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Acceptance of UDDTs in Eastern Europe, Caucasus, and Central Asia

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Abstract:

The main research question posed in this paper is: to what extent have UDDTs been accepted by users in this region, and which factors impacted acceptance? The research methods include extensive quantitative analysis based on WECF monitoring and registration sheets conducted during the project, in combination with in-depth interviews during project implementation, and several semi-structured interviews post-project implementation. These results feed into certain debates surrounding acceptance of new technologies, such as whether more units within a village will lead to higher acceptance or whether acceptance amongst users is higher when users contribute a larger proportion of their own funds to finance the toilet. Overall, the main findings of this project analysis demonstrate that results vary regionally, which may imply that cultural factors can also impact acceptance and use patterns.

Key Words: Acceptance, EECCA, sustainable development, UDDT

Introduction

The sanitation conditions in rural areas of the EECCA countries is very difficult. Most of the villages are not provided with reliable centralised water supply. Generally, and also for those households analysed in this report, most rural households in the EECCA region utilise pit latrines. Pit latrines however can have very dangerous ramifications for the environment and water sources. The human waste contaminates the groundwater, which is often the source for drinking water leading to various water borne diseases. Pit latrines also tend to be characterised as having the following qualities: poorly constructed superstructure (windy, not rainproof and temperatures may fall below zero in the winter), slippery path to the toilet, poor smell and the

presence of flies. UDDT technology can provide a sustainable, environmentally friendly, economical, and more comfortable alternative in these circumstances.

From January 2008 to December 2010, Women in Europe for a Common Future (WECF) implemented its programme entitled 'Empowerment and Local Action' (ELA). As part of this programme, WECF cooperated with 30 local partners in 10 EECCA countries (see List 1 in Annex).¹ This paper analyses the specific results of a particular component of ELA the introduction of ecological sanitation (Ecosan) in the partner countries. This aspect focused on the implementation of sustainable sanitation technology, specifically the use of Urine Diverting Dry Toilets (UDDTs).² The main research question posed is: to what extent have UDDTs been accepted by users in this region, and which factors impacted acceptance?

Methodology

The means of data collection that were utilised to monitor progress with UDDT construction and the patterns of use of households. The households were visited by the partner organisation as well as by WECF staff. Monitoring by both also provided households with the opportunity to share experiences or receive additional instruction in case of problems. The quantity of visits for monitoring varied per organisation. For instance, some toilets were visited three times, others once.

The means of assessing the results of the ELA project have included three data collection methods:

1. Registration sheets were filled out by the local NGO partners in the local language
2. Monitoring sheets were filled out by the local NGO partners in the local language while interviewing the households
3. Extensive database were filled in by WECF staff while interviewing the households
4. Interviews conducted by author with households

The registration sheets were utilised to track the toilets being constructed by partners. When partners constructed toilets, each one was registered and each was required to answer several questions regarding the household and the toilet design. These include:

1. Name of a household member (family)
2. Village
3. Whether the toilet is single or double vault
4. Quantity of males and females in the household
5. Project contribution to materials
6. Household owner contribution to materials
7. Total cost of materials
8. Cost of labour (2009 and 2010)
9. Owner work time in days
10. Construction year

¹ Bentvelsen, Kitty (2011), 'Empowerment and Local Action: WECF MFS1 Programme', WECF, p.1.

² WECF's ELA project complies with World Health Organisation (WHO) issued 'Guidelines on safe use of wastewater, excreta, and grey-water'. These guidelines specify the proper process for safe sanitation and reuse of human excreta.

WHO (2006), 'WHO Guidelines for the safe use of wastewater, excreta and greywater - Policy and regulatory aspects', Geneva: WHO.

