

Success factors and barriers for acceptance of Urine Diverting Dry Toilets (Ecosan) in Kyrgyzstan

Authors:

*Fedde Jorritsma**: Address: WECF (Women in Europe for a Common Future) The Netherlands, P.O. Box 13047, 3507 LA Utrecht, The Netherlands. E-mail: fedde.jorritsma@gmail.com

Gero Fedtke: WECF, Address: St.-Jakobs-Platz 10, 80331 Munich, Germany. E-mail: gero.fedtke@wecf.eu

Alp Ergünsel: Address: WECF/TUHH, Eißendorfer Straße 42 (M) D-21073, Hamburg E-mail: alp.ergunsel@wecf.eu

Abstract

From 2006 – 2008, WECF network implemented the project “A sustainable decentralized wastewater management for Kyrgyzstan”. Sixteen UDDT were constructed, 15 of which are included in this case-study. The main objective of this study was to identify success factors and barriers for introducing UDDT (Urine Diverting Dry Toilets) in Kyrgyzstan. Main indicators were defined to analyse the reasons for the acceptance or non-acceptance.

Of the 15 toilets analysed in this study, 73% were fully and partly accepted by summer 2008, about one year after their construction. This figure rose to 87% by late autumn 2008. The main barriers were: perception of flush toilets as the best solution, combined with scepticism towards something new. The results indicate that the following aspects facilitate the introduction of UDDT in Kyrgyzstan:

1. Training and support of the users by experts. Especially smell problems have to be solved.
2. Involvement and feeling of ownership: The decision to construct a UDDT for the household should be taken by wife and husband together. Households should significantly contribute.
3. The chances for UDDT to be accepted are significantly higher with a demand driven approach. E.g. high groundwater table and farmer-oriented households.

Key-words: *Acceptance; Kyrgyzstan; Project implementation; Success factors and barriers; Urine diverting Dry Toilets.*

1. Introduction

Wherever you are in the world, toilets are not a topic most people feel comfortable talking about –they are a sensitive issue. Early in 2006, a WECF staff member visited Kyrgyzstan to find organisations interested in cooperating in this project. During his visit, he was shown around the project villages and he always went to see the toilets, taking photographs. This bemused local villagers and raised questions: has he some infection? The director of one of the local partner organisations expressed his scepticism later by: “My first thought was: this guy can’t be serious!”

In December 2006, four Kyrgyz NGOs, supported by WECF, started working in partnership on a 2-year project to introduce the concept of sustainable sanitation to Kyrgyzstan funded by the German Federal Environment Ministry (UBA – Umwelt Bundes Amt).

Kyrgyzstan is a country of dramatic scenery and picturesque mountainous landscapes. But it is also among the poorest EECCA states: 40% of the 5.36 million population are estimated to live below the poverty line. (1) FAO estimated in 2003 that 66% of the population lives in rural areas. (2) The average poor rural household has normally no more than a small piece of land, whose products are mainly used for subsistence. Most households do not have permanent sources of income as job opportunities are often scarce. The systems of the Soviet period supplying the population with water, energy, work, food and consumer goods have mostly collapsed. Practically only nitrogen fertilizers are available, but at rising prices and unaffordable for a growing percentage of the rural population.

Related to poverty, a major problem is sanitation. Only 1% of the rural population in Kyrgyzstan has access to an inside toilet, 97% use outside pit latrines, and 2% do not have a toilet at all (3), while winters are normally extremely cold (below minus 10 ° C during daytime). In the villages there are sometimes wastewater treatment plants, which were built in Soviet times but are no longer functioning. This inadequate sanitation is likely to cause infectious diseases like diarrhoea. Out of 1,400 school children examined from three provinces, at least one of the four common parasites *Giardia lamblia*, *Enterobius vermicularis*, *Hymenolepis nana*, *Ascaris lumbricoides* infection was found in the faeces of 75%, 61 % and 79% of the children in Talas, Naryn and Issyk-Kul provinces respectively. (4)

2. Study objective & Methodology

The project presented in this study was conducted in rural or peri-urban regions in Chui, Issyk-Kul, and Jalalabat provinces. Local project partners (Ecological Movement BIOM, Habitat Foundation Kyrgyzstan, and Public Association ULGU) had the task to try different designs and material with support of WECF. More significantly, however was the different approaches partners used in the implementation strategy. Sixteen UDDT were constructed, 15 of which are included in this case-study. The main objective of this study was to identify success factors and barriers for introducing UDDT in Kyrgyzstan. Here adequate implementation is understood as to provide quality, satisfaction of use and acceptance among beneficiaries, thus providing good demonstration examples for long-term replication.

