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Abstract
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Keywords
acceptance, ecosan, gender-sensitive, MHM, perception, pit latrine, school sanitation, UDDT, WASH

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Abstract

In rural areas of Eastern Europe, the Caucasus and Central Asia (EECCA) without reliable piped water supply, the conventional school sanitation system – the pit latrine – is leading to hygienic and environmental problems. Urine diverting dry toilets (UDDT) have been demonstrated to be an alternative, ecological sanitation solution for rural schools of the EECCA region. This study compares the acceptance, perception and absenteeism of students at schools served by the two different sanitation systems (ecosan versus pit latrine), comprising 18 schools in six countries of the region. A combination of quantitative and qualitative data collection methods was applied: absenteeism data from official school records (only in Eastern Europe and the Caucasus (EEC), a standardized questionnaire, and focus group discussions (FGDs).
Results of the EEC school records show that the intervention led to a significant decrease in monthly absenteeism; however, a bigger school sample size is needed to confirm the results. Overall, high acceptance of school toilets can be translated into sanitation conditions providing comfort, cleanliness and privacy. Both male and female students preferred the UDDTs compared to pit latrines in all studied countries. The acceptance is significantly higher in areas where pit latrines are predominant, as in Central Asia (CA), in contrast to EEC. The study highlights the impact poor quality sanitation has on students` fluid intake especially in CA. Girls benefit more from the intervention, as they suffer more than boys from the inadequate sanitation conditions of the common pit latrines in rural schools.

Key words: acceptance, ecosan, gender-sensitive, MHM, perception, pit latrine, school sanitation, UDDT, WASH

INTRODUCTION

Worldwide about 443 million school days are lost due to Water, Sanitation and Hygiene (WASH) related diseases (Roma & Pugh 2016). A systematic review by Wolf et al. (2014) confirms the considerable impact of drinking water and sanitation on diarrheal disease in low- and middle income settings. In Eastern Europe, the Caucasus and Central Asia (EECCA region) the water and sanitation infrastructure has deteriorated since the 1990s and service has been further disrupted due to poor maintenance (UNICEF 2012, Valent et al. 2004). Most EECCA countries have standards in place, but these often neglect critical WASH aspects and additionally, the complex legal framework hampers their implementation (WHO 2016). According to an analysis carried out by Prüss-Üstun et al. (2014) about 10 diarrhea deaths per day in the WHO European region are WASH related. There is a big gap between rural and urban areas in terms of hygiene and sanitary conditions, which becomes obvious in schools. Reviews of sanitation in rural Moldovan and Kyrgyz schools show that the sanitation conditions have deteriorated in recent years and are considered one of the most pressing hygienic problems faced by the health authorities in the region (UNICEF 2011, National Center of Public Health Moldova & UNICEF 2011). Sanitation facilities in rural schools are usually outdoor pit-latrines located far from the school buildings, which is predominately a risk for girls. Samwel & Gabizon (2009), UNICEF (2012) & UNICEF Georgia (2013) state that, particularly in rural areas of the EECCA region, many school toilets are in poor condition.

Sanitation-related infections and parasitic diseases are spreading in school settings, e.g. in Moldova, these diseases had increased by 33% among students aged 15-17 years from 2004 to 2007 (National Center of Public Health Moldova & UNICEF 2011) and are highly prevalent in Tajikistan (Matthys et al. 2011).

Depending on the hydro-geographical situation, a high density of pit latrines and the lack of a sufficient safety distance between toilets and wells can result in contamination of potable groundwater supplies by microbes and nitrates (Banks et al. 2002; Herbst 2006). This puts the rural population at constant risk of contracting waterborne diseases such as diarrhea, hepatitis A and methemoglobinaemia. An Armenian review showed that the major cause of water-related outbreaks was the cross-contamination of drinking water by wastewater (Anakhasyan et al. 2012). The Western standard sanitation system with flush toilet and adequate wastewater management can usually not be installed in areas without a reliable piped water supply. According to WHO & UNICEF (2014), 49% and 21% of the population in Central Asia and Eastern Europe, respectively, have no access to piped water supply. In areas lacking piped water supply, where pit latrines are common, an alternative is the ecological sanitation (ecosan) option. The so-called urine-diverting dry toilet (UDDT) is suitable especially for rural areas such as in the EECCA region. The UDDT system separates urine and fecal matter at source, and collects and treats both streams safely (Rieck et al. 2012). The installation of UDDTs in schools can immediately improve the hygienic situation, the comfort of the users and reduce the groundwater pollution (Deegener et al. 2009). The UDDT system

together with hand washing facilities have been introduced by WECF and local NGOs, it was accompanied by 15 years of raising awareness/training campaigns in 10 countries of the EECCA (Wendland et al. 2011). For school sanitation in Moldova, UDDTs have been accepted as a standard technology: there are UDDTs in more than 55 rural schools (Hecke 2017) and a national construction norm was developed (Ministry of Regional Development and Construction Moldova 2016).