In order to assess the degree to which the toilets were accepted by the households, WECF developed a list of monitoring questions:

Table 1: Monitoring Questions

| Basic acceptance criteria | Scoring | |
|---|--------------------------|--------------------------|
| 1. Are the faeces used as fertiliser? | Yes | no |
| 2. Is the toilet clean? | Yes | no |
| 3. Are there functioning hand washing facilities? | Yes | no |
| 4. Is the UDDT the main toilet? | Yes | no |
| 5. Is the old toilet removed? | Yes | no |
| 6. For how long are the faeces stored? | 1 if ≥ 2 years | 0 if < 2 |
| 7. Is urine being used? | Yes | no |
| Overriding or core acceptance criteria | Minimum – no, not at all | Maximum – yes, very much |
| 8. Is there a smell? | 0 | 5 |
| 9. The extent to which the family likes the effects of fertilisation? | 0 | 5 |

The answers to these questions were given a numerical equivalent. For the first seven basic questions, the possible answers were yes or no which corresponded to a scoring of 1 and 0 respectively.

The other two questions related to two core criteria which are considered as essential for a sustainable acceptance of the UDDT – smell and use of the toilet products. These criteria are scored differently. Answers were ranked from 0 to 5. For the degree to which a smell persisted, a rank of 5 corresponds to no smell and 0 corresponds to foul smell. For the last question, a rank of 5 corresponds to highly effective, positive results, and 0 corresponds to negative, or lack of use.

Integrated into the overall acceptance score these core questions have a higher weight on the overall acceptance score. The overall acceptance score is calculated as follows:

$$\text{Overall acceptance score} = \text{Monitoring result 1} + \text{Monitoring result 2}$$

$$\text{Monitoring result 1} = \sum \text{score basic question 1 - 7}$$

$$\text{Monitoring result 2} = \text{score q 8} / 2.5 + \text{score q 9} / 2.5$$

The maximum possible result is a score of 11 (7 of the monitoring result 1 and 4 of the monitoring result 2). A well accepted toilet is defined as having a score of 5 or higher.

The quantitative results were analysed by correlating the overall acceptance with various aspects of the toilets, including design factors, sex of users, and quantity of toilets in the community. This was done based on the pearson coefficient.³

In addition to the monitoring sheets, a number of toilets were visited and results were cross-checked by WECF staff through interviews with the partner organisations and the households. For 63 UDDT in depth interviews were carried out with the households which were collected in a separated data base (See Annex List 2). This data base serves as a more thorough qualitative analysis that supports the quantitative analysis.

³ The *r* correlate is calculated by utilizing the pearson coefficient. Here, the relationship between two variables that utilise the same unit of measurement is calculated. A score of -1 stimulates a strong negative relationship and a score of +1 indicates a strong positive relationship.

Jackson, Sherri (2012), Research Methods and statistics: a critical thinking approach, Belmont, CA: Wadsworth, Cengage Learning: pp.159-160.

The registration and monitoring sheets were of diverse quality and could not always be used for evaluation. Some toilets have not been finished at the end of the project and could not be fully assessed. In other cases, both monitoring and registration sheets were not fully available or inconsistent and could not be assessed. Although 112 toilets were constructed in Afghanistan, due to the ongoing conflict and lack of security in the country, no WECF staff was able to check the information provided by partners. Although some monitoring may have been carried out by partners, due to the instability, the validity of monitoring sheets and ability to carry out monitoring for each toilet was made difficult.⁴ The table below provides an overview of the implementation of the toilets and the data availability.

Table 2: Quantity of UDDTs for analysis

| | Total quantity of UDDT data | Usable for assessment of acceptance | Usable for qualitative assessment |
|--------------------|-----------------------------|-------------------------------------|-----------------------------------|
| Registration sheet | 861 | 403 | |
| Monitoring sheet | 861 | 403 | |
| Database | | | 63 |

All of this means that the sample size was not random, but rather was chosen due to the needs of this research. Even though the sample size was reduced to more than half for assessment of acceptance, the sample is large enough to ascertain certain results and patterns amongst users and the partner organisations that assisted with the procurement of UDDT technology. 2040 individuals (403 households) were a part of this study.

Results and Discussion

The majority of toilets constructed within the ELA project are well accepted by households, making this project largely successful. Overall, approximately 65 percent of UDDTs are cited as well accepted. This means that out of the total 861 UDDTs constructed, 555,3 of them were well accepted.