Semi-structured interviews, where questionnaires were prepared, were conducted with almost all UDDT owners (men, women or both) in the project; once during the building process and once when the toilets were in use (see annex 1). Data was cross-checked with Kyrgyz NGOs and key respondents in villages e.g. neighbours of UDDT owners, local authorities and just people on the street. These interviews had an informal character. Interviews have been documented in spreadsheets and text documents. In summer 2008, the project and results were evaluated and discussed by Kyrgyz partners together with WECF which is also incorporated in this study.

3 Results

Motivation to implement a UDDT

The top motivator without exception amongst 10 UDDT owners questioned was a practical and personal one: the bad state of their current toilet, mostly regarding the smell. Additionally, the cold in winter as well as draught coming frequently out of the pit were mentioned as major perceived shortcomings of the pit latrines. Environmental pollution was

clearly a secondary motivator. For women, ease of cleaning was a strong motivator, since this falls under their responsibilities. Some male farmers showed especially interest in the free fertilizer aspect. In some cases status and the local traditions of hospitality also played a role with two opposite reasons: they wished to offer a clean and comfortable toilet but on the other hand they felt the barrier to explain how the new toilet. In areas with a high groundwater table, the pit latrine has to be moved often because it is impossible to dig a deep pit, or the pit is filled with water which causes bad smells.

Initial Barriers

People expressed interest, but at the same time could not really believe that UDDTs would function as promised. Flush toilets are seen as the “civilized” sanitation standard; and most people who currently use pit latrines wish to achieve this standard. Therefore, education and raising awareness was crucial; all partner NGOs indicated this to be one of the most important success factors of their project. The fear of bad smells proved to be another important barrier, and people remained sceptical about smell prior to the construction of their new UDDT toilet. In all cases the toilets were built outside the house except one toilet attached to an office. They tried to find a balance between walking distance and risk of smell near the house. Nevertheless, the new UDDT was mostly built closer to the house than the old toilet, which shows a cautious trust in UDDT. The application of urine and faeces as fertilizer was also met with scepticism. The process of acceptance appeared to be slowly. The old pit latrine continued to be the toilet used most. It took the owners about a year to

gradually switch to using the UDDT until finally, when the old pit latrine was full, they decided not to move it to a new place and completely switched to using the UDDT. As figure 1 show, 57% of the 15 toilets were fully accepted by summer 2008, about one year after their construction, 73% fully and partly. Partly accepted is here understood as not by all family member or/and not the whole year long.

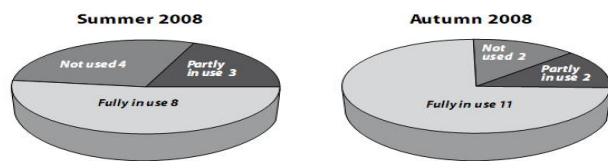


Figure 1: Acceptance of UDDT

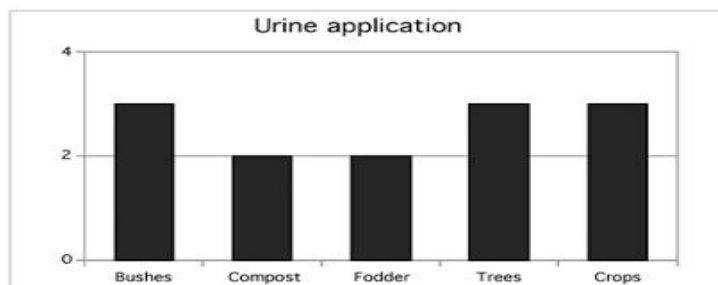


Figure 2: Urine application among UDDT owners

Handling of toilet products and reuse of nutrients

Handling urine and faeces, and applying them to plants that will be eaten proved to be an idea most people met with much scepticism. The owners of the 13 toilets in use were interviewed about how they deal with the urine and faeces in practice. The results are summed up in figure 2. The figure does not include application of urine to several categories of plants, but

