Kanawat Health Centre

Improvement of Sanitation Infrastructure

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1 Summary

To improve the situation of the Kanawat Health Centre with regard to sanitation the following measures were implemented:

1. Renovation and reconstruction of pit latrines / composting toilets
2. Renovation of showers/washing place and connection to sewer line
3. Construction of a dry toilet block with 4 doors
4. Construction of sewer line and
5. house connections (incl. bypassing of existing septic tanks and soak pits)
6. Construction of a wastewater treatment system comprising a septic tank for pre-treatment, a horizontal subsurface flow constructed wetland system for secondary treatment, a sludge drying bed for sludge from the septic tank (to be discharged by gravity)
7. Construction of a low cost medical waste incinerator
8. Awareness creation, capacity building and training

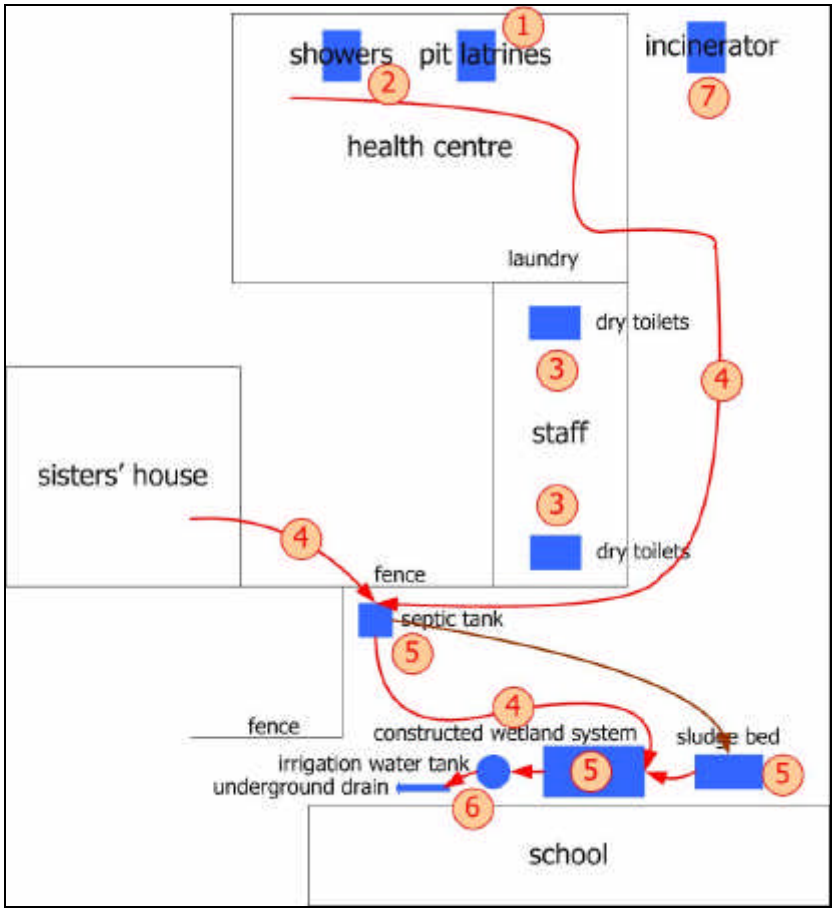


Figure 1: Overview about the project components.

2 Project Organisation

While planning, technical design, control of implementation and parts of the training were done by EcoSan Club with support by the realisation of the project was carried out by Norman Construction and Engineering Services, Kampala. One site engineer for organising and supervising the work for (local) constructors were employed for the duration of the project implementation.

3 Situation before the Project

Wastewater produced in the Health Centre, sisters houses and staff quarter (some few flush toilets and grey water from kitchen and showers) was collected in septic tanks and the overflow drained away more or less untreated in soak pits.

Toilets for patients attendants were available on the health centres' compound in the form of pit latrines. Due to underground conditions (hard rock) it was not possible to dig sufficiently deep pits. Thus the toilet slab was raised app. 1,20m above ground level to achieve a sufficient storage volume and to make emptying easier. In the immediate vicinity of these pit latrines shelters were available for the patients attendants to be used as showers (which were misused for defecation). The Health Centre staff was using pit latrines which are located near the staff houses.

Picture 1: Raised pit latrine for patients attendants.

No wastewater treatment of any kind was available. Drinking water sources within the compound were directly located near pit latrines, showers and soak pits. However the situation was clearly unsatisfying and potentially dangerous.

In addition also the incinerator for the medical waste was located on the small compound of the Health Centre. Due to the broken construction of the incinerator, black and densely smoke was polluting the air and insufficient burnt medical waste was dumped uncontrolled.

Picture 2: Old medical waste incinerator.

4 The Project Components

4.1 Composting Toilets

To avoid all problems connected with pit latrines (smell, flies, potential ground water pollution, etc.) the existing raised pit latrines were reconstructed as dry toilets. Following discussions with the administration and the technical personnel on site it was decided to construct composting toilets for various reasons:

- ✓ the present construction allows the creation of a sufficiently large storage volume
- ✓ composting toilets can be used like pit latrines by the patients attendants
- ✓ maintenance in order to assure proper conditions for composting can be carried out by the technical staff on site
- ✓ the final product can be reused or dumped without additional storage or treatment

Picture 3 / 4: Reconstructed composting toilet for patient attendants.

4.2 Showers and washing place

Due to the general poor state of the old showers new units were constructed as well as a washing place for washing cloth. Both units were connected to the sewer line, in order to avoid mosquito breading and groundwater pollution.

Picture 5: Showers and washing place for cloth.

4.3 Dry toilets for the Health Centre staff

In order to avoid the problems related to pit latrines on the one hand and to demonstrate modern technologies on the other hand dry toilets (diversion toilets) were constructed. The final design of the toilets was discussed before construction in detail with the users of the units. The required awareness creation activities were carried out by the technical personnel of the Health Centre together respectively additionally of the EcoSan Club.

Picture 6: Dry toilet for Health Centre staff

4.4 Construction of sewer line and house connections

Remaining wastewater from the Health Centres' flush toilets, showers and laundry are collected in a PVC sewer line. Existing septic tanks are bypassed in order to reduce the future O&M requirements. The septic tank of the sisters' house could not be included because of too low gravity.

4.5 Wastewater treatment system

Wastewater collected by the sewer line will have to be treated according to Ugandan Standards in a wastewater treatment unit before being discharged to the environment. In line with these request a combination of mechanical and biological treatment was constructed. The first mechanical treatment step consists of a septic tank were solid particles are separated by gravity and stored before being discharged to the sludge bed for further stabilisation and storage. Discharge of the sludge to the sludge beds is being done by gravity every 3 months.

Picture 7: Septic tank for pre-treatment of wastewater.

The outflow of the septic tank is further purified in a horizontal subsurface flow constructed wetland system before the treated wastewater is collected in an irrigation tank.

Picture 8: Horizontal flow constructed wetland.

4.6 Irrigation water tank and subsurface drain

A concrete tank was positioned at the lower end of the constructed wetland system to allow storage of treated wastewater for reuse as irrigation water. The water tank is designed to store the maximum daily wastewater flow which has been estimated to 5m³. Surplus water will overflow to a subsurface percolation trench. Its recommended to use the treated wastewater to irrigate fruit trees or any kind of plants which are not used for food production.