Table 33: Quantity of well maintained toilets

| Country | Quantity of well accepted UDDTs |
|-----------------|---------------------------------|
| Afghanistan | 0 |
| Armenia | 22 |
| Azerbaijan | 0 |
| Georgia | 146,8 |
| Kazakhstan | 28,5 |
| Kyrgyz Republic | 236,3 |
| Moldova | 24,0 |

⁴ Bentvelsen (2011), p.8.

| | |
|--------------|--------------|
| Tajikistan | 56,0 |
| Ukraine | 27,7 |
| Uzbekistan | 14 |
| Total | 555,3 |

There are several factors that may impact acceptance of UDD toilets for an individual, a household, and/or community. This chapter assesses these factors.

Education and training

Based on semi-structured interviews with four Georgian partners, education was identified as one of the most crucial factors that will lead to acceptance and use of toilets.⁵ For instance, one Georgian partner explained that he was impressed with the concept of UDDTs, and thought that this option would solve many of the problems that rural Georgians were facing. Upon his participation in the ELA project, he realised that villagers were initially sceptical of the UDDT technology, finding it a strange concept, especially concerning reuse of urine and faeces. After working with the villagers and following instructional seminars, he explained that the villagers were extremely enthused and pleased to be participating in the project. The key to success was proper education in order to overcome initial stereotypes or misconceptions that individuals may have. He continued on to say that after the ELA project was completed, residents of neighbouring villages and other households within the targeted project areas began to invest privately in such toilets, with assistance from partner organisation for construction and education regarding proper use.⁶

Similarly, during interviews conducted with users of well maintained toilets, they explained that their use patterns were significantly influenced by a thorough explanation of how to utilise the UDD toilets and how to keep them clean and without smell.⁷ Another couple explained that they found the concept ‘strange’, yet after seeing a UDDT, how clean it was, the lack of smell, and lack of flies, they were immediately impressed and realised the utility and advantages of such a model.⁸ Another family had a similar experience, and discussed the reaction of guests to their new toilet. Guests were equally impressed with the UDDT, but had to be instructed (verbally as well as with print instructions located in the bathroom) thoroughly on proper use of the UDDT.⁹ Education proved to be one of the most important factors contributing to successful adoption and usage of UDDT technology.

Design of the UDDT

Design aspects that were correlated with acceptance, include the quantity of vaults, the location of the toilet, the presence of urinals, the presence of stairs, and whether a sitting or squatting design was utilised. None of these factors had a significant impact on acceptance overall, yet some regional divergences were present. Toilets built with a double vault design

⁵ Interview conducted by author with director of Greens, Georgia in August 2011.

Interview conducted by author with director of the Development Centre in Khamiskuri on 19/07/2011.

Interview with Rostom, director of Rural Communities Development Agency, by author in August 2011.

⁶ Interview with Rostom, 2011.

⁷ Interview with Mzkala Kiria in Khamiskuri on 19/07/2011.

Interview with Anna Kiria in Khamiskuri on 19/07/2011.

Interview with Inga and Irma Kilasonia in Kheta on 19/07/2011.

Interview with Ali and Nino Kangia in Kheta on 19/07/2011.

⁸ Interview with Ali and Nino Kangia in Kheta on 19/07/2011.

⁹ Interview with Mzkala Kiria in Khamiskuri on 19/07/2011.

tend to be correlated with a slightly higher acceptance than single vault toilets overall and to varying degrees regionally. This was the result expected due to the design of the toilet, as previously explained. The double vault design, because it permits faeces to be stored for drying without being removed from the chamber. This double vault system eliminates direct handling of fresh faeces, unlike the single vault design.

The location of toilets (indoors, outside of the home, or attached to the home), also fails to have a significant impact on acceptance with a slight positive correlation of 0.08 and no statistically significant relationship exists. The presence of urinals also failed to impact acceptance; because urinals are not necessary for use of a UDDT, it is possible that users find other factors more pertinent.

