils and teachers.

The four rural primary schools to be included in the project were selected from two rural districts (Ngororero and Huye District):

- **Kiziguro** obtained a rain water harvesting tank of 10 m^3, 12 UDDTs and 10 handwashing facilities.
- **Kiruhura** (assisted by Rheinland Pfalz Partnership in terms of classroom construction) received 12 UDDTs and 10 handwashing facilities.
- **Kirwa** (assisted by UNICEF) obtained only 10 hand washing facilities.
- **Sovu** (assisted by Concern International in terms of classroom construction) received a water tank (5 m^3) and 10 handwashing facilities.

[1] Ministry of Health (2008 and 2009), see Section 13 for details

[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/).

[3] The activities of GTZ in Rwanda are described here: http://www.gtz.de/en/weltweit/afrika/595.htm. Partners are Ministry of Health and Ministry of Education for the school health initiative.

[4] A German NGO which supports in particular projects for handicapped people in developing countries (http://www.christoffel-blindenmission.de/index.html)

[5] http://www.psi.org/where-we-work/countries/rwanda

[6] **FEA** started in Rwanda in 1983 as an NGO funded by the Austrian Government. It is now a joint project funded by the European Union, Austrian and Rwandan governments. FEA's objective is to reinforce the existing local technical capacities in the planning, implementation, maintenance and management of water and sanitation facilities. FEA has vast experience in building sanitation and water facilities in schools, hospitals and other environments in Rwanda, Uganda and Kenya.

Urine diversion dehydration toilets in rural schools Huye and Ngororero Districts, Rwanda

During the baseline study[7] conducted by GTZ-Rwanda from November 2006 to February 2007, almost 2,000 students in these four primary schools were examined, including rapid anamnesis and clinical check up, eye and stool examinations as well as a number of knowledge, attitude and practice questions. The study aimed at supporting existing school health programs and initiatives at the national level.

Normally, the age range in primary schools in Rwanda is 6 to 12 years because primary school starts at the age of 6 after 3 years of nursery school. But due to the Rwandan policy of education for all, older pupils are also allowed to attend primary schools in Rwanda.

The baseline study found that frequent diseases of the pupils were: fever/malaria, stomach problems like abdominal pain or diarrhoea, flu/cold and respiratory diseases. All the diseases mentioned above can be prevented or reduced through the provision of adequate sanitation and hygienic conditions at the school (and at home, although this was not part of this project).

The baseline study also revealed that about 7% of girls have their menstruation periods and 17% of them miss school sometimes during their menstruation days due to lack of separate and adequate sanitary infrastructure.

About 85% of children use the school toilets on a daily basis while others do not use them because of long queues or filthy toilets (students prefer to urinate and defecate in the surrounding bushes). The pit latrines at all schools were unhygienic and their maintenance was a problem. About 97% of children's families have pit latrines at home and 3% have no latrines at all.

The construction of UDDTs, provision of handwashing facilities and installation of water tanks took place in **January to March 2007**. Deworming and eye treatment was also carried out at the same time. The construction of UDDTs was followed by sensitisation at all schools in collaboration with PSI. The operation of UDDTs in the two schools of Kiruhura and Kiziguro started in July 2007 (see Paul (2007b) for an initial assessment of the UDDTs).

Fig. 5: Toilet block with 10 single vault UDDTs at **Kiruhura** Primary School (teachers have another 2 UDDTs built separately). Five cubicles are for boys, five for girls[8].

[7] Paul (2007a), see Section 13 for details

[8] It is normally advisable to separate the entrances to the boys' and girls' toilets better, such as with separate buildings or dividing walls.

Fig. 6: Toilet block with 10 UDDTs built in **Kiziguro** primary school (teachers have another 2 UDDTs built separately). Five cubicles are for boys, five for girls.