Figure 1. European-Asian map indicating the countries included in this study

The aim of this study was to address the following questions:

How do secondary school children in the rural EECCA region accept school toilets? What are the perceived differences between ecological and conventional sanitation systems? Are there relevant differences between the three sub-regions, Eastern Europe, the Caucasus and Central Asia, and between boys and girls? Is there a relationship between the two types of sanitation systems and fluid intake at school? What is the impact of school sanitation on absenteeism of girls during puberty?

Talking frankly about toilet behavior and menstrual hygiene management (MHM) can be difficult for children and adults alike; therefore, the authors of this study combined quantitative and qualitative methods to collect reliable data.

Selection and Description of the Schools

For this study, two countries from each sub-region of the EECCA region were chosen: Moldova, Ukraine for Eastern Europe, Armenia, Georgia for the Caucasus and Kyrgyzstan, Tajikistan for Central Asia. The selection reflects the countries where WECF has run ecosan projects and is part of a network with various stakeholders. In these countries, 18 public rural schools, 10 with ecosan toilets (ecosan schools) and 8 with the traditional toilets, the pit latrines (reference schools), were chosen. The schools were selected from a group of schools where WECF supported the intervention of installing an ecosan toilet; the schools participated on a voluntary basis. For comparison, "reference schools" were selected, these schools were situated near the "ecosan schools" and had similar frame conditions; the major difference was the sanitation system.

To characterize the schools and their sanitation systems, the size of the rural schools and the installed number of toilets are given in Table 1. The schools size ranged between 36-490 students with 50% each boys and girls. The availability of toilets, calculated in boys and girls per toilet cabin or/ and urinal respectively, on average 27 boys and 43 girls shared one toilet (urinal), this differs from the recommendation by Adams et al. (2009) and UNICEF (2012) which recommends 25 students share a toilet facility.

Ecosan School in Armenia Outdoor

In both school types, ecosan and reference had segregated toilets with separate entrances for boys and girls. Ecosan toilets, in addition, had separate cabins with lockable doors for each toilet. Pit latrines without functional locks mostly had slabs poorly separated with walls at half room height (see photos). Furthermore, they were located relatively far from the school building, which is required by construction regulations to avoid odor in the classrooms, whereas the ecosan toilets were inside or adjacent to the school building.

METHODS

The quantitative data were gathered by the extraction of absenteeism data from official school records and a standardized questionnaire. Additionally, focus group discussions (FGDs) were performed to obtain qualitative data. The data was collected and kept anonymously (no name on questionnaire, questionnaire kept with WECF).

Table 1. Number of students and availability of toilets/urinals in the selected rural ecosan and reference schools

	Ecosan school (10 schools)		Reference school (8 schools)	
	No of students		**No of students**	
Average Min-Max	262 36 – 490		325 196 - 449	
	No of boys per toilet/ urinal	No of girls per toilet	No of boys per toilet	No of girls per toilet
Average Min-Max	27 8 – 43	43 4 – 100	36 23 – 110	37 25 – 115

Official School Records

The schools in the EECCA region keep official school records (class books) where teachers note daily absenteeism for each student. For this study, records of 10 schools (5 ecosan and 5 reference schools) were screened for at least two years of 8th, 9th and10th graders, covering the year 6 months before the intervention ("before ecosan") and the year 6 months after the intervention ("after ecosan"). Absenteeism data from the records was extracted in a sex-disaggregated form for students being absent for an entire day. The schools were located in Armenia, Georgia, Moldova and Ukraine. Unfortunately, it was not possible to get absenteeism data from the Central Asian countries Kyrgyzstan and Tajikistan.

Questionnaire

The standardized questionnaire was comprised of about 16 closed questions on school toilets, including toilet acceptance and perception, see appendix. It was drafted in English and translated into Armenian, Georgian, Kyrgyz, Romanian, Tajik, Ukrainian and Uzbek by the local partners (Uzbek is the local language in Tajik villages). After a pre-test at three schools in Tajikistan and Kyrgyzstan, the questionnaire was revised and adapted at a few points to optimize understandability. The female version of the questionnaire contained two additional questions on MHM. At least 15 girls and 15 boys (9th graders) at each school were selected by the teacher and asked to complete the standardized questionnaire on a voluntary base. In addition to the teacher, a local NGO member was present in the room while the students were given the questionnaire format and filled it in on their own. The data were assessed anonymously.

Ecosan School in Armenia Indoor

Focus group discussions (FGD)

Students were selected to participate in the FGDs from those who completed the questionnaire. Participation was voluntary and children were free to withdraw at any time. During the gender-sensitive discussions in the girls´ group, MHM was intensively addressed, and the discussions were conducted by WECF or local NGO members in a separate classroom and following written instructions (Zomerplaag & Mooijman 2005). An additional local assistant (same gender as the FDG participants) took notes on the interactions and made observations on group dynamics. Teachers were not present during the discussion. The topics discussed covered the same issues as the questionnaire. The FDG duration varied between 30 and 90 minutes. The average duration was 35 minutes in the female and 30 minutes in the male groups.

Study Population

The studied population were exclusively students, aged between 13 and 17 years (average 14 years), see Table 2.

Reference School In Georgia Outdoor

Statistical Analysis

Data extracted from the official school records and the questionnaire was analyzed statistically.[1]
For the questionnaire data, all preconditions for the Chi-squared test were met. P-values of $p < 0.05$, $p < 0.01$, $p < 0.001$ were regarded as statistically significant, very significant and highly significant, respectively. The official school record data was not normally distributed according to the Kolmogorov-Smirnov test, at a significance of $\alpha = 0.05$. Therefore, two-tailed Mann-Whitney U tests were conducted.

Limitations and sources of bias

As schools with ecosan facilities are not common, a random selection of schools was not possible. The involvement of teachers in the selection of students answering the questionnaire a participating in the FGDs may have biased the results in terms of selecting those expected to provide the right answers, but

Table 2. Overview of the study population and methods

Method	No. of schools		Country (no. of ecosan/reference schools)	No. of students per school	Total no. of students
	ecosan	reference			
Official absenteeism records	5	5	Armenia (1/1), Georgia (1/1), Moldova (2/2), Ukraine (1/1)	72-108 (50% girls)	931
Questionnaire	10	8	Armenia (1/1), Georgia (1/1), Kyrgyzstan (1/1), Moldova (3/2), Tajikistan (3/2), Ukraine (1/1)	at least 15 of each girls and boys	636
Focus group discussion	10	8	Armenia (1/1), Georgia (1/1) Kyrgyzstan (1/1) Moldova (3/2) Tajikistan (3/2) Ukraine (1/1)	at least 6-10 of each boys and girls	145

1 Programs used: Microsoft Excel, Version 14.0.0, 2010 (Microsoft Corporation), SPSS for Windows, Version 20.0 (SPSS Inc. U.S.A) and R, Version 3.1.1, 2014 (R Foundation for Statistical Computing).

this was unavoidable under the given circumstances. Due to organizational restrictions, it was not possible to administer all methods in all countries included in this study. Thus, the absenteeism survey was only carried out in four countries of Eastern Europe and the Caucasus (EEC): Armenia, Georgia, Moldova and Ukraine. The interpretation of our results was limited by the lack of baseline data for reference.

Reference School In Georgia Indoor

RESULTS

Absenteeism according to official school records

A total of 931 students (with 50% female students) from 10 schools had absenteeism data recorded for one school year (8 to 10 months) before and after the ecosan intervention.

Boys are missing significantly more often than girls (Table 3).

Figure 2 shows the absenteeism rate distribution by school before (year 1) and after the ecosan intervention (year 2).

For the ecosan school, the monthly absenteeism rate in year 2 is reduced by 18% compared to that in year 1. The differences in school attendance before and after ecosan are significant, with a probability of 58% that the absenteeism rate in year 1 is higher than in year 2. Students from reference schools are significantly more often absent in year 2 compared to year 1.

Table 3. Statistical results of the absenteeism survey (Mann-Whitney U test)

Factor	Groups	N	U value	p value	Effect Size
Boy or girl	Boys	3894	6391316	0.000	0.417
	Girls	3934			
School (Ecosan)	Year 1	1733	1269307	0.000	0.415
	Year 2	1767			
School (Reference)	Year 1	2075	2225716	0.006	0.476
	Year 2	2253			

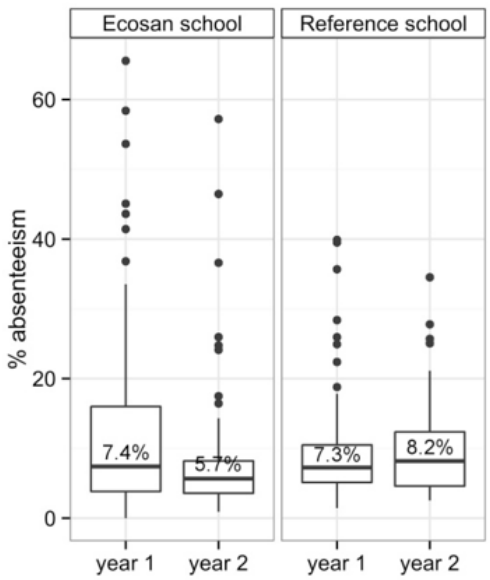

Figure 2. Monthly absenteeism rate distributions by year and type of school

Questionnaire

The statistical results of the questionnaire reveal inter alia that students at ecosan schools less often skip school (Table 4).

Acceptance and use of the school toilet

Most of the questions (10 out of 16) dealt with acceptance and use of the school toilets.
In the ecosan schools: the majority of the students were "satisfied" or "very satisfied" with the school toilet. There is a significant difference between EEC and CA, but not between boys and girls. In CA, the satisfaction is higher than in EEC, 98% of the girls and 99% of the boys are "satisfied" or "very satisfied" compared to 82% and 80% for girls and boys in EEC, respectively (Figure 3). Crosschecking the same question with classmate responses, the overall numbers for satisfaction is almost the same. Thirty five percent of the ecosan school students replied that they prefer to use the toilet at home, 41% the school toilet and 24% had no preference. Thirty-four percent of the girls and 24% of the boys replied that they always use the school toilet, 27% of the girls and 33% of the boys sometimes and only 1% of both never use the school toilet. Sixteen percent of the students replied that they never go to the school toilet to defecate.

Table 4. Statistical results of the questionnaire analysis (Chi Square test)

Topic of question	Ecosan school / reference school		EEC / CA		Ecosan school: girls/boys		Reference school: girls/boys	
	N	p value	N	p value	N	p value	N	p value
Acceptance of toilet (4 questions)	573-627	<0.001	573-627	<0.001	328-359	0.238	240-275	<0.001
Use of school toilet (6 questions)	620-629	<0.001		<0.001	349-352	<0.256	271-277	<0.456
Fluid intake at school (2 questions)	625	<0.001	625	<0.001	350	<0.555	275	<0.288
Skipping school (2 questions)	248-279	0.005	248-279	<0.001				
MHM (2 questions)	248	0.079	248		Not applicable			

In the reference schools: many students are not satisfied with the existing school pit latrine, especially the girls. Fifty percent and 53% of the girls and 38% and 22% of the boys in EEC and CA, respectively, are "dissatisfied" or "very dissatisfied" (Figure 3). There is a significant difference between the regions. The students in EEC are less satisfied with the school toilet than in CA, which was confirmed by the results of another cross checking question. Most reference school students (85%) prefer to use the toilet at home instead of the school toilet. Nine percent of the students never used the school pit latrine, 25% rarely, 38% sometimes and only 4% of both, boys and girls, always used the school pit latrine. Forty three percent of the students replied that they never go to the school toilet to defecate.

