Looking back on implementation projects from the last 10 years

This paper revisits implementation projects carried out by EcoSan Club during the last 10 years.

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Abstract

The paper revisits 8 implementation projects carried out by EcoSan Club during the last 10 years. The projects are described and challenges and problems during the planning/design/implementation phases as well as the lessons learnt are discussed.

Introduction

This paper looks back on EcoSan Club's 10 year experience in implementing projects in the field of water supply and sanitation. Project implementation has been carried out by EcoSan Club and mainly by its company branch, ESC Consulting KG, which was founded in 2004 for this purpose.
Members of the EcoSan Club who have not been involved in the actual implementation work wrote the article. The idea was to revisit implementation projects and look what went well or wrong in order to learn for future projects. We selected 8 projects and discussed specific issues of these projects with those colleagues that have been responsible for project implementation. The starting point for us was the description of the projects in the data sheets that are available on the company's website (http://www.esc-consulting.at).

The paper briefly introduces the projects and the discussions are presented as interviews from members of EcoSan Club with the persons working on implementation for the company branch.

Project 1: Gloggnitzer Hütte

Location: Lower Austria
Name of client: Gebirgsverein Sektion Gloggnitz (private association), Austria
Dates (start/end): Jan 2009 – Dec 2011

Short description

In the course of the overall renovation of the refuge hut, located within the drinking water protection area of Vienna, a resource oriented sanitation system was designed and implemented. The overall objective of the project was to find a solution, which minimises risks

Lessons learnt:

- Sanitation systems are only operated well if the owner has a benefit from the system (e.g. faecal compost, irrigation water, etc.). Treating wastewater only is not beneficial enough for owners to guarantee sustainable long-term operation of the system.
- Operation and maintenance (O&M) needs to be considered already in the planning phase and the owners of the system need to be aware of the necessity and scope of O&M work. Extra in-depths training sessions might be needed e.g. for composting staffs.
- Implementation partners often do lack capacity in the proposed technologies and therefore do not understand the systems that they shall construct. The outcome of this is poor or wrong implementation work. Therefore more resources need to be foreseen for supervision of construction work in the short run and for capacity building of local partners (e.g. construction firms) in the long run.
- Visits of implementation projects after the project ends more likely result in successful project and need to be foreseen and funded.
- Donors more likely invest in new infrastructure than in rehabilitation of already existing infrastructure, capacity building, measures to ensure O&M, etc.

for the drinking water supply. The system comprises composting toilets for human excreta management with an additional secondary composting step, a waterless urinal and the treatment of greywater in a vertical subsurface flow constructed wetland system before infiltration. Both in order to equalise the load to the treatment system as well as to enable recirculation of treated wastewater during wintertime (infiltration not possible) a buffer tank was foreseen. For a more detailed description of the system see Freiberger and Weissenbacher (2011).

Services provided

Design, application for funding and subsidies, construction supervision

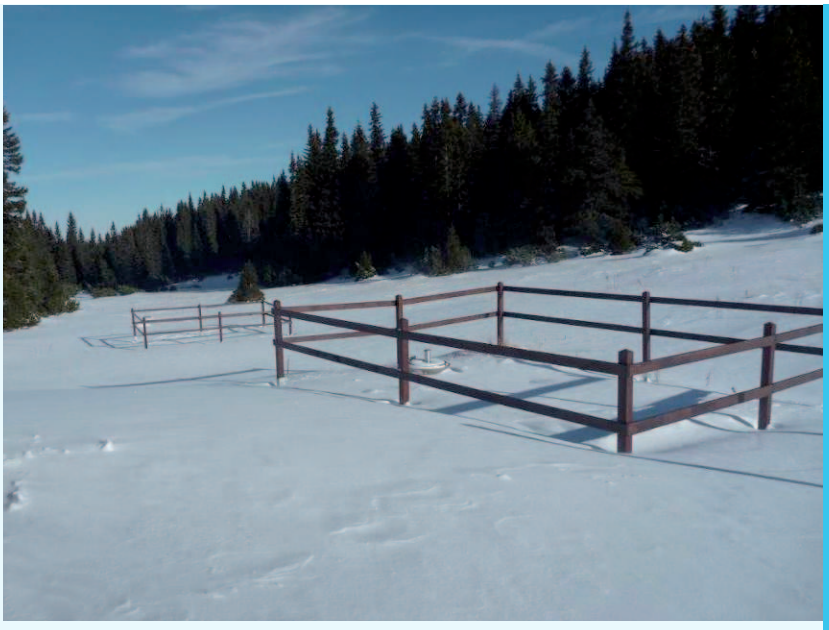

Figure 1. Vertical flow constructed wetland and infiltration system in winter.

Discussion

Q: Who came up with the idea to implement this project; the owner of the mountain hut or the consultant?

A: Neither, the project was initiated by the Vienna waterworks (Wiener Wasserwerke) as a kind of demonstration project for the large number of mountain huts in the drinking water protection area.

Q: Have similar projects (=same technical solution) been implemented before? If yes, which kind of knowledge benefit was used in this project?

A: No, not in this combination. Of course other projects exist, but with only parts of the full system implemented.

Q: What have been the main constraints / hindrances during planning/design/implementation?

A: The main problem was that the technical solution chosen was not implemented before. Design guidelines for technological components did not exist, e.g. for the constructed wetland treating greywater.

Q: Is the system running as designed?

A: No, there were 2 main problems: 1) the power supply from the photovoltaic system turned out to be too week for the pumps installed and therefore the process control was not functioning, and 2) the owners did not carry out the few operational measures needed all the time.

Q: What lessons did you learn?

A: Sanitation systems are only operated well if the owner has a benefit from the system, only wastewater treatment is not beneficial enough. If control schemes that require simple operational measures by the owner do not work under European conditions they will not work under conditions in developing countries where most likely less qualified people are assigned to operate the system.

Project 2: Integrated Community Development Water Extension Programme

Location: Gamo Gofa and South Omo, Ethiopia
Name of client: Horizont 3000 / EU ACP Water Facility
Dates (start/end): Jan 2007 – Dec 2011

Short description

The Integrated Community Development Programme (ICDP) – Water Extension Project (WEP) aims to combat poverty in that there should be sufficient water for livestock, such as cattle, sheep and goats and possibly leading to irrigation schemes in the future - if sufficient water can be harvested in the targeted communities.
In view of this situation the objective of the proposed action is poverty reduction through the provision of safe drinking water for humans and agricultural production. The economic, social and human well-being of disadvantaged communities (groups and individuals) in selected areas of Gamo Gofa and South Omo Zones shall be secured thus enabling them to actively shape and enhance their own development.

The expected results of the planned project have been 1) improved retention of rainwater, 2) increased infiltration, 3) reduced erosion, and 4) increased quantity and improved quality of water available.

Services provided:

Technical assistance in water management, evaluation.

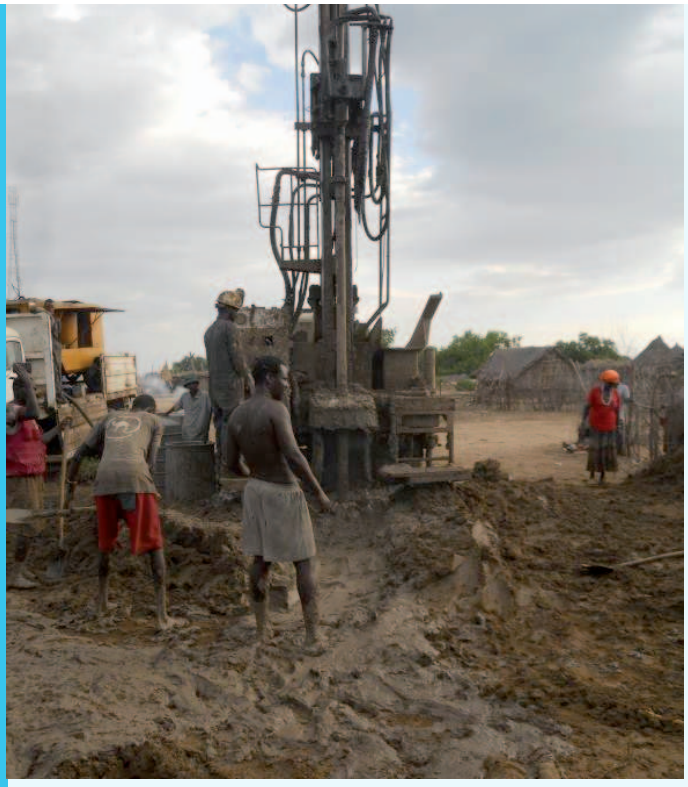

Figure 2. Borehole drilling, Ethiopia.

Discussion:

Q: What percentage of the local inhabitants was directly involved in the decision process of this project?

A: There was no direct involvement of local inhabitants as this project was performed in cooperation with the local institutions. We had to suppose that the institutions acting in the interest of the local inhabitants.

Q: What have been the main constraints / hindrances during planning/design/implementation?

A: As mentioned above, a demand driven participatory approach was foreseen in the project document but the local implementation partners neglected this. Therefore the local people have only been informed about what's planned. Secondly, the local implementation partner lacked technical knowledge and skills.

Q: Was technical supervision of certain construction performed by the consultant in the process of providing technical assistance in water management"?

A: The supervision on site comprised just a few days, too little to be effective.

Q: Are the systems running as designed?

A: As the project ended just recently, no monitoring data are available yet. However, also most baseline data are missing that would be needed to assess the systems.

Q: What lessons did you learn?

A: More money for capacity building of local partners would be needed, otherwise money spent for implementation is not effective.

Project 3: Infirmary Hosptial Balit - Water Supply and Sanitation

Location: Mindanao, the Philippines
Name of client: Beschaffungsbetrieb der MIVA, Austria
Dates (start/end): Jan 2004 – Dec 2005

Short description

The project supported the establishment of a new Health Centre with the design and construction supervision of the water supply and sanitation infrastructure. Drilling of boreholes, catchment of protected springs, rainwater harvesting and the storage and distribution system were included on the water side, while on the sanitation side the entire hospital was equipped with newly design indoor dry toilets and decentralised greywater treatment systems.

Services provided

Detailed technical design, construction supervision

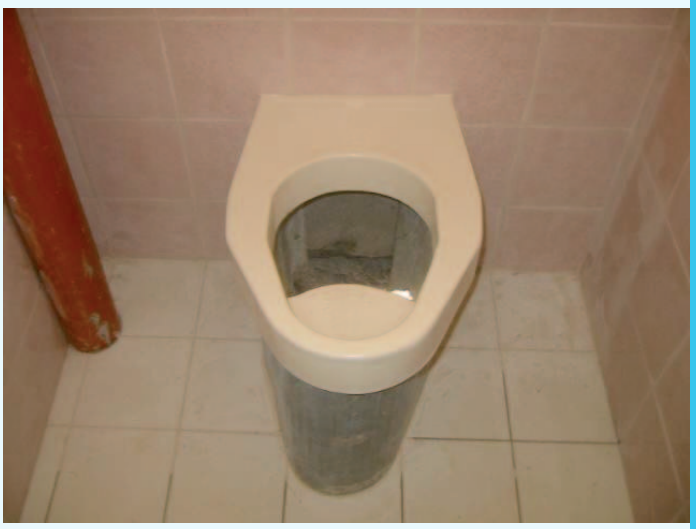

Figure 3. Toilet seat for a Urine-Diversion Dehydration Toilet (UDDT).

Discussion

Q: What have been the main constraints/hindrances during planning/design/implementation?

A: The organisational responsibilities for O&M have not been discussed between the donors and the local partners until the end of the implementation work.

Q: Is the system running as designed?

A: No, according to our information the whole hospital did not start into operation until today. An additional problem was the corruption of the local project partner.

Q: What lessons did you learn?

A: Management and operation of the system need to be considered from the start; including the organisational responsibilities. It has to be clear to the owners that the new systems might require additional effort in O&M and maybe also additional personal.

