Abstract: Third International Conference on Ecological Sanitation

Title	**Ecosan– a step towards sustainable rural development in Eastern Europe**
Keywords	ecological sanitation; double vault urine diverting toilet; nutrient cycle
Author(s)	Stefan Deegener, Ralf Otterpohl
Address	Institute of industrial and municipal wastewater management, Hamburg University of Technology, Germany
Telephone	+49- (0)40-42878-3441
Fax	+49- (0)40-42878-2684
Mobile	
E-mail	deegener@tuhh.de, otterpohl@tuhh.de
Abstract ID no	S/3

Ecosan– a step towards sustainable rural development in Eastern Europe

In this paper the implementation of double vault urine diverting toilets and waterless urinals in a rural Ukrainian school as a pilot-project is presented. As a sustainable sanitation system this kind of toilets offer all the benefits of Ecological Sanitation: Protection of water resources, recovery of nutrients and minimisation of water-based infections.
Special attention was turned towards the education of the toilet-users and interested locals, maintenance of the toilets and the hygienically safe reuse of the recovered products (stored urine and decomposed faeces) in horti- and agriculture. Urine with its high content of nutrients and trace elements is an excellent fertiliser and faeces, when treated properly are a good soil conditioner. This is important for the mainly poor population, that cannot afford chemical fertilisers. It was shown that the installation of double vault urine diverting toilets is a low cost, very fast and easy to realise possibility to protect the groundwater and thus improve health conditions. The establishment of ecological sanitation is especially reasonable in regions with no central water supply and no sanitation system except pit-latrines.

Introduction

In rural Eastern European areas most of the population is not connected to a central water supply, in particular after the breakdown of the former Soviet Union. These people get their drinking water mostly from shallow, private wells. The groundwater is often polluted, mainly by nitrates and faecal bacteria. While part of the nitrates are from agriculture related sources, the faecal bacteria and part of the nitrates have their roots in the traditional and widespread pit-latrines, which are not sealed to the ground and often located close the drinking water wells. Part of the rural population is ill due to the polluted drinking water and shows symptoms of waterborne diseases.
In the scope of the project “Co-operation for Sustainable Rural Development“ the village of Gozhuly (population: 3600) in central Ukraine was selected by the NGOs WECF from Netherlands and Mama-86 (Ukraine) to start a pilot-project in co-operation with the TUHH due to very high levels of nitrate and faecal bacteria. Besides raising public awareness (the people do not realise that the water makes them ill, because it looks and smells well), the establishment of an affordable groundwater-protecting sanitation system is the major aim of this project.

Sanitation system

For this pilot-project a toilet facility with 3 double vault urine diverting toilets and 3 waterless urinals was installed at a school with approx. 160 pupils (grade 1-9) and 15 teachers. The principle and use of double vault urine diverting toilets (or variations) has been established for many years in countries like Mexico, China and Vietnam (Esrey1998, Del Porto 1999).

The introduction of the new technology is rather done in a school than in private homes or other public facilities because of the multiplying effect (not only the children and teachers, but also the parents are introduced to the new toilets).
For each toilet there are two easily accessible faeces-chambers (vaults) with a sealed floor. One is in use for approx. 1 year, then allowed to rest for one year while the other chamber is used. Ventilation pipes with fly nets were installed from the faeces-chambers to above the roof to avoid odour and flies. The urine from the separation-toilets and the waterless urinals is collected in two urine tanks of 2 m^3 each. The two compartments are, similar to the faeces chambers, necessary for the resting time in which many pathogens are killed or at least reduced.

Education and Maintenance

Several workshops were held to educate the toilet users and caretakers. Special, easy to understand education-materials were developed to explain the right use and maintenance of the toilets. It is important that the users keep the urine and the faeces separate as most of the pathogens are contained in the faeces, while the urine (from healthy persons) is mainly aseptic (Otterpohl 2002).

Maintenance is crucial therefore it is recommended that the users cover after defecation the faeces with dry earth, ashes, sawdust or a mixture of these to minimise the water content and thus odour and flies. The faeces-chambers and the urine-tank have to be monitored, when one tank/vault is full (faeces-vault up to app. 80%), the urine/ faeces should be directed to the other compartment.

Some ecosan projects failed, not due to a lack of the system, but due to not understanding the system and a lack of maintenance (Austin 2003, Del Porto 1999).

Figure. 1: Photos of the old (left) and new school-toilets (Source: Deegener)

Results and Conclusions

It was shown that the installation of double vault urine diverting toilets is a low cost, very fast and easy to realise possibility to protect the groundwater and thus improve health conditions. It was also shown that with proper education even 6 year old children understand the principle of diverting toilets as a part of Ecological Sanitation because even in the critical first weeks of usage no problem occurred. The new toilet system was accepted very well by the teachers and the pupils. The interest of the parents and citizens in Ecological Sanitation is very high and many want to install ecosan toilets.

This pilot-project can act as an example not only for other Ukrainian villages, but for many (Eastern European) countries, which are facing similar groundwater- and health-problems.

References

Austin, A. (2003). “An unsuccessful sanitation scheme at a rural school: Lessons learned from the project failure.” In: *2nd International Symposium on Ecological Sanitation*, April 7-11 2003,Lübeck, Baltic Sea, Germany.

Del Porto, D. and Steinfeld, C. (1999). *The composting toilet system book: a practical guide to choosing, planning and maintaining composting toilet systems*. CEPP, Concord

Esrey, S et al. (1998). *Ecological Sanitation*. Sida, Stockholm

Otterpohl, R. et al. (2002). “Innovative Technologies for Decentralized Wastewater Management in Urban and Peri-Urban Areas*”*. Keynote presentation at *IWA Small2002*, Sept 2002,Istanbul, Turkey.

Vinneras, B. et al. (2003). “Tentative guidelines for agricultureral use of urine and faeces.” In: *2nd International Symposium on Ecological Sanitation*, April 7-11 2003,Lübeck, Baltic Sea, Germany.