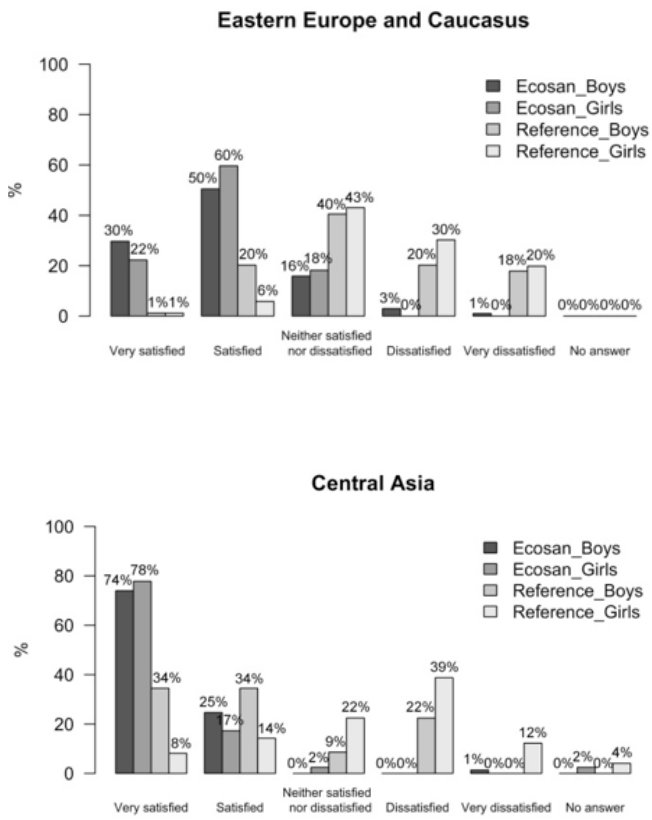

Figure 3: Replies to the question: "Are you satisfied with the school toilet?"

Concerning the acceptance of toilets, the use of school toilets, fluid intake at school and skipping school, it is highly significant that the ecosan students are better off. For the sub-regions EE, C and CA, we found that the results are similar for EE and C, but significantly different for CA. The overall data showed no significant differences between boys and girls.

Fluid intake at school

Regarding fluid intake at school, data showed a highly significant difference between ecosan and reference schools in CA, but not in EEC. In CA, almost half of the reference school students (47%) reply that they avoid consuming fluids at school, compared to only 16% of the ecosan school students. In EEC, 13% and 16% of ecosan and reference school students, respectively, do not consume fluids at school.

Self-rated absenteeism (skipping school)

Overall, ecosan school students skip school less often than reference school students. When students were asked, whether or not they stay at home because of problems with the school toilet, the data show a highly significant difference for: (i) reference versus ecosan schools, (ii) EEC versus CA and a significant difference (iii) for girls versus boys only at reference schools (Figure 4). Almost all ecosan school students (96%) in EEC replied that they never stay at home because of toilet problems, while 75% at reference schools do. In CA, 84% of the girls and 65% of the boys at ecosan schools report never skipping school because of toilet problems, compared to 58% of the girls and 43% of the boys at reference schools.

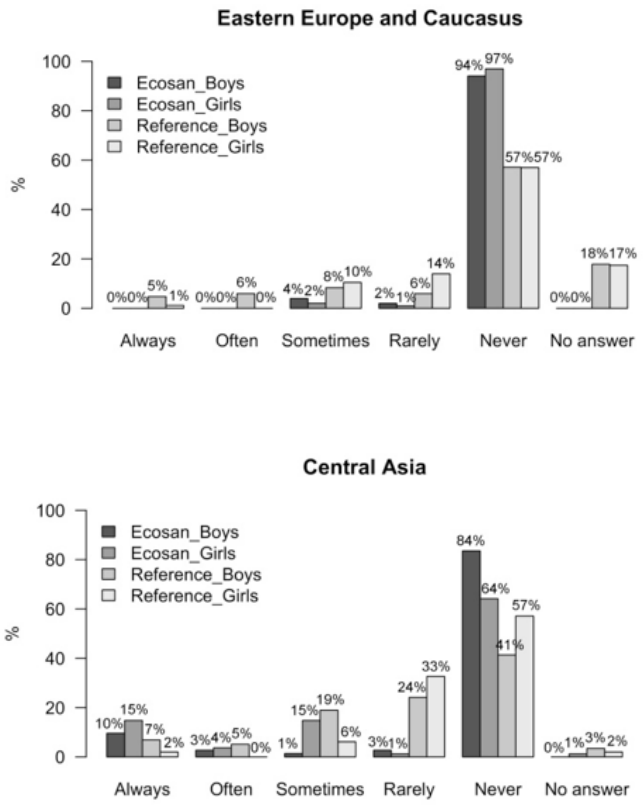

Figure 4: Replies to the question: "Do you stay home because of problems with the school toilet?"

Menstrual hygiene management (MHM) at school

Two MHM related questions were directed at the girls. The results show significant differences between ecosan and reference schools, but not between EEC and CA. Seventy percent of the girls at ecosan schools replied that they never skip school during menstruation, compared to 50% of the girls at reference schools. The primary reason reported for skipping school was pain. At the reference schools, a "lack of privacy" was indicated by 15% of CA girls and 3% of EEC girls, in contrast to 3% and 0% at ecosan schools. Nine percent of the girls at reference schools replied that the "lack of a washing facility" is the reason for skipping school during menstruation, in contrast to 3% at ecosan schools. Other reasons such as "problems in obtaining hygienic material" were indicated by less than 3%.

Focus group discussions (FGD)

In general, students, both boys and girls, see a good toilet as:

- Hygienic (no odor, clean, no flies),
- providing privacy/dignity (separate cabins for boys and girls, door locks),
- Comfortable (comfortable temperature, no odor) with appropriate toilet facilities (hand washing possibilities, towels, toilet paper and soap).

The absence of a bad smell was a major advantage of ecosan toilets indicated by students. A beautiful and clean toilet is seen as hygienic. Students in CA sometimes avoided using the new 'beautiful and shiny' ecosan toilet because they feared misusing it and making it dirty.

Odor was associated with discomfort, but also with flies, uncleanliness and lack of hygiene. Students of reference schools sometimes indicated they avoided using the toilet by consuming less fluid.

The aspects of privacy and dignity were another benefit of the ecosan toilet design. Mostly girls, but also boys, complained that the pit latrines have only half height walls between the cabins, no locks on the door, or that the door was even completely missing. Girls at the reference schools reported a lack of privacy, which was mitigated by going home to change menstrual pads. At some schools, girls admitted staying at home for one or two days per month during menstruation, e.g., sometimes older girls avoid using the pit latrine during menstruation, because younger girls could see them.
In general, girls agreed that the ecosan toilets improve MHM due to improved privacy and better facilities. Their requirements were a closed waste bin, toilet paper, and the

possibility to wash inside the toilet room. In the girls` perception, not all ecosan schools fulfilled these requirements. Most girls said they still prefer changing their pads at home; however, they do not skip school to do so. The distance between the classroom and the pit latrine and the resulting time constraint was mentioned as a disadvantage. Furthermore, low temperatures in the pit latrine during wintertime were mentioned at 80% of the schools as a major disadvantage. In Armenia and Tajikistan, reference school students avoid using the toilet for these reasons. When an ecosan toilet is constructed in or adjacent to the school building, students perceive this as a big improvement.

A lack of toilet paper was mentioned as a disadvantage at most reference schools and a few ecosan schools; leading to avoidance of the school toilet for defecation. Half of the students indicated that they go home or to a neighboring toilet to defecate (about 1-3 times a week). At the reference schools in Tajikistan, students were using "kiznyak"(dried cow dung which is usually used for heating), dry clay or stones for anal cleansing, which they found around the toilet. It was mentioned at one school that the same stone or "kiznyak", can be used by different students. Although cultures differ in utilization of anal cleansing materials, the presence of toilet paper was indicated to be highly appreciated by students visiting schools being equipped with new ecosan toilets.

DISCUSSION

Overall, students prefer the toilet at home, this is particularly the case at the reference schools or when students have a flush toilet at home. The results from the questionnaire and the FGDs confirm that in all ecosan schools the UDDT is preferred over the standard pit latrine. In particular, the absence of a bad smell, cleanliness and privacy were seen as major benefits. This is underlined by the record of one ecosan school where the UDDT was not properly operated and smelled bad. Acceptance was therefore low and absenteeism did not decrease after the intervention. As shown in other studies, from other parts of the world, the state of the toilets is very important for female students (Abrahams et al. 2006, Sommer, 2010; WHO 2016).

The fact that students in CA are more satisfied with the UDDT toilet than those in EEC reflects the level of sanitation at home, because the CA students experience the UDDT as a benefit to their standard pit latrine at home, whereas half of the EEC students have a flush toilet at home.

The analyses of the school records show that in general boys miss school more often than girls. Since the absenteeism data was taken from routinely collected data by teachers, recall bias was avoided (Hunter et al. 2014; Joshi & Amadi 2013). In rural areas of the region as in other parts of the world, the children must often take over family tasks or contribute to the family income due to high poverty levels (Choitonbaeva 2016). A study in Moldova found that children having parents who were abroad or neglected education, lack of clothing, or school requisites and students having to work (Anonymous 2011/2012), drove school absenteeism of boys and girls in rural schools. Adolescent boys seem to be more prone to these circumstances. The causes mentioned are not limited to Moldova and are overlapping the impact of the WASH interventions at school. However, the significant decrease in absenteeism after the UDDT implementation in EEC implies a relationship with the intervention.

The fact that the intervention, comprises the construction of a UDDT including hand washing facilities as well as awareness raising and

> ***"Hygienic school conditions are important for interventions aimed at mitigating the spread of infectious diseases"***

training, can be regarded as a general upgrade of the school and its image. The impact of this set of measures and the resulting improved image is assumed to be the reason for the remarkable improvement in terms of absenteeism. This is the case for both boys and girls.

Consumption of fluids at school is important for health and school performance (Hunter et al. 2014). Drinking less fluids in order to avoid toilet use, may contribute to a higher risk of associated continence-related issues like urinary tract infections (Jasper et al. 2012). Regarding fluid intake, the study has revealed no difference between both types of school sanitation in the EEC. In contrary, in CA the intervention had a positive impact on fluid intake at school. The positive impact on adequate fluid consumption of a well-accepted sanitation facility has been confirmed by the FGD in all countries. It goes without saying, that other factors, such as availability of safe drinking water in the community and school, also play a decisive role.

The results of the absenteeism survey confirm the statement by Oster & Thornton (2011) that menstruation has a very small impact on school attendance. In contrary, research by Freeman et al. (2011) showed that girls miss less school due to WASH interventions in developing countries. For the EECCA region, the missing statistical association between the WASH intervention and the absenteeism rate for girls due to improved MHM can be explained by higher WASH standards and a higher educational level compared to CA.
Due to the relatively small numbers of this survey more absenteeism surveys, particularly in CA, would be needed to confirm the results. However, the overall positive impact of the intervention for girls should not be underestimated. The girl FGD showed that some UDDTs can be considered as a technological equal to flush toilets in terms of comfort and acceptance.

In general, hygienic school conditions are important for interventions aimed at mitigating the spread of infectious diseases (Koopman 1978). The fact that in Tajikistan the same stone or piece of cow dung is used for anal cleansing by several students in reference schools shows not only a tremendous lack of hygiene and awareness, but also a lack of institutional responsibility towards public health. A study in rural Uzbekistan revealed the absence of anal cleansing materials in about 30% of the households as a risk factor for diarrheal disease (Herbst et al. 2008).

CONCLUSIONS

Good acceptance of school toilets can be translated into sanitation conditions offering comfort, cleanliness and privacy for the students. As this is mainly dependent on the toilet design, as well as its operation and maintenance, it can be met by several technologies. In rural areas, UDDTs offer a well-accepted alternative for schools, indoors or adjacent to the building and they stop soil and groundwater contamination at once.

The intervention (implementation of a UDDT with hand washing facilities, as well as awareness raising/training campaign) seems to lead to a significant decrease in absenteeism for both boys and girls.

There are significant differences between EEC versus CA: the UDDT are better accepted and

perceived in CA where pit latrines are the most common conventional sanitation systems in the homes.

Boys and girls appreciate the UDDT implementation similarly. However, girls suffer more from the inadequate sanitation conditions of the pit latrines in the reference schools and thus benefit more from the UDDT intervention.

> ***"Non-accepted school toilets may lead to less fluid intake"***

Causal relationships between sanitation and health impacts are beyond the scope of this study. However, in CA the results of this study suggest evidence that non-accepted school toilets may lead to less fluid intake.

In general, the boys miss school more often than girls, most likely due to other reasons than school sanitation. In all studied countries girls indicated in the questionnaire that they missed school much less during menstruation, since ecosan was implemented. The higher positive impact of the intervention for girls is further underlined by the results of the FGD.