Project 4: Ecological Rehabilitation of Water Supply and Sanitation Infrastructure at Maracha Hospital

Location: Arua District, Uganda
Name of client: Beschaffungsbetrieb der MIVA, Austria
Dates (start/end): Jan 1999 – Dec 2002

Short description

During the implementation period of the project the entire water supply and sanitation infrastructure at the Maracha Hospital was rehabilitated, resp. where required newly constructed. In addition to other components in the overall project - construction of staff houses and installation of solar energy supply systems - boreholes were renovated, new (solar) pumps installed, the distribution network rehabilitated and water meters installed. On the sanitation side a sewer system for wastewater and greywater collection was constructed, the wastewater being fully treated in a constructed wetland wastewater treatment plant. For staff families dry urine diversion toilets were installed. In addition theoretical and on the job training was carried out for operation & maintenance personnel.

Figure 4. Faecal compost, Maracha hospital.

Figure 5. Constructed wetland at Maracha hospital.

Services provided

Preparation of feasibility studies, participatory planning, detailed design, tendering, construction supervision

Discussion

Q: What have been the main constraints / hindrances during planning/design/implementation?

A: The whole process went well, mainly because a lot of time was planned to be spent at site for supervision of the construction work. Usually donors do not allow for the time required to guarantee effective supervision.

Q: Dry toilets were installed only for family staff member. What about the patients?

A: For patients sealed pit latrines are in place, the pit latrines are emptied into a sludge drying bed.

Q: Is the system running as designed?

A: Composting works well as there is a benefit from the faecal compost. The syphon for flushing the vertical flow constructed wetland broke several times. Although it was replaced repeatedly by us (after the project duration) the owners did never replace the spare parts by themselves.

Q: What lessons did you learn?

A: Only if benefits from the sanitation system exist and the owners recognise these benefits (e.g. faecal compost in this case) the systems are operated and working well, otherwise O&M is neglected and the systems are not functioning.

Project 5: Rehabilitation of water supply and sanitation infrastructure at the St. Franzis Naggalama Hospital

Location: Mukono District, Uganda
Name of client: Beschaffungsbetrieb der MIVA, Austria
Dates (start/end): Jan 2002 – Dec 2004

Short description

During the implementation period of the project the entire water supply and sanitation infrastructure at St. Franzis Naggalama Hospital was rehabilitated, resp. where required newly constructed. In addition to other components in the overall project - installation of a new (solar) energy supply system - boreholes were renovated, new pumps installed, the distribution network rehabilitated and water meters installed. On the sanitation side a sewer system for wastewater and greywater collection was constructed, the wastewater being fully treated in a constructed wetland wastewater treatment plant. For staff families dry urine diversion toilets were installed. In addition theoretical and on the job training was carried out for operation & maintenance personnel.

Figure 6. Mechanical pre-treatment of wastewater upstream secondary treatment in a constructed wetland.

Figure 7. Constructed wetland at St. Franzis Naggalama Hospital.

Services provided

Feasibility Study, detailed technical design, construction supervision.

Discussion

Q: What have been the main constraints / hindrances during planning/design/implementation?

A: The local implementation partner did not fully understand how the constructed wetland system works. Therefore, sand that is not suitable (not washed and wrong grain size distribution) has been used for filling the beds. Finally the sand had to be removed and washed before the refilling of the bed could be carried out.

Q: Was the hospital closed during construction works? If not, how was the management of using toilets during rehabilitation?

A: The hospital was not closed, it performed as usual. Staffs as well as patients were using the existing pit latrines during construction.

Q: Is the system running as designed?

A: The project has been visited several times after completion. Generally spoken, the system worked as expected, except for some problems with regular O&M activities like cleaning of the distribution chamber. The keen interest in faecal compost production was really surprising. In the beginning the faecal compost from sludge, faeces and organics was used in the health centre's own garden. But after several month real business started to grow and the operators started selling faecal compost to nearby farmers.

Q: What lessons did you learn?

A: Again, capacity building of local partners is of utmost importance, the implementation partners need to fully understand the system. Additionally, responsibilities among local partners need to be clearly defined during the implementation process.
This project is again an example that the systems are working if there is a benefit for the owner and one can even make profit.