only the category most of the urine is applied to. Most toilet owners decided not to apply urine to plants directly intended for human consumption with a short “psychological distance” between the fertilizer and the crop. This was done only in 3 of 13 cases with

application on crops growing close to the ground like cucumber, tomato, cabbage, watermelon, and potatoes. The “psychological distance” is short, since the crop/fruit in these cases is close to, or even in, the ground. Seven owners applied the urine as fertilizer to plants with a big “psychological distance”, such as fruit trees (the fruit are higher up on the branches when compared to e.g. cabbage) or compost (where there is a bigger distance in time and the additional composting process between applying fertilizer and application to a plant). Only in 3 cases the urine was not used as a fertilizer, but simply discharged to the environment nearby the toilet (in most cases bushes) without the intention to have better crop production. These include the two toilets of public character. Asking why they do not apply urine on their crops, respondents referred to the idea of eating vegetables and fruits fertilized by urine being unpleasant. They also cited hygienic aspects, displaying distrust in the safeness of application even according to sanitization guidelines. As one toilet-owner said: “If my guests know that the tomatoes are fertilized with urine, they will not eat them”. Not surprisingly, farmer orientated households (who sell agricultural products to the markets) were applying the urine more effectively: during the development phase of the plant and crops with a high nitrogen demand. Also nitrogen enrichment of compost by urine application seems to require some specific agricultural knowledge – this was practised only by farmer-orientated households. In one village, the toilet owner indicated to have no need for fertilizers because cow manure was available in abundance.



Figure 1: Kyrgyz farmer shows his corn field fertilized with urine

Only one farmer had already used the faeces of his single vault UDDT. After composting he spread them around his fruit trees. When asked about the prospect of applying sanitized faeces, many respondents admitted they were reticent because of hygiene aspects. Some planned to put the faeces on a heap covered with soil after the two years sanitizing time for further composting. Others explained they would incorporate it in the soil but on safe places like for trees or flowers. Only three persons, who are familiar with composting, wanted to compost the faeces together with other organic matter and apply it in their gardens on edible plants.

Factors of success and barriers

Six indicators were chosen to analyse the reasons for acceptance or non-acceptance of Ecological Sanitation. All of negative values held true for two of the four toilets not being used in summer 2008, and some of them for the other two not being used (see table 1 and Annex 2). All four toilet owners and their families had been given support and it had been discussed with them intensely how to solve the problems. But those two owners for whom all six factors held true decided not to start using the UDDT by autumn 2008.

Toilet not in use, Summer 2008	1. No proper smell prevention	2. External constructor	3. Only husband or only wife trained	4. Single vault	5. Low financial contribution	6. High groundwater table	Total negative indicators	Toilet being used in autumn 2008
UDDT 1	x	x	x	x	x	x	6	
UDDT 2	x	x	x	x	x	x	6	
UDDT 3		x		x		x	3	x
UDDT 4	x	x	x				3	x

Table 1: Negative values for UDDT not in use summer 2008

Most of these

indicators have to do with three main aspects: training and support from project staff (indicators 1-4), and with involvement and feeling of ownership on the side of the toilet owners (indicators 3-5). A third aspect have to do with the selection of households this should be on basis of demand and motivation like the groundwater table and financial contribution (indicator 5-6). It is noteworthy that of all these indicators, the best full acceptance level (100%) was reached when the toilets were built by the owners themselves, and the lowest (20%) when they were built by hired constructors (see Annex 3).

Smell prevention

From a construction point of view, proper smell prevention is provided for UDDTs via:

1) correct diameter of ventilation pipes >100mm, 2) proper slope in urine pipes, 3) water-resistant cover on the floor, 4) proper separation, 5) usage of cover material, and 6) regular cleaning.

Seven out of the fifteen UDDTs fulfilled all requirements in autumn 2008. In many cases, toilets faced initial problems with smell that could be solved easily by improving the construction. The major technical problems creating smell proved to occur with ventilation, urine pipes, and self-made Urine Diverting seats or slabs. In three cases the owners did not use any cover materials for the faeces, causing smell. In two cases this was accepted by the (male) household members, but in one case this smell was the reason why the toilet was not used at all. After this problem was identified and the owners switched to proper covering, the smell problem was solved and the toilets fully accepted. All these cases show a proper training for trainings is needed. In all cases, toilet owners needed additional information and support.