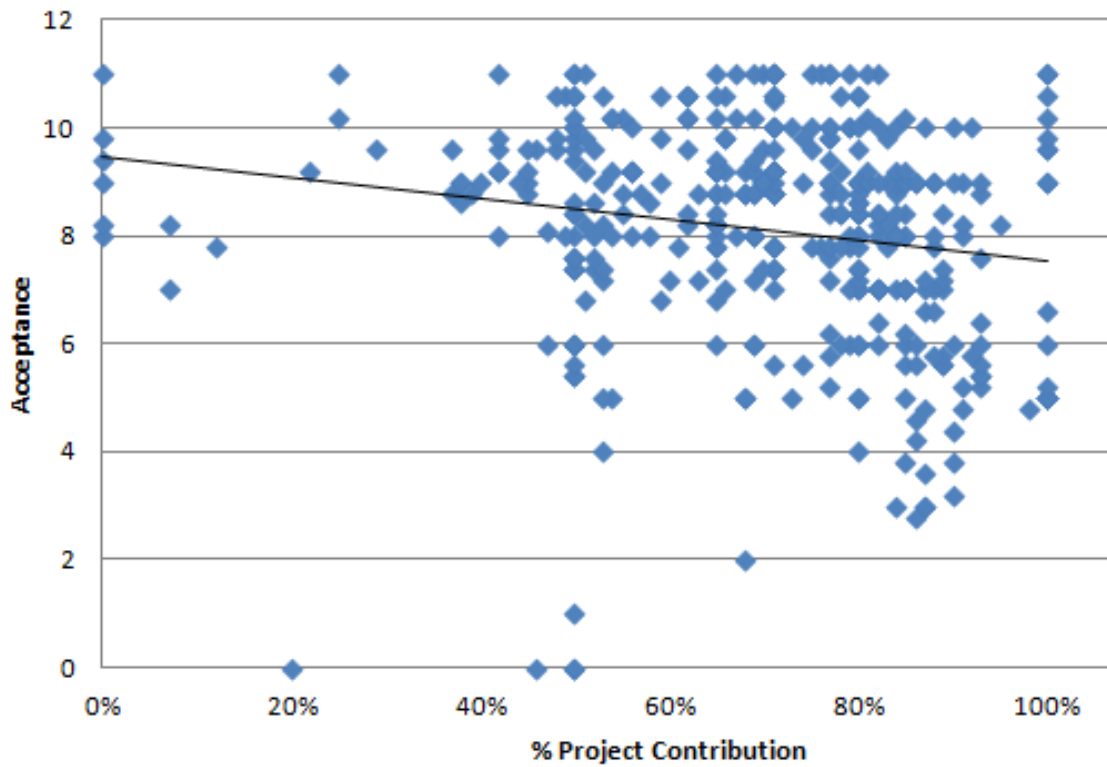
Toilets without stairs tend have higher acceptance amongst users than those with stairs in some regions, while in others, the pattern is reverse. The overall pattern demonstrates no relationship between the presence of stairs and acceptance. The table below summarises the quantity of toilets constructed with and without stairs based on their acceptance scores.

Squatting models have tended to demonstrate higher acceptance than sitting models with a correlation of -0.3. These results depend largely on the organisation, which tended to construct a single design. At the same time, the overall results of acceptance demonstrating higher trends of acceptance in favour of squatting models may be because the design resembles a pit latrine, which may make the adjustment to a UDDT more comfortable for some users who were hesitant to change. The presence of stairs or urinals tends to have no impact on acceptance overall.