Project 6: Kanawat Health Centre - Improvement of Sanitation Infrastructure

Location: Kotido District, Uganda
Name of client: Beschaffungsbetrieb der MIVA, Austria
Dates (start/end): Jan 2003 – Dec 2004

Short description

The following activities were carried out under this project:

1. renovation and reconstruction of pit latrines into composting toilets
2. renovation of showers and connection to sewer line
3. construction of 2 dry toilet blocks with 2 units each
4. construction of sewer line and house connections (incl. bypassing of existing septic tanks and soak pits)
5. 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)
6. construction of a low cost medical waste incinerator.

Services provided

Technical design, construction supervision

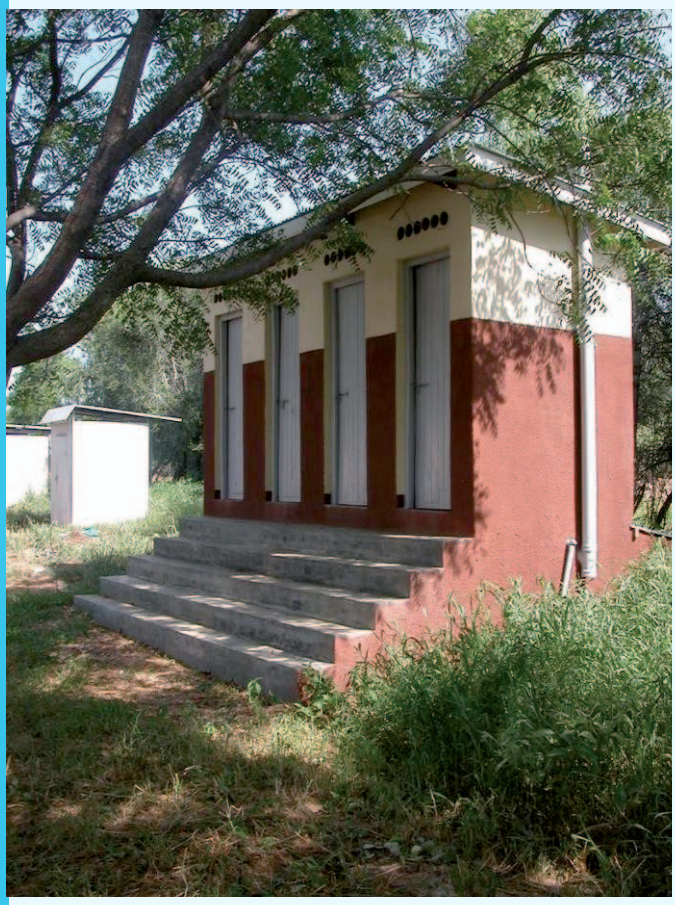

Figure 8. Composting toilets (rebuilt from pit latrines) at Kanawat Health Centre.

Figure 9. Reforestation area.

Discussion

Q: What have been the main constraints / hindrances during planning/design/implementation?

A: Too little time/money was available for supervision of construction, which lead to insufficient quality of the implemented structures.

Q: How did you design the composting toilets?

A: The requirement was to use the existing pit latrines. They have been constructed above ground due to the rocky underground that did not allow the digging of pits. The volume of the storage chambers for the composting toilets was therefore determined by the existing structure.

Q: In case if family members accompany the patients, there would be a high fluctuation of people? Which effect has this fluctuation on the operation of the composting toilets?

A: The composting toilets where constructed without a urine separation to avoid misuse of the toilets due to the high fluctuation in the hospital. Further it was assumed that the hospital staff will not be able/willing to train every day all new patients and family members regarding the correct use of composting toilets.

Q: Was a filter installed at the medical waste incinerator? If not, do certain operation manuals exist on how to burn the waste to avoid unnecessary exhausts Q:

A: Yes, there is such a manual and adequate operation is part of the on the job training.

Q: Regarding the safe reuse of materials from composting toilets in agriculture and gardening: Have there been analysis performed?

A: No, nevertheless an additional project focussed on the risk of reuse of such materials.