Involvement in construction

Five out of the 15 UDDTs were built by hired constructors. All other UDDT were built by the men of the household who were often supported by NGO-staff and or neighbours. Those who constructed the toilets themselves explained in the interviews that they did not perceive the construction as difficult. Of the 5 toilets built by hired constructors, only one is fully used, while two are not used at all. What had happened was that the hired constructors were not trained properly enough and therefore the constructions showed deficiencies leading to e.g. smell problems. While it would be wrong to conclude that household UDDT should not be built by hired constructors, this indicator clearly shows the importance of proper information and training, as well as personal commitment.

Who has been trained: the gender aspect

For 10 of the 15 toilets, either only the husband or both husband and wife had been trained and informed directly by the responsible organization. All these 10 toilets were fully or partly in use. In 4 cases, only the wife had been trained – 2 of these toilets are among those not used at all. It seems that often the person who decided to build the toilet did also participate in the trainings.

In general it can be said that women focused more on hygiene aspects of the toilet while men paid more attention to technical aspects, and in some cases were especially focused on the reuse of nutrients. In many cases of poorly maintained toilets, the men of the family had taken the decision to build and constructed the toilet without involving their wives. In both cases of toilets not used by autumn 2008, the wives had not involved their husbands. They explained the toilets had technical defects that could only be repaired by their husbands. However, the men in households were sceptical about the toilet and not willing to invest time

and money in fixing the technical problems, which they also did not understand well. These cases indicate that proper involvement of both men and women in the decision making, as well as in training and information is another crucial factor. Furthermore it can be considered to conduct target-orientated trainings where women are trained on maintenance and operation and men in construction of UDDT toilets.

Single and double vault systems for storage of faecal material

Two different types of UDDT have been tried out in the project: single vault (5 toilets) and double vault types (10 toilets). The evaluation shows the better partial or full acceptance of the double vault toilets (100%) in comparison to the single vault toilets (60%). Closer analysis of the problem with the single vault UDDT not being used revealed that problems in design and misunderstandings how to use were the reason. Both of the problematic single vault toilets did not have a proper container to collect the faeces. The owners of single vault toilets in use likewise often mentioned carrying the faeces as a disadvantage. Single vault



Figure 2: Single vault UDDT with too small container

toilets need extra attention to ensure a proper use and a working technical design. In the case of the three functioning single vault toilets, this attention had been paid: In one case a farmer built a compost site next to the toilet and does not perceive it as a problem to empty the faeces container to it every three months. In another single vault toilet the container was placed on rails and can thus easily be removed. The single vault toilet in the tourist camp is used only in summer. During winter and spring the faeces dry in the chambers, from which they are removed to a compost site with shovels when the camp opens again. They are no longer fresh and less unpleasant to handle. Possible further solutions include: using two or more containers and extra space in the faeces chamber to let the faeces dry in the container before they are removed. The use of two or more containers prevents the necessity to handle fresh faeces.

Financial contribution by the owner

In all cases beneficiaries had a contribution to their UDDT ranging from 9-52% of the total material cost. In three cases micro-credit was provided. Two toilets were constructed in addition by interested people without any financial support from the project funds. It should be expected that the purely owner-funded toilets would be better accepted, due to the implied high levels of motivation. The chances for acceptance are indeed higher if the cost share of the owner is above 50%. But the distribution of costs between project funds and the owners has no automatic link to acceptance – 2 cases of initial non-acceptance were found among toilets funded completely by their owners. But in both cases the family switched to using the toilets after technical problems were solved.

Groundwater level

The groundwater level is considered to be high if it is less than 2 meters from the surface. At this height it can interfere with the pit latrine, causing a lot of smell. A high groundwater level also means that the pit latrine has to be moved often, because it is impossible to dig a deep pit. In some areas, where the groundwater level is only about 50 cm below the ground surface in the irrigation season, this means moving the pit latrine every 3-5 months. As has

already been shown, such conditions prompted a higher interest in constructing a UDDT. It is in line with these results that UDDT in areas with high groundwater levels faced no acceptance problems. All toilets which were or still are not being used are in areas with low groundwater levels (see Annex 2)