Qualitative monitoring of health outcomes was carried out in July 2008 with interviews (without medical examinations due to financial constraints). At this point, the UDDTs had been in use for just over a year (Herzog, 2008). Some improvements in health were observed although those related to the once-off deworming and eye treatment for the children had mostly faded away again.

To gain an updated impression on the state of these UDDTs, Eugene Dusingizumuremyi (consultant for GTZ, e-mail: eugedu@yahoo.com) **visited the four schools on 11 and 16 November 2009**, after the toilets had been in use for 2.5 years. He interviewed headmasters or deputy headmasters of the schools.

5 Technologies applied

GTZ-Rwanda and FEA decided to construct single vault UDD toilets in the two primary schools of Kiruhura and Kiziguro because of ease of maintenance, less odour and the ability to produce a safe fertiliser. UDDTs with a single vault were chosen because of the high quantity of faeces per day. Faeces have to be sanitised in the separate drying shelter. It is not easy to get enough ash at the school to be added to the vaults every day.

Single vault UDDTs are cheaper to construct than double vault UDDTs. For single vault UDDTs, the external drying shelter plays a crucial role instead of double vaults.

In Kiruhura primary school, the single-vault UDDTs have collection baskets made out of tree branches which are located inside of the faeces vaults. These baskets are not strong enough though and some of these baskets have been destroyed (in that case the faeces are collected directly in the vaults).

In the Kiziguro primary school, faeces are collected in the faeces vault (without a separate container) and the vaults are emptied when they are almost full. There is no data collected on how often the vaults need emptying at the two schools.

The urine is directly infiltrated into the soil in both schools, except in Kiziguro where half of the urine is collected in 20 L

jerrycans and reused directly as fertiliser in coffee plantations (see Section 7).

Table 1: Comparison table of important parameters in the two primary schools with UDDTs.

Parameter	Name of primary schools	
	Kiruhura	Kiziguro
Location	Province: South District: Huye Sector: Rusatira Cell: Kiruhura	Province: West District: Ngororero Sector: Ngororero Cell: Kaseke
Number of pupils	1197	845
Single vault UDDTs for pupils	10	10
Single vault UDDTs for teachers	2	2
Ratio of pupils to toilet cubicle[a]	120:1	85:1
Handwashing facilities	10	10
Water tanks installed	0	1

[a] The actual ratio is lower, because the younger students are requested to continue using the old pit latrines (exact number of those younger pupils and their pit latrines not known). The budget was too limited to build more toilets.

In addition, each of the four schools received 10 **handwashing facilities** that were installed in front of classrooms to be able to monitor the pupils if they wash hands after using toilets. Some handwashing facilities were installed near the toilets and this is normally the preferred location. But these handwashing facilities, which had been recommended by FEA, were found to be too fragile (the system consisted of a jerrican which is fixed to a wall, with a small water pipe and flap to close and open it). In July 2008, only 2 out of 10 were still in use in Kiziguro and in November 2009 none of these handwashing systems were in use anymore.

The superstructure the UDDTs is made of different materials, ranging from cement to bricks and stones for the foundation, vaults and stairs. The toilets have a concrete floor into which a plastic urine diversion squatting pans is inserted. These pans were imported from Uganda (see Section 14 for supplier's details). The roof is constructed out of trees and corrugated iron sheets. The doors are made of timbers.

Water sources for the four primary schools:

- **Kiruhura** primary school is connected to a water pipe from the adjacent secondary school financed by a foundation.
- **Kiziguro** primary school is not connected to a water supply network but has a rainwater harvesting system (10 m^3 tank provided under the project). When the water in this tank runs out, the pupils have to bring water from their homes (taken from wells or springs).
- **Sovu** primary school has now a 5 m^3 water tank connected to a water pipe where water is paid for by a foundation.
- **Kirwa** primary school uses rainwater harvesting and is also connected to a water network from a natural spring (this school is supported by UNICEF-Rwanda).

Since none of these rural schools uses groundwater from the school compound, groundwater pollution from pits or from urine infiltration at the school site was not regarded as a potential problem.