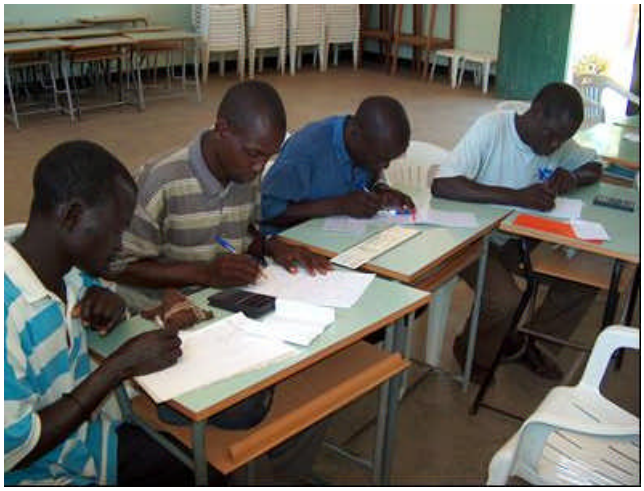
4.7 Low cost medical waste incinerator

In order to be able to dispose of health care waste in a safe way to replace the old medical waste incinerator was necessary. To reduce both investment and running cost a low cost medical waste incinerator based on a project of the Applied Sciences Faculty of the De Montfort University in Leicester was constructed. A covered and fenced dumping area for the burned ashes was constructed additionally in the Health Centres compound (on request of the project, but was not included) for a safe disposal of the burnt residues.

Picture 9: Low cost medical waste incinerator.

4.8 Awareness creation, capacity building and training

The responsible person for operation and maintenance was trained at two workshops on water supply and sanitation at the Matany Hospital (September 2003, June 2004). In addition during



the construction an experienced local site engineer was available for training on the job. Backstopping for any additional questions on spot and an O&M - Manuel (prepared together with the workshop participants in June 2004) was provided from the EcoSan Club.

Picture 10: Training on Sanitation & Water Supply

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The Location

Kanawat Health Centre is located in Kotido District in North-eastern Uganda. The Karimojong region is characterised by short and heavy rainfalls with long dry and hot periods. The different Karimojong tribes living in this region are still following a semi-nomadic lifestile, where the economy is based mainly on traditional livestock keeping (cattles, goats and sheeps) and subsistance agriculture.

Kanawat Health Centre

The Health Centre was founded in 1976 by the Comboni missionaries following a small catholic mission. On average about 150 patients per day are coming to the Centre, their number steadily increasing.

Untill 2001 the only source of electricity for the centre was a generator, lacking a constant supply of fuel. In 2002 Dreikönigsaktion (DKA) an Austrian NGO started to support the Health Centre in a first phase with an electrical solar system, to guarantee electricity also during the nights and in times without fuel. In 2003 a second phase followed, adressing the shortcomings of the sanitation infrastructure: untreated wastewater discharge, unsealed pit latrines, inappropriate medical waste incineration and insufficient washing facilities.

The main objective:

Prevent the spreading of water-related diseases.

Improvement of Sanitation Infrastructure

The Problem

Pit latrines

- Toilets for patients attendants and staff were available on the health centres' compound in the form of pit latrines. Bad smell, flies and potential ground water pollution were only some of the problems.

Untreated wastewater

- Waste water from flush toilets, showers and laundry was collected in septic tanks and discharged afterwards untreated to the environment close to the drinking water sources. Furthermore poor washing facilities (showers and for washing cloth) for the patient (attendants) combined with open drainage of waste water were a breading place for mosquitos and a source of groundwater pollution.

Inappropriate medical waste incineration

- Medical wastes (sharps, gloves, needles, glases, medical residues) were burnt insufficiently in a local incinerator and the remaining ashes dumped in an uncontrolled and unprotected way.

The Improvements

Composting and dry Toilets

- Renovation and reconstruction of pit latrines to composting toilets for the patient attendents.
- Construction of a dry toilet block with 4 stances for the staff of the health centre.

Wastewater treatment system

- Construction of separate sewer line and house connections.
- Construction of a wastewater treatment system comprising a septic tank for pre-treatment, a horizontal subsurface flow constructed wetland system for secondary treatment and a sludge drying bed for sludge from the septic tank.
- Use of the treated wastewater for irrigation of orchards.

Low cost medical waste incinerator

- In order to be able to dispose of health care waste in a safe way and to reduce both investment and running cost the construction of a low cost medical waste incinerator based on a project of the Applied Sciences Faculty of the De Montfort University in Leicester was constructed.

Awareness creation and (on the job) training

- Training of users and local personel for operation & maintenance before project start and during implementation.
- Offering backstopping for operation and maintenance for two years following the project.

Implementing Organisations:

EcoSan Club

BBM

Financing Agency:

Dreikönigsaktion
Hilfswerk der Katholischen Jungschar

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