Q: Is the system running as designed?

A: According to measurements the constructed wetland performs well in terms of treatment. The system is also operated well as the treated water is used for irrigation of a forest. Reforestation is an important topic in this area.

Q: What lessons did you learn?

A: Two main things: 1) Enough resources (time/ money) need to be foreseen for supervision of construction work, and 2) systems are operated well if the owners has a benefit (irrigation water in this case).

Project 7: Rehabilitation of Water Supply and Sanitation Infrastructure at St. Joseph's Hospital, Kitgum

Location: Kitgum District, Uganda
Name of client: Beschaffungsbetrieb der MIVA, Austria
Dates (start/end): Jan 2006 – Dec 2008

Short description

St Joseph's Hospital, located in Kitgum Town in Northern Uganda suffers from an old and overstrained water supply system and an inadequate, resp. mostly non-existing sanitation infrastructure. The project's objective is the development of a conceptual design for water supply and sanitation at the hospital and the detailed technical design. Special focus is laid on a resource-oriented systemic approach, enabling the hospital to make double profit of the new system. During the construction phase ESC is furthermore responsible for local as well as external supervision and technical backstopping.

Services provided

Technical design, construction supervision

Figure 10. Toilet facilities at St. Joseph's Hospital.

Discussion

Q: What have been the main constraints / hindrances during planning/design/implementation?

A: The project was not planned sufficiently by the donors. After a detailed planning was finally done the costs increased up to twice the available budget. This lead to splitting of the implementation work in two phases and even higher implementation costs at the end.
Additionally, quality of construction work was poor and, again, too little resources have been planned for supervising the construction work.
It has been shown that training of staffs on composting needs much more time than originally planned and that additional visits to the site are needed especially in the first months after completion.

Q: Which kind of reuse of treated human excreta is foreseen?

A: At the beginning it was planned that the products can be used in a small garden at the site of the treatment plant. Further use cannot be foreseen; unfortunately no resources are available to follow up on this issue.

Q: What is special about the design of the composting toilets?

A: The composting toilets have been constructed on ground level to allow for easy access for elderly and ill persons without stairs. However, this implicates additional efforts for operation, e.g. emptying the chambers.

Q: Is the system running as designed?

A: Yes, expect the syphon for loading the vertical flow constructed wetland, which broke already several times and was not replaced by the owners.

Q: What lessons did you learn?

A: Extra training is required especially for composting. Visits after finalisation of the have been shown crucial for the operation especially for the composting part.

Project 8: Catholic Diocese of Kotido Water and Sanitation Project

Location: Kotido District, Uganda
Name of client: Dreikönigsaktion, Austria
Dates (start/end): Jan 2008 – Sep 2010 (phase 1); Jan 2011 – Dec 2013 (phase 2)

Short description

The purpose of this project is to improve and guarantee access to safe water in sufficient quantity and quality for human consumption as well as improve the sanitary conditions for the people living in Kotido District.
The expected results have been:

- Water sources & infrastructure (boreholes, town water supply system) are operated and maintained
- Information on quantity and quality of water resources in the diocese is available
- The potential of rainwater harvesting for groundwater recharge has been demonstrated
- A sanitation behaviour change has been initiate

Services provided

Technical consultancy, construction supervision

Discussion

Q: What have been the main constraints / hindrances during planning/design/implementation?

A: It took the first 3 years of the project to convince local implementation partners that the rainwater harvesting component is required in its proposed form. Implementation has not yet started.

Q: Did the demonstration of "the potential of rainwater harvesting for groundwater recharge" had any sustainable impact on the behaviour of the community?

A: Not yet (see above). Implementation for this part of the project did not start yet.

Q: What has been achieved up to now?

A: Management of existing boreholes has been improved a lot.

Q: What lessons did you learn?

A: Donors more likely invest in constructing infrastructure than in rehabilitation of existing infrastructure.

Figure 11. Existing water source lacking management.

References

Freiberger, E., Weissenbacher, N. (2011): Sanitation system for the 'Gloggnitzer Huette' mountain refuge. Sustainable Sanitation Practice 8 (July 2011), 8-12.

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