Fig. 7: Back view of the two UDDTs for teachers in Kiruhura primary school. At the base (covered by the bushes) are the access doors for the faeces vaults.

6 Design information

As mentioned above, the design and construction of the UDDTs was carried out by FEA (Fond de l'Eau et Assainissement). Drawings and photos of the UDDTs are available on the flickr website (see Section 13 for link).

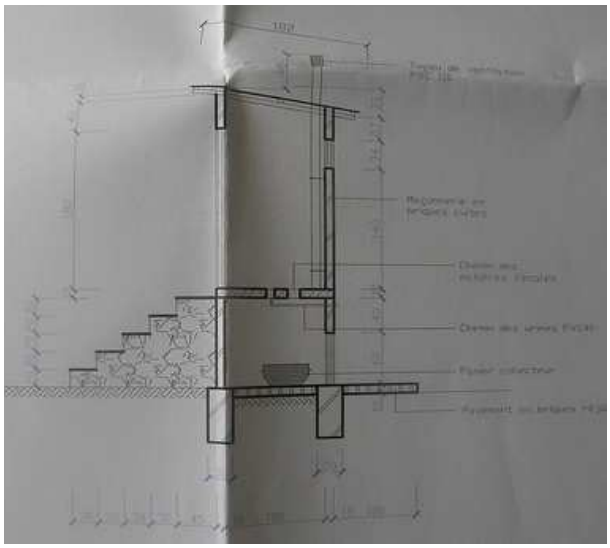

Fig. 8: Photo of a design drawing showing side view of one single vault UDDT with basket for faeces (drawing by FEA, Rwanda, Nov. 2007). More drawings are available (see Section 14 for link).

The single vault UDDTs were designed based on an average of 700 pupils per primary school (the current number of pupils is higher however, see Table 1). The toilet cubicles are 1 m x 1 m (length by width), and the faeces vaults are the same plan area as the cubicles and are 1 m high (therefore total volume of the faeces vaults: 1 m^3).

All UDDTs are built entirely above the ground, as is normal for UDDTs, to facilitate maintenance and emptying of the vaults and to accelerate the drying process. The compartments have a small staircase of 3 to 4 steps. The number of steps depends on the terrain. The UDDTs have access hatches to

remove faeces from the vaults which are made of painted red metal (the red painting was done to avoid corrosion of the metal).

The ventilation of the faeces vaults is provided with PVC pipes installed at the back of the UDDTs. The pipes start in the vault and reach up to approximately 75 cm above the roof and have a diameter of 110 mm (see Fig. 7). The openings are covered with fly screens to prevent flies from entering.

At Kiruhura, there are waterless urinals for boys made of walls plastered with a mixture of sand and cement (they are located on the side of the UDDTs).

The shed for drying of faeces (after drying in the faeces vaults) is fenced with chicken wire and its roof is made out of corrugated iron sheets. It is directly behind the UDDTs and its length is the same as that of the UDDT block.

Fig. 9: Inside view of UDDTs at Kiruhura primary school showing plastic urine diversion squatting pan and bucket with ash for covering faeces after defecation. Toilet has been in use for 2.5 years.

7 Type and level of reuse

Use of urine:

Only one of the two schools uses urine as a fertiliser and this is at Kiziguro, where *half of the urine* is collected in 20 L jerrycans and reused directly as fertiliser in coffee plantations[9]. The urine is mixed with water at a ratio of 1:3 (urine: water).

There is no information on what kind of fertilisers was used before (composts of organic matters are common in Rwanda and are used everywhere). There is also no information on whether the urine is resulting in increased yields, but it is likely to do so.

In Kiruhura primary school, urine is not collected at all (but infiltrated) because the teachers were not comfortable with the idea of using urine as fertiliser. During the visit in Nov. 2009, the GTZ consultant told them how urine can be used as fertiliser. Despite the limited space of gardens at the school, they need fertilisers.

[9] The school does not have containers to collect urine. They are only using one jerrycan per toilet block. Not all toilets are connected to one jerrycan, only half of them.

Most of the schools in Rwanda have school gardens where urine can be used as fertiliser. Thus, it would be useful to provide full information and training on the reuse of urine.

Use of dried faeces:

The dried faeces from the UDDTs contain also menstrual pads and anal cleansing material (toilet paper and hard paper) and are stored for 6 months in the drying shelter before being reused as soil conditioner.

In Kiruhura primary school, faeces are kept for six months in the drying shelter. After six months faeces are used as fertiliser in the garden of vegetables (in Kiruhura) and on banana plantations after just four months in Kiziguro.

As the menstrual sanitary pads are not biodegradable they should be collected separately in waste bins to be disposed and treated separately. It is not clear whether and how the school guards pick out the sanitary pads before applying the dried faeces as soil conditioner.

There was no information available on the state of sanitised faeces before being reused as fertiliser. The schools do not have special equipment to empty and transport dried faeces. School guards arrange themselves how to transport the faeces.

Fig. 10: Open vault of a UDDT in Kiziguro primary school. Paper is used as cleansing material.

Fig. 11: This photo taken in Kiruhura Primary school shows the dried faeces after 4 months in the drying shelter. The faeces will be reused as fertiliser after six months.

Fig. 12: Banana plantations where faeces are used as soil conditioner in the Kiziguro primary school garden.

8 Further project components

Sensitisation and skill based behaviour change followed the construction and installation of sanitary and water infrastructure prior to the operation of UDDTs. The target group of planned sensitisation and behaviour change campaign was teachers and pupils.

With the aim of achieving a sustainable maintenance of the new facilities and to establish a sense of ownership, all schools received sensitisation and training on utilisation and maintenance of the new facilities. During the Information, Education and Communication (IEC) Campaign that followed the baseline study, all children, all teachers and approximately 1,000 parents, received one-day trainings and skill based sensitisation session on the topics identified during the study.

One major sensitisation topic included the water treatment with "Sûr'Eau", and parents and the school received samples of Sûr'Eau (a chlorine based solution that is added to water to make it safe for drinking), in order to get acquainted with this method. In addition the target schools received teaching materials to facilitate their hygiene and health lessons in the future. Moreover, PSI brought a mobile cinema showing clips that sensitised parents in the community close to the two schools in Huye about water and sanitation as well as malaria.

Urine diversion toilets at Kirwa primary school:

UNICEF-Rwanda, the main funding partner of Kirwa primary school provided urine diversion toilets (UDTs) to this school (this is not a UD**D**T as the faeces are not dried). These are mobile toilets where the superstructure is made of plastic. The sub-structure consists of a pit dug underneath and with stones as retaining walls inside. The 12 mobile UDT compartments and one bathroom are fixed above the hole built with the stones. Urine is diverted and infiltrated into the soil, while faeces and cleaning water (for the plastic floor) are mixed in one single big lined pit (probably a hole was dug and protected with stones). Greywater from bathrooms is infiltrated separately into the soil.

The UDTs provided by UNICEF are rather smelly compared to UDDTs constructed by GTZ-Rwanda. The main reason of this odour problem is that cleaning water is mixed with faeces in the same pit. Even if the urine is diverted into a soak away pit, cleaning water for the plastic floor is mixed with faeces, and this results in bad smell and attracts flies and other insects.

9 Costs and economics

The capital costs for the UDDTs, handwashing facilities and water tanks are shown in Table 2 below (a further break-down of the costs is not available). All costs were covered by the project partners, and the schools had no costs at all (meaning the toilets were 100% subsidised), not even via contribution of labour.

The costs for the UDDT toilet blocks are on the high side, although they do include the training sessions and drying shed (the cost is equivalent to EUR 500 for one UDDT; or EUR 6 per student, as the schools have on average approx. 1000 students).