Due to the fact that the presence of teachers – which could not be omitted in this study – seemed to tense the atmosphere in some cases, absence of teachers should be a precondition.
Since unhygienic toilet conditions such as a lack of anal cleansing materials, found also in Kenyan regions by Greene et al. (2012) and McMahon et al. (2011), are associated with increased risk of contracting diarrhea at school (Koopman 1978), strong efforts on the political level are needed to mitigate this deficiency.

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APPENDIX

See following pages for survey

APPENDIX

Annex: Standardized questionnaire

Are you satisfied with the school toilet?

☐ very satisfied ☐ satisfied ☐ neither satisfied nor dissatisfied ☐ dissatisfied ☐ very dissatisfied

Which kind of toilet do you have at home?

☐ Pit latrine ☐ Water flush toilet

☐ Other, please specify:_____

Which toilet do you prefer to use?

☐ At home ☐ At school ☐ No preference

How often do you use the school toilets?

☐ always ☐ often ☐ sometimes ☐ rarely ☐ never

How often do you use the school toilet to defecate?

☐ more than 3 times a day ☐ 2 times a day ☐ once a day ☐ 3 times a week or less ☐ never

Which toilet do you prefer to use to defecate?

☐ At home ☐ At school ☐ No preference

Do you drink while you stay at school?

☐ Yes ☐ Sometimes ☐ No

What don't you like the most about the school toilet?

>> MAX. 3 ANSWERS; IF 'A', NO OTHER OPTIONS POSSIBLE <<

A ☐ I don't see any disadvantages	H ☐ no door
B ☐ no soap	I ☐ others can see me
C ☐ bad smell	J ☐ unable to lock the door
D ☐ toilet is not clean	K ☐ no towel
E ☐ a lot of flies	L ☐ no garbage bin
F ☐ no toilet paper	M ☐ dangerous construction of toilet building
G ☐ no water for washing	N ☐ rooms for girls and boys are not separated
	O ☐ others: _____

What do you like the most about the school toilet?

>> MAX. 3 ANSWERS; IF 'A', NO OTHER OPTIONS POSSIBLE <<

A ☐ I don't like it at all	H ☐ have door

B ☐ soap is available
C ☐ no smell
D ☐ toilet is clean
E ☐ no flies
F ☐ toilet paper is available
G ☐ water for washing
I ☐ separated toilet rooms for boys and girls
J ☐ unable to lock the door
K ☐ towel is available
L ☐ garbage bin is available
M ☐ safe construction of toilet building
N ☐ No one can see me
O ☐ others: _____

For what reasons do you usually skip school?

>> MAX. 3 ANSWERS; IF 'A', NO OTHER OPTIONS POSSIBLE <<

A ☐ I never skip school
B ☐ headache
C ☐ have a cold / flu / temperature
D ☐ stomach ache
E ☐ childhood diseases
F ☐ parasitic worms
G ☐ hepatitis / yellow skin
H ☐ injury / accident
I ☐ malaise
J ☐ toothache
K ☐ anemia
L ☐ sore throat
M ☐ diarrhea / liquid poo
N ☐ others: _____

Do you avoid using the school toilet during the classes?

☐ Yes ☐ No ☐ Sometimes

How do you usually avoid using the school toilet during the classes?

>> MAX. 3 ANSWERS; IF 'A', NO OTHER OPTIONS POSSIBLE <<

A ☐ I don't avoid using school toilet
B ☐ I go home for toilet
C ☐ I hold it in until I find better
D ☐ I go for toilet only before school and after school
E ☐ I don't drink
F ☐ I go to nearby toilet, but not home
G ☐ I go to bushes
H ☐ others: _____

Do you avoid drinking, while at school so that you don't have to use the school toilet?

☐ always ☐ often ☐ sometimes ☐ rarely ☐ never

Do you stay home from school because of problems with the school toilets?

☐ always ☐ often ☐ sometimes ☐ rarely ☐ never

APPENDIX

>>ONLY FOR GIRLS<

>>IF YOU ARE NOT MENSTRUATING YET - STOP HERE<

What are the reasons for skipping school while you are menstruating?

A ☐ I don't skip school while menstruating

B ☐ Problems in obtaining hygiene materials

C ☐ Lack of privacy

D ☐ Pain/malaise

E ☐ Lack of washing facility

F ☐ It is not allowed to go to school during menstruation

E ☐ Inconvenience of toilet

G ☐ Other: _____

How often do you skip school while you are menstruating?

☐ always ☐ often ☐ sometimes ☐ rarely ☐ never