Construction

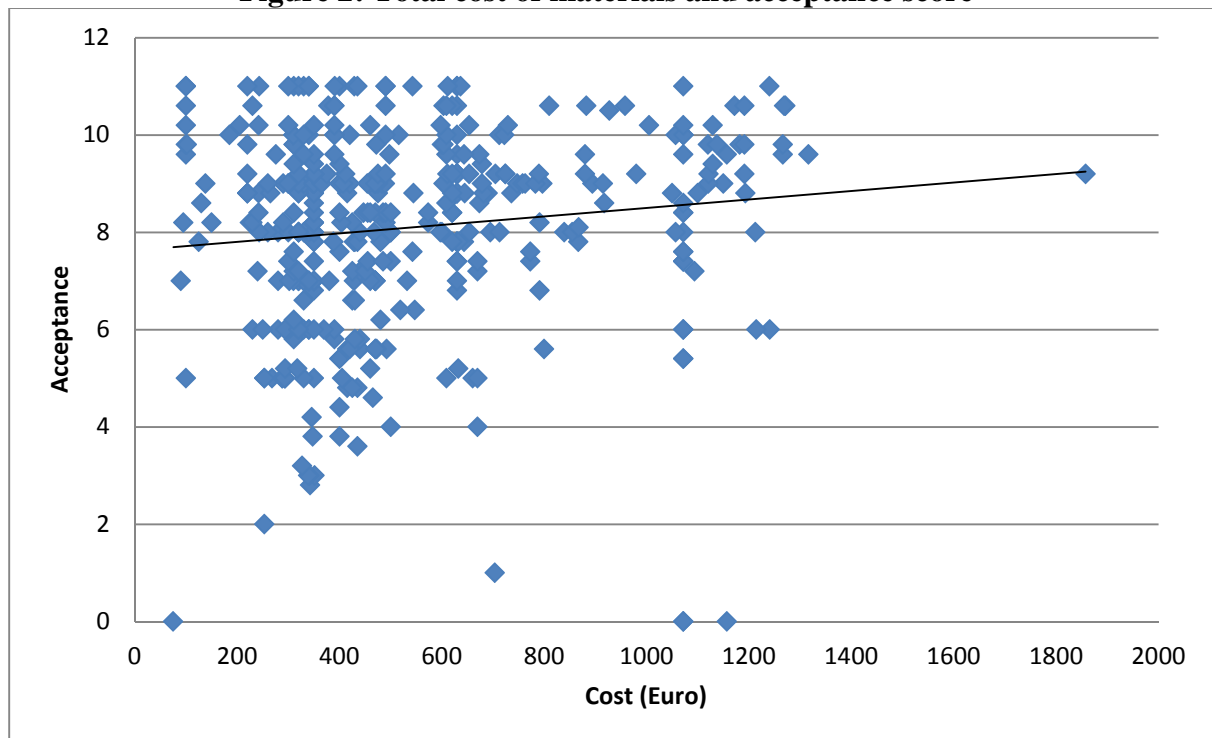
This section assesses various aspects of construction and their relationship with acceptance: the cost of materials, the percent the project contributed to the total cost of the toilet, and cost of the toilet per household user. The results of the project demonstrate that users tend to have a higher acceptance of the UDDTs when they also contribute financially to the toilets. For example, as the percent of the project contribution increased, acceptance tended to lower. This inverse relationship is demonstrated in the graph below.

Figure 1: Project Contribution and Acceptance Score



What this also shows is that installation of UDDTs based on credit may be a viable option for individuals who want to obtain a UDDT after the project duration. At the same time, a relationship between the overall cost of the toilet and acceptance can be noted.