In terms of annual costs, there are only the salaries for the schools guards who do the maintenance of the UDDTs but who are employed by the school already for other duties (see next section).

Table 2: Capital costs for the installations at four schools, including material and labour, in EUR (Source: adapted from Paul (2007a). GTZ-Rwanda received the funds for the initiative from the GTZ Program Disease Control and Health Promotion.

Item	Quantity	Cost per school	Total Cost
UDDT toilet blocks (12 toilet stands/per school)[a]	2	6,017	12,034
Handwashing facilities (10 units per school)	4	143	573
Water tanks (10 m^3)	2	3,295	6,590
Total cost			**19,198**

[a] Includes drying shed and sensitisation for pupils and teachers.

10 Operation and maintenance

Operation and maintenance activities in the two schools with UDDTs include:

- Keeping the toilets clean
- Covering the faeces after defecation with ash as drying material (done by the users; ash is brought by pupils every day)
- Monitoring the level of urine and faeces in the collection containers and vaults (this is done by the "school guards" who also transport the dried faeces to the fields).

Each school has day and night guards. School guards are in charge of hygiene and security at the schools and are paid by the schools.

Each school has two teachers in charge of hygiene, a male teacher and a female teacher in charge of boys and girls respectively. Pupils are reminded daily on how to use the UDDTs properly. Specifically, in Kiziguro primary school, each classroom has UDDT guidelines displayed inside the classroom (photos shown in Flickr photo set, see Section 13 for link). And teachers keep explaining the proper use of UDDTs. In Kiruhura primary school, they have a morning

session on hygiene and code of conduct during the general assembly for all pupils. This is an opportunity to remind all pupils on the correct use of UDDTs.

In all primary schools, the pupils have STE ("Science et Technologie Elémentaire" meaning "basic science and technology") course for classroom. This course has a component of hygiene.

To be on the safe side, both schools preferred junior pupils not to use the UDDTs because it is difficult for them to follow UDDT guidelines[10]. But, after one year at the school they are allowed to use them (i.e. at the age of 6 or 7 years old).

11 Practical experience and lessons learnt

The UDDTs constructed in the two schools are in good shape and well used by pupils and teachers (about 2.5 years after they have been inaugurated).

At Kiruhura, separate cubicles of the UDDTs were assigned for each class in addition to providing separate toilets for boys and girls. This measure proved to be very effective in enhancing the students' ownership for the respective toilet cubicles, especially when it is reflected in the maintenance rules whereby each class cleans their own toilet cubicle(s).

Maintenance has become an issue because the UDDTs have been constructed by FEA without involvement of local people (due to time constraints at the time when the project was implemented). This is the case of Kiruhura primary school where two compartments of UDDTs are not functioning anymore because the urine pipes became clogged after only a short time. There is nobody in that place who can repair such UDDTs, the headmaster said[11].

The problem of repairing UDDTs can be solved by training of local technicians and other interested people on the maintenance of UDDTs and sanitisation of urine and faeces before reuse as fertiliser. In turn, trained technicians can help UDDT owners in repairing them when necessary.

It is advisable to have bins in the girls' UDDTs (and the related user training) where the adolescent girls can dispose of sanitary pads separately from faeces – this would make reuse of dried faeces easier.

The UDDTs are preferred by the pupils compared to the formerly used traditional pit latrines. In addition to acceptance of UDDT by pupils and teachers the surrounding households would like to have them. But they think that the cost of UDDTs is too high – so no spontaneous copying has taken place so far.

[10] These are new students for their first year, and pupils of nursery schools (nursery school pupils range from 3 year to 6 years old).

[11] It seems that the pipes got clogged by misuse of UDDTs (something was thrown in the urine pipe which got stuck inside). This could easily be replaced and fixed by the school guards. Another possible reason is that the slope of the urine pipes was not high enough.

12 Sustainability assessment and long-term impacts

A basic assessment (Table 3) indicates five sustainability criteria for sanitation, according to vision of SuSanA, document 1. The project has its strengths and weaknesses.

Table 3: 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).

	collection and transport			treatment			transport and reuse		
Sustainability criteria	+	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 fertiliser 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).

With regards to long-term impacts of the project the following can be concluded:

1. The main expected impact of the project was to improve public health and in particular to reduce the rate of diarrhoea incidences in school children. UDDTs are a preventive tool to lower disease and parasite infestation (intestinal worms). But no data is available on actual intestinal worms' reduction.
2. The new school toilets reduced the toilet queues, as well as bad smell at the two schools.
3. The demonstration UDDTs have not yet resulted in any upscaling activities for ecosan systems by the schools or by the Ministry of Education.

It is possible that an opportunity for scaling up of ecosan systems is within the National Strategy of "Child Friendly Schools" planned by the Ministry of Education in collaboration with UNICEF.

13 Available documents and references

- Link to a set of **photos** of UDDTs and **drawings** at the two schools (December 2009): http://www.flickr.com/photos/gtzecosan/sets/72157622872968074/
- Herzog, K. (2008) Intersectoral Cooperation for School Health: Report on the Impact and Sustainability of the Initiative in Rwanda, Report for GTZ (Program „Disease Control and Health Promotion"), Eschborn, Germany. http://www2.gtz.de/Dokumente/oe44/ecosan/en-school-health-report-rwanda-2008.pdf
- Paul, F. A. (2007a) Baseline Assessment and Intervention Study on Initiative "Intersectoral Cooperation for School Health", Rwanda: Final Report for GTZ (April 2007), Kigali http://www2.gtz.de/Dokumente/oe44/ecosan/en-final-report-school-health-rwanda-2007.pdf
- Paul, F. A. (2007b) Evaluation Report on the Baseline and Intervention Study on School Health in Rwanda (July 2007) http://www2.gtz.de/Dokumente/oe44/ecosan/en-evaluation-school-health-rwanda-2007.pdf

Other relevant national government documents:

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14 Institutions, organisations and contact persons

GTZ-Rwanda (project leader)
Contact: Elisabeth Girrbach
Principal Technical Health Advisor
P.O. Box 59 / 2, avenue Paul VI (# rue de la Concorde)
Kigali, Rwanda
T: +250 -252-502869
M: +250 -252-503736
E: Rwanda.sante@gtz.de

Primary schools (owners of UDDTs)
Uwayisenga Médiatrice, Headmaster
Kiruhura Primary School
Cell of Kiruruhura
Sector of Rusatira , District of Huye
Southern Province, Rwanda
M.: +250 (0) 788658286

Kalirwanda J. Baptiste, Headmaster
Kiziguro Primary School
Cell of Gaseke
Sector of Ngororero, District of Ngororero
Western Province, Rwanda
M: +250 (0) 783720515

FEA (construction of UDDTs)
Mr. Karangwa Lambert, Fund Team Leader
Nyamagabe, Southern Province
Tel: +250 (0) 788622647/ (0) 750353800
E: kalambert2000@yahoo.fr; waterfund@rwanda1.com

Supplier of urine diversion squatting pans
There is no data available on the company that supplied the plastic squatting pans but it was probably Crestanks in Uganda
Crestanks Ltd.
P.O. Box 11381
Kampala, Uganda
E 1: scs@crestanks.co.ug
E 2: janet@crestanks.co.ug
E 3: crestank@africaonline.co.ug
I: www.kentainers.com

Case study of SuSanA projects

Urine diversion dehydration toilets in rural schools, Huye and Ngorererо Districts, Rwanda

SuSanA 2010

Author: Eugene Dusingizumuremyi (consultant for GTZ, email: eugedu@yahoo.com)

Editing and reviewing: Elisabeth von Münch (GTZ; ecosan@gtz.de)

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