5 Conclusions, lessons learned and follow-up

This study shows that a successful implementation of Ecosan technologies should not only build on good quality of technical construction but also on adequate knowledge transfer and participation of interested persons, confirming the findings of other recent research on development work. Introduction of UDDT on a wider scale has to pay attention to the following three aspects in order to be successful:

- training and support of the users by experts
- involvement and feeling of ownership on the side of the toilet owners
- demand driven approach

Put into practice, this means it is recommended that a programme for wide-scale introduction adheres to the following:

1. Proper smell prevention and construction, operation and maintenance principles have to be well understood and applied. Men and women have to be trained taking into account gender specific roles (e.g. construction by men, cleaning by women). Expert support has to be available for the households if they cannot solve occurring problems themselves. This support should best be offered pro actively, and regular monitoring should be carried out. The necessary expert knowledge should be built up locally by strengthening the capacity of communities. Good demonstration units should be provided locally; preferably by the experts themselves.
2. The decision to construct a UDDT for the household should be taken by wife and husband together. Households should significantly contribute both with labour and materially. Given the economic situation a system for financial support is needed. The approach of micro-credit and revolving funds are a practicable option for this support. They can be offered by community-based organisations offering also expert support. Contracts between owners, experts, and structures providing financial support could be an important part of a regulatory framework.
3. The chances for UDDT to be accepted are significantly higher in areas with a high groundwater table. They are also high with farmer-oriented households facing a shortage of fertilizer.

Acknowledgement

This study was conducted under the project “A sustainable decentralized waste water management for Kyrgyzstan” conducted by Women in Europe for a Common Future (WECF) in cooperation with the Technische Universiteit Hamburg-Harburg TUHH. The project has received funding of the German Federal Environment Ministry (UBA – Umwelt Bundes Amt).

References

- (1) http://hdrstats.undp.org/2008/countries/country_fact_sheets/cty_fs_KGZ.html assessed Nov. 2008
- (2) FAOSTAT database, available at: www.fao.org assessed Nov. 2008
- (3) McKee et al. (2006), Access to water in the countries of the former Soviet Union - Public Health (2006) 120, pp 364–372.
- (4) Meimanaliev et al. (2005), Kyrgyz Public Health Promotion, presentation at 6th IUHPE European Conference, 3. June 2005, available at: <http://www.bestpractice2005.se/iles/fr201-212.pdf>

ANNEX 1 – Questionnaire used for the case-study during building process and usage of UDDT

Acceptance and use
Why did you decide to construct a UDDT?
Why did you choose this location?
Which problems do you face during usage?
How did you solve the problems?
Are there family members not using the toilet? If not, what is the reason for not using it?
Is the toilet used the whole year long? If not, what is the reason?
Did you receive enough information about the reuse of the nutrients?
In your opinion, what are the main advantages of UDDTs?
In your opinion, what are the main disadvantages of UDDTs?
How do you deal with guests?
What is the guests' opinion about UDDT?
Capacity building and support
What are the main advantages of an UD toilet?
What are the main disadvantages of an UD toilet?
Trainings received by owner/ builder and men/wife? How many days?
Who did participate in trainings: owner/ builder and men/wife? How many days of trainings?
Did you receive enough information about the construction of the new toilet?
Did you receive enough information about the usage and maintenance of the new toilet?
How often did the supporting NGO visit you during construction? Did you receive enough support?
How often did the supporting NGO visit you after construction? Which time intervals?
Sanitizing and reuse
How do you treat the faeces?
Frequency of emptying the faeces chamber?
How do you sanitise faeces (by storage, by composting, for which time)?
How do you collect the urine?
Frequency of emptying the urine canister?
How do you transport the urine?
Do you have problems with the collection /transportation of the urine?
Where do you apply the urine?
Which kind of plants/crops/fruits do you apply it to?
How many litres are applied usually?
Details about application: size of field, dilution?
Which effects of using urine as fertilizer do you perceive?
Do you sell agricultural products to the market?
How do you perceive the quality of the soil of your plot?
Do your neighbors know that you re-use the products?
What is their opinion about re-use?
General (information provided by the supporting NGO)
How many UDDT have been built in the village?
Other project activities in the village?
How was the knowledge transfer organized - how many trained trainers are in the village?
How was this village selected?
By whom was this beneficiary selected?
What were the selection criteria?
How is the toilet owner participating in the project?

ANNEX 2 - Acceptance within the six indicators