Figure 2: Total cost of materials and acceptance score

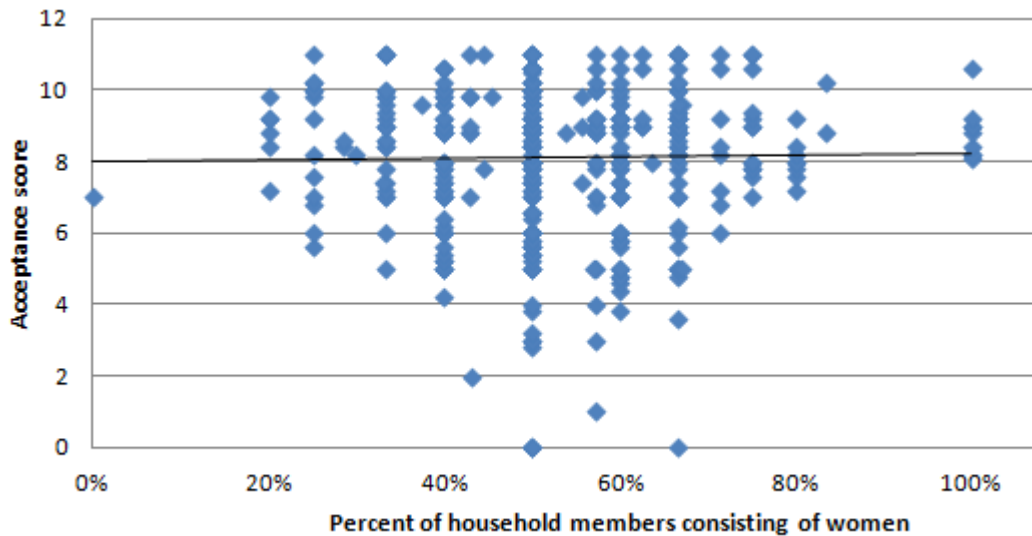


This positive relationship between the cost of the toilet and acceptance can be explained via a few reasons. Firstly, it is possible that owners contributed more money towards the cost of more expensive toilets and are therefore more pleased with the results rather than receiving a donation because they feel a sense of ownership. What is more, it is possible that these more expensive toilets may also serve as bathrooms, and may therefore be more appealing to users because they have several purposes and have showers.

Sex of users

The sex of the household members was also correlated to acceptance in order to understand whether the presence of a particular sex within a household or whether a balanced quantity of men and women would impact acceptance. The results demonstrated that households with more equal gender balances in the household tended to have higher levels of acceptance. For instance, when the percentage of women within the household was correlated to acceptance, there was no relationship found.

Figure 3: Percentage of Women in the Household and Acceptance Score



The results show that as the percentage of women in the household increased, acceptance was not impacted – it did not increase or decrease. No relationship existed between the percentage of women in the household and acceptance.

In contrast to the quantitative analysis, the qualitative analyses and observations during the trainings indicated that a gender balance within the household would be more likely to lead to acceptance. This is also partially due to a division of labour within the household, which was transferred to the UDDTs. For instance, women tend to be responsible for cleaning the toilets, whereas men tend to be involved in construction and handling of faeces. Due to this division of labour, both men and women should be trained on how to properly utilise and maintain the UDDTs.

Quantity of toilets built per village

Results demonstrate that the quantity of monitored UDDTs per village does not impact acceptance of the technology. This result is evident because there is an insignificant correlation between acceptance and the quantity of monitored toilets (-0,05). Regional trends

vary, yet all were statistically insignificant. Similarly to the overall results of monitored toilets and acceptance, if one examines the total quantity of toilets constructed per village and the acceptance per toilet, the same pattern emerges – acceptance has no relationship with the quantity of toilets constructed. The correlation is -0,04, which means that the trend between acceptance and the quantity of toilets per village is slightly negative, but is not statistically significant. Therefore the quantity of toilets per village cannot be considered to impact acceptance.

The varied results of this section feed into a debate as to whether organisations should focus on construction more toilets in a particular village with a concentrated output in fewer villages or whether they should construct fewer toilets per village and target more villages. These arguments in favour of the former goes as follows – that a larger concentration of residents with this technology will be able to assist each other in case of problems, and that UDDTs are more likely to be perceived of as a normal technology if more households have access to it. However, the argument in favour of the later focuses more on finances, and the logic behind it is that if more UDDTs are constructed with donor funding, the villagers will expect an organisation to provide UDDTs to them, and will be less likely to contribute with their own money for obtaining a UDDT. This is also related to acceptance, where households that contribute their own money towards the UDDT are more likely to have higher acceptance than households that do not or households that contribute less.

The results of this project demonstrate that the quantity of toilets constructed per village does not impact acceptance, which in turn questions the first argument that a larger quantity of toilets constructed per village will lead to higher acceptance per household.

Reasons for Use

Based on WECF's online database of in-depth interviews conducted, the advantages identified by users of UDDTs, include: fertilizer, clean, comfort, lack of smell, warmth, urine, distance to house (closer than pit latrine), hygienic, ecological benefits, no need to rebuild (unlike pit latrines), lack of flies, no water wasted, seat, absence of steps, and the appearance of toilet.¹⁰ Free fertiliser, the cleanliness of the toilet, the comfort it provides, the lack of smell, and warmth were most cited by the most households as one of the main reasons for use and advantage of UDDTs over other types of toilets, whereas the others were cited three times or less.¹¹ Similarly, interviews conducted by the author support these findings. Users identified warmth, comfort, lack of smell, and lack of flies as the benefits and reasons for use of UDDTs.¹² Furthermore, the improved social status and dignity gained from utilising a toilet rather than pit latrine were emphasised by WECF partners, as well as households.¹³

¹⁰ WECF Database (2011), 'Zoho Database'.

¹¹ *Ibid.*

¹² WECF Database (2011).

¹³ Interview Greens 2011.

Interview conducted by author with director of the Development Centre in Khamiskuri on 19/07/2011.

Interview with Rostom, director of Rural Communities Development Agency, by author in August 2011.

Interview with Mzkala Kiria in Khamiskuri on 19/07/2011.

Interview with Anna Kiria in Khamiskuri on 19/07/2011.

Interview with Inga and Irma Kilasonia in Kheta on 19/07/2011.

Interview with Ali and Nino Kangia in Kheta on 19/07/2011.

Aside from the practical benefits of UDDTs (warmth, easier access, free fertiliser, etc), these results also show that certain psychological benefits exist of UDDTs. Most of the households involved in the project had pit latrine's prior to UDDTs, and some users explained that the 'beauty' or appearance of the UDDTs were one of their main benefits. These finds were also supported by post-study semi-structured interviews conducted in Georgia, where both WECF partners and household users explained that the toilets not only provided warmth and comfort, but also improved their sense of dignity. Whereas many owners previously were embarrassed to have company because they had pit latrines, with UDDTs, they explained that they could proudly have guests.

Conclusions

This paper leads to several conclusions and brings to light the factors that had the strongest relationship leading to higher acceptance amongst users, summarised below. These are based on overall trends, including all 403 toilets for which data was available. Based on the quantitative analysis, the following categories had the greatest impact on acceptance: squatting toilet, percent contribution of the owner to the cost of the UDDT, and the total cost of materials. The factors that had the least impact on acceptance were: the sex of the users, absence of urinals, the quantity of vaults, the quantity of UDDTs in the village, the cost per user of the toilet, and the absence of stairs. However, the overall results may not be as informative as the results per region due to the diversity of results and possible impact of cultural factors.

In the Caucasus, the factors that had the most impact on acceptance are: less project contribution, presence of double vaults, and the cost of materials. In Central Asia, the factors that had the most impact on acceptance are: less project contribution (higher personal financial contribution), the quantity of monitored UDDTs and total UDDTs in village. In Eastern Europe, the factor that had the most impact on acceptance is an inverse relationship with monitored and total quantity of UDDTs. In Eastern Europe, none of the factors had a strong positive impact on acceptance. Cost of materials and the type of model (squatting or sitting) had no relationship with acceptance. The other factors had a correlation of 0,1 or -0,1, which implies a very slight relationship, or barely any relationship.

In all regions, the sex of users had no impact on acceptance. The other factors varied more amongst the regions. The overall findings of this analysis demonstrate that the results vary significantly between the three regions wherein the ELA project was carried out. The results however to contribute to debates within development, such as whether a donor should concentrate the units provided within a single village in order to stimulate a network of support, or provide a limited quantity of units per village in order to prevent dependency or expectation of free units from a donor. What is more, one of the main findings was that a higher percent contribution of the project correlated to lower acceptance scores. This could imply that projects based on micro-credit could have highest quantities of acceptance. It is possible that household users would feel a sense of ownership which could lead to higher likelihood to utilise the technology provided. This requires further studies.

These results of this research feed into certain debates surrounding acceptance of new technologies, such as whether more units within a village will lead to higher acceptance or whether acceptance amongst users is higher when users contribute a larger proportion of their own funds to finance the toilet.

Annex

List 1: List of partners

Kata Khel; Afghanistan
AWHHE; Armenia
ChWomen; Armenia
Lore Eco Club; Armenia
ECOS; Azerbaijan
Akhalsikhe
FCE; Georgia
GEBMA; Georgia
Greens; Georgia
PAROS; Georgia
RCDA; Georgia
SEMA; Georgia
Agerkech, Kyrgyzstan
ALGA, Kyrgyzstan
BIOM; Kyrgyzstan
CAAW; Kyrgyzstan
HFHK; Kyrgyzstan
ULGU; Kyrgyzstan
Unison; Kyrgyzstan
KAWS; Kyrgyzstan
MCJM; Kazakhstan
UGAM; Kazakhstan
YGN; Kazakhstan
ECOTOX; Moldova
WISDOM; Moldova
ASDP NAU
SAFO; Tajikistan
YECT; Tajikistan
MAMA-86; Ukraine
BSWC, Ukraine
Vozrojdenie; Ukraine
Mehriban; Uzbekistan

List 2: WECF online database questions

1. Date of monitoring
2. Evaluator
3. Country
4. Surname of household member interviewed
5. Respondent(s)
6. Number of UDDTs in village
7. Village name
8. Number of users in the household
9. Photo of the toilet
10. Total cost of materials
11. Contribution of household for the toilet
12. Financing

13. Drinking water source
14. Depth of ground water table (m)
15. Distance of hand-washing facility (m)
16. Distance of toilet from the household entrance (m)
17. Time that the toilet is in use
18. Supporting organisation(s)?
19. Is it partly in use and why?
20. By whom was the toilet constructed?
21. Technical problems observed
22. Kind of cover material
23. Description of technical problems
24. Reason of technical problems addressed by the owner?
25. Problems with maintenance and usage?
26. How is the toilet cleaned (materials, frequency, by whom)?
27. Ventilation type?
28. Remarks on maintenance and usage problems?
29. Reasons of usage and maintenance problem addressed by respondent?
30. Materials used for under-structure?
31. Kind of urine diversion device?
32. Kind of toilet?
33. Faeces removal?
34. How many urine tanks are in use?
35. After how many days is one urine tank full?
36. When and how often is the urine used?
37. Urine blocker?
38. For what is urine used?
39. What are the perceived results of urine and faeces application?
40. Perception of soil quality?
41. Soil input before?
42. How many faeces collection units are used?
43. After how many months one faeces collection unit is full?
44. To what extent is the respondent satisfied with the toilet
45. Main advantages?
46. Main disadvantages?
47. What do the neighbours think about the UDDT toilet?
48. Who has been trained, about what, how long was the training in hours?
49. How often has the local organisation visited the toilet during construction and afterward?
50. How was the household selected, how have the beneficiaries participated in the project?
51. Access to knowledge: Meet with other toilet owners? Experts in the village? Resource centre?
52. Satisfaction of the training?
53. Other crucial information said by respondent?
54. Other crucial information from evaluator?
55. Toilet preference?
56. The toilet is used by all household-members for faeces and urine?
57. Old toilet removed?
58. Canalisation available?
59. Preselected by WECF staff?

60. Anal washing opportunity available?
61. Urinal available?
62. Are products fertilised with Ecosan sold?
63. Has the constructor been trained?
64. Urine application? Urine application?
65. How and for what is the faeces used?
66. Surface of urine application (m2)?
67. If other technical problem?
68. If other usage/maintenance problems?
69. If other urine application?
70. Toilet usage?
71. If other?
72. Other toilets in household?
73. What is the size of one faeces vault/collection unit?
74. Price of fertilizer?
75. Number of visits local NGO during construction? (times/month)
76. Number of visits local NGO after construction? (times/month)
77. If other wastewater management?