

Ecosan household toilets in rural areas in Moldova

Promotion approach and lessons learnt

March 2019



The ApaSan project, implemented by Skat Consulting Ltd. and the Moldovan Branch of Skat Foundation was financed by the Swiss Agency for Development and Cooperation (SDC) and the Austrian Development Cooperation (ADC) from 2008 to 2019.

The document is based on contributions from the ApaSan project team.
Compilation: Matthieu Amos

Table of content

Introduction.....	1
Promotion of ecosan household toilets	1
Monitoring of ecosan household toilets	2
Lessons learnt and limits of the approach	4
Conclusion	5
References.....	5
Annex 1 Ecosan toilets.....	6
Annex 2 Cooperation contract	8
Annex 3 Summary of ecosan toilets built by Skat and inspected during the monitoring 2014.....	10
Annex 4 Results of the monitoring campaign from 2014	11
Portfolio.....	12

Glossary

Cesspool	Watertight tank used as blackwater storage. Has to be emptied frequently. Does not treat blackwater.
Ecosan toilets	Dry toilets in which the urine and the faeces are collected and treated separately. See Annex 1 for a more information.
Excreta	Urine and faeces
Septic tank	Watertight chamber through which blackwater and greywater flows from primary treatment Settling and anaerobic processes reduce solids and organics but treatment is moderate.
UDDT	Urine Diverting Dry Toilet, international name for ecosan toilet

Introduction

From 2008 to 2019, the Swiss Agency for Development and Cooperation (SDC) and the Austrian Development Cooperation (ADC) funded the ApaSan project, which was implemented by Skat Consulting Ltd (Skat). The ApaSan project aimed at supporting Moldovan institutions at all levels to better respond to the needs for water supply and sanitation services of the rural population, including the most vulnerable.

The situation regarding access to water supply and sanitation services in Moldova is characterised by a strong gap between urban and rural areas. While most people in urban areas have access to a piped water supply and flush toilets connected to sewers in the house, only 20 % of rural households use a flush toilet, the remaining 80% rely on simple pit latrines in their backyard (Danube Water Program, 2018). Many of these pit latrines are in bad shape, poorly maintained, unpleasant to use and unhygienic. The groundwater is often also contaminated by pathogenic organisms originating from those latrines.

Community-wide sewerage systems with wastewater treatment are still rare in Moldovan villages and are unlikely to be a valid option in the near future, due to the high costs for investment and maintenance, as well as to the low amounts of wastewater produced in the villages. Therefore, most households are limited to on-site sanitation options for improving their sanitation situation. However, people in villages generally have limited capacities to improve their own sanitation systems. One of the main obstacles is limited knowledge of available options, e.g. common knowledge on sanitation technologies is usually limited to pit latrines or flush toilets connected to a cesspool (usually called “hazna” in Moldova).

Skat has been working on introducing alternative options for on-site sanitation suitable for Moldovan villages, such as flush toilets connected to septic tanks or ecosan toilets.

Ecosan toilets - the internationally used technical term is Urine Diverting Dry Toilets (UDDT) - are a potential alternative option for on-site sanitation in Moldovan rural areas. The system has the advantage of being waterless, while offering a similar comfort and level of hygiene as flush toilets (see Annex 1). Construction and maintenance are easy and affordable. All needed building materials are available locally. While there is no proper market for ecosan seats or pans yet in Moldova, Skat managed to produce them locally for the purpose of the project. When well-operated, the system is odour free and can be integrated in buildings. The system limits the risk of groundwater contamination and health risks during emptying. The possibility of stored urine and dried faeces reuse in the garden is also an advantage.

Besides the ApaSan project, other initiatives for the promotion of the ecosan system have been undertaken in Moldova by NGO such as Ormax (Moldova), WiSDOM (Moldova) and WECF.

Promotion of ecosan household toilets

Starting from 2008, Skat has introduced ecosan toilets as a solution for school sanitation in Moldovan villages without existing wastewater collection and treatment systems¹. Up to 2019, such solutions were implemented in more than 65 villages. Based on the good experiences with the ecosan school toilet blocks and requests from school staff and parents for similar sanitation improvements at the level of their households, Skat launched in 2012 a promotion initiative for ecosan household toilets in

¹ See <http://apasan.skat.ch/sanitation-in-schools/>

order to raise awareness for this option and to test an approach on how rural households can be supported to improve their sanitation facilities.

Skat proposed, via the school management and the local public administration (mayors), a package of technical and financial support to interested households. The conditions for support were that at least 20 households of the village signed a request for the implementation of an ecosan toilet and that only villages with functioning ecosan school toilets could benefit from the campaign.

When criteria were met, all interested households, which turned out to be mostly educated people or their close relatives, had to conclude a contract (available at Annex 2) signed by the household heads (usually both wife and husband) and ApaSan representatives. A model ecosan toilet² was constructed for free in one of the interested household, which was drawn by lot. The other households then had to build their own ecosan toilet using the model as a reference. Plans with general dimensions and lists of materials for ecosan toilets were given to participants, which had to manage the construction themselves. Each toilet had to feature at least: 2 dehydration vaults closed with watertight metal lids, a ventilation system for the dehydration vaults (ventilation pipe) and one for the cabin (window or other), plus a urine diverting pan or seat. A package of key materials was provided by Skat, free of charge:

- 1 urine diverting toilet seat or pan (items that are not easily available locally);
- 1 ventilation pipe and system (to ensure the used pipe will be of an appropriate diameter);
- 2 metal frames with hinged lids for the dehydration vaults (to ensure the robustness and airtightness of the lids).

Costs for these items were approximately 2,600 MDL/toilet. Once the toilet had been completed by the owner and compliance with the specified quality and functionality criteria verified by project staff, households received an additional cash contribution of 3,000 MDL to the construction costs from Skat. The contract also required that once the contribution was received, the households should close or demolish their old pit toilet.

When signing the contract, ApaSan staff visited each household and determined the emplacement and orientation of the ecosan toilet together with the household heads. The option preferred and recommended by Skat was to attach the toilet to the house, pushing forward the higher degree of commodity of such an arrangement. Moreover, it was considered as an experience to shift the conception of toilet from the realm of agriculture (outside, dirty) to the realm of the house (inside, clean), which would increase its attractiveness. The track of the planned toilet location was kept through pictures taken at the moment of the contract signing and after construction. In spite of these arguments, the majority of house owners preferred to build their toilets as separate, outside units.

Monitoring of ecosan household toilets

Between 2012 and 2014, 66 ecosan household toilets were built by house owners under the conditions of the described promotion. In 2014, a survey was conducted in order to assess the success of the ecosan implementation at household level. The interviewed households had at least started to build their ecosan toilets, but some were not completed at the time of the survey.

² Model toilet's design is available on <http://apasan.skate.ch/sanitation-in-villages/>

Construction

156 interested households were registered by mayoralities but only 66 genuinely took part in the project and at least started to build a toilet (Annex 3). 5% of the interviewed households never completed their ecosan toilet and therefore did not get the cash subvention from Skat.

People were asked why they decided to build an ecosan toilet in their household. The increase in comfort (50%), following advice from other people (25%), protection of the environment (23%) and the small space requirement (23%) were the main cited reasons (Annex 4a). 15% of the interviewed households told subsidies were a reason for implementation. During the implementation, villagers appreciated the plans with dimensions proposed by ApaSan engineers and half of them mentioned the presence of a model toilet cabin as a plus.

Regarding the household expenditure to build the ecosan toilet, 31% of the household declared they spent less than 3,000 MDL, 26% between 4,000 and 6,000 MDL, 18% between 7,000 and 20,000 MDL. The remaining 26% do not know.

Toilet use and satisfaction

In 2014, 70% of the surveyed households were using their ecosan toilet, either as the only toilet or in parallel with other toilets (mostly pit toilets). Some households stopped using it as they changed for a flush toilet.

Among ecosan users, 26% of the household use their old pit latrines or new built flush toilet in parallel. 44% of them (11% of the total surveyed households) did not give a specific reason for that behaviour, 16% (4% of the total surveyed households) explained it by the fact their ecosan toilet was still under construction and 13% (3% of the total surveyed households) use their ecosan toilet only for guests. Further reasons are showed in Annex 4b.

Overall, the households use their toilets without problems and appear to be satisfied. They would recommend ecosan system to other people (Annex 4c). 40% of the households would not change the design of their toilet (Annex 4d).

Maintenance and cleanliness

During the survey, bad smells were observed in 47% of the toilets. Problems leading to the presence of smells were that covering material used to cover excreta were used systematically in only 40% of the households and almost half of the toilet had liquid mixed with the faeces during the inspections of the toilets (Annex 4e). Most of the urine valves had never been checked or changed by the owners.

Use of by-products

Most of the users of ecosan toilets directly infiltrate their urine into the soil instead of collecting it. Regarding faeces, in 2014, only a few people had had to remove them since the toilets have been built, as chambers were not full. Dried faeces were mostly used as a soil conditioner in the owner's garden.

Lessons learnt and limits of the approach

During the selection process, all considered mayoralities were able to gather more than 20 households' signatures in their village. However, except in two villages, many of the originally registered households finally did not implement an ecosan toilet. It may be possible that some households were pushed by local authorities or other genuinely interested households to sign the request in order to complete the requested minimum number of 20.

Overall, ecosan users appear to be satisfied with the toilet implemented with Skat support. However, it has been observed that many households continue to use other toilets besides the ecosan toilet and many of the ecosan toilets are not properly operated and maintained.

The main lessons learnt can be summarised as follows:

- The subsidies given by the Skat were probably too high. 31% of the households spent less than 3,000MDL in order to build their toilet, as they could recycle most of the construction material, and thus may have even gained money with the Skat's subvention. In addition, it has been observed that many households initially registered as volunteers to build an ecosan toilet vanished once the lottery for the free model toilet was over. It can be assumed that some people were interested in trying their luck to win the free model toilet. For a sustainable result, the motivation for constructing an ecosan toilet should not be based on the expectation of a financial gain, but on improving one's living conditions.
- Generally, the technical quality of construction of the toilets was satisfactory. However, the correct use and maintenance of the toilet was not ensured in many cases. Some villagers often neglected the maintenance needed to keep their toilet clean and odourless. There appears to be a low culture of maintenance, thus tasks are rarely anticipated and frequently omitted. A stronger emphasis on education is needed, especially on environmental aspects, proper use of the toilet and use of the by-products.
- Only few households attached their toilet to the house. Not only people were reluctant to do that, but it also was not always technically possible to add an annex to the house for the toilet. Moreover, constructors often did not understand the concept of attaching the toilet to the house, and if not closely monitored by the owner, built the toilets at another emplacement.
- It appears that villagers have other more urgent concerns than sanitation and are thus reluctant to invest in sanitation improvements on their own. No replication has been observed or requested after Skat's support campaign.

Conclusion

The trial of promoting ecosan household toilets had mixed results. In principle, the solution is suitable for the Moldovan context and households with functioning ecosan toilets seem to be satisfied. It appeared that the ecosan technology attracted mostly the more educated people of the villages, whose curiosity was risen after the successful implementation of ecosan school toilet blocks.

It was initially foreseen by Skat that the implementation of ecosan individual toilets in the houses of most educated people may have a repercussion on the village-wide interest for sanitation improvements. However, such effect has not been observed. Nevertheless, as households were responsible for the construction, an expertise has been developed within participant villages and new ecosan toilets could now be implemented without any external support.

A future approach of promoting better sanitation facilities in villages should therefore consider the following recommendations:

- Efforts need to focus on strong information and education to households on maintenance and operation of sanitation facilities, including the reuse of products from ecosan toilets.
- Financial support (cash or goods) should be limited in order to avoid false incentives.
- Promotion of sanitation technologies should not focus only on one technology, but include a wider range of options, to allow households to choose the solution that motivates and suits them the most.
- Assessing the overall sanitation situation and needs in the village is important, as is the identification of the households most in need for improvements

References

Danube Water Program. (2018). *A review of rural water and sanitation services Moldova (draft May 2018)*.

Tilley E., U. L. (2014). *Compendium of sanitation systems and technologies. 2nd revised edition*. Dübendorf: Swiss Federal Institute of Aquatic Science and Technology (Eawag).

Annex 1 Ecosan toilets

Description of the ecosan system

Ecosan toilets collect urine and faeces separately, without the use of flushing water. The technical term for ecosan toilets is Urine Diverting Dry Toilets (UDDT). The toilet bowl has a divider and two separate openings, which allow the separate collection of urine and faeces. A UDDT can be both done as a squatting pan or toilet seat.

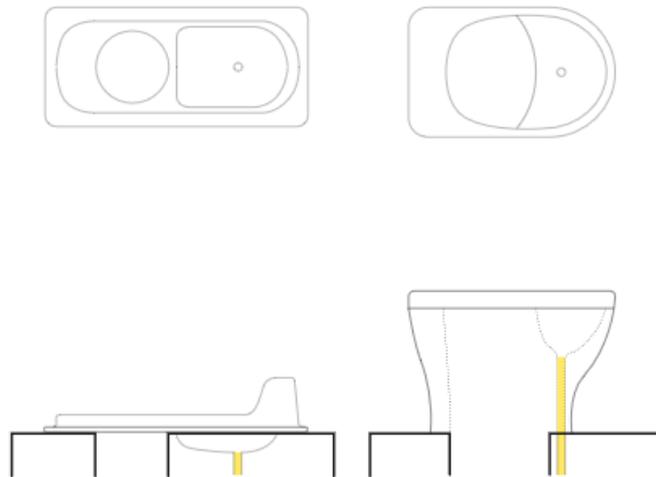


Figure 1: Top and profile views of urine separation toilets (squatting pan and toilet seat)

The urine is drained away in pipes and collected in tanks.

The faeces fall into a chamber beneath the toilet where they are collected. As urine is collected separately, the faeces dry in the collection chamber. Ash, sawdust or dry soil is added after use to enhance the drying process. Good ventilation of the chambers also helps drying as well.

An important effect of separating the urine and drying the faeces is that the development of bad smells is greatly reduced and can be completely controlled by good ventilation of the chambers and the toilet building. Urine pipes need an odour seal below the toilet to keep bad smells from the urine collection tanks reaching the restroom. If properly designed and well maintained, ecosan toilets do not smell and thus can, in principle, be integrated into the building.

Urine and dried faeces need to be removed periodically from the collection tanks or chambers. Volumes that need to be managed are relatively small, as urine and faeces are not mixed with flushing water. The largest fraction to be handled is urine, which can be handled easily if collected in portable containers. Faeces are of a very small volume, and drying further reduces their volume. The drying process renders them inoffensive and they resemble to compost that is easy to handle.

In order to reduce health risks from the handling of urine and dried faeces, parallel tanks are being installed, which allows storage of urine and dried faeces for some time without fresh material being added. This allows for dying of pathogen organisms. Urine that has been stored for several months can be safely used as fertilizer. Faeces needs to be stored longer (at least 1 year) before it can be safely used, but safe disposal by burying them locally is also possible as quantities are small.

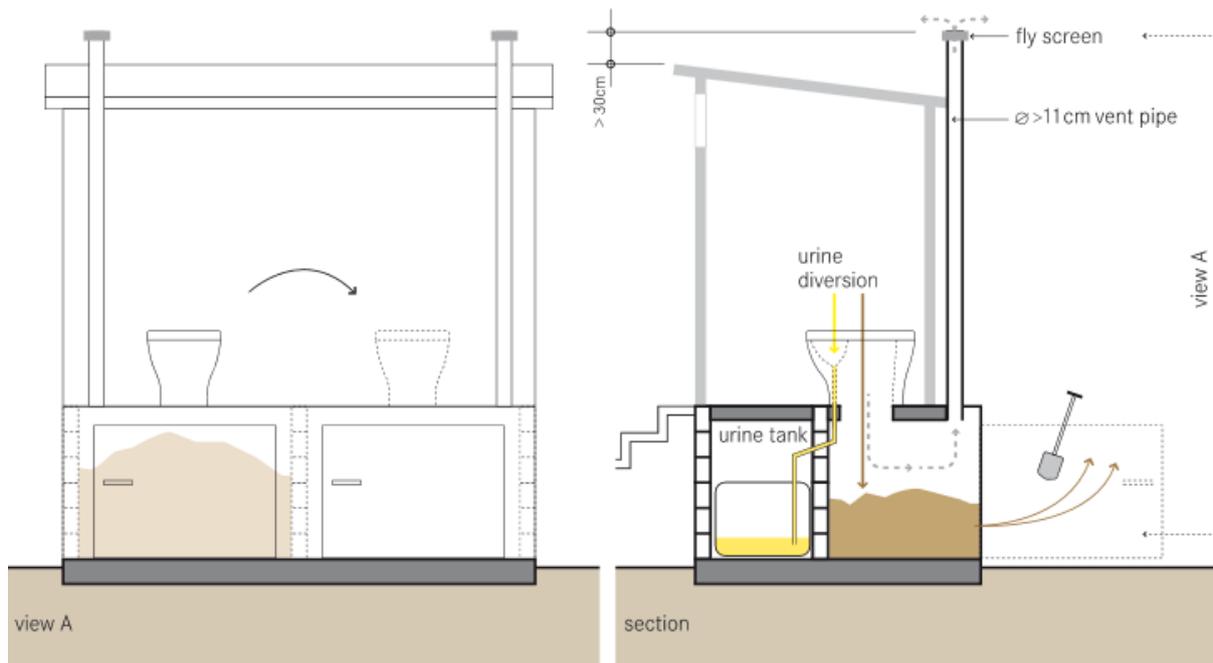


Figure 2: Scheme of drying chambers in ecosan toilets (urine diverting dry toilets) (Tilley E., 2014)

Ecosan toilets have special requirements as to how they are to be used, cleaned and maintained. Thorough training of users and caretakers is therefore required.

All materials needed for building ecosan toilets can be procured locally. Urine separating toilet bowls, both squatting pans and seats, can be procured in Moldova. Odour seals for urine plumbing can be made from locally available materials.

A more detailed description of the system and each of its components can be found in the “Compendium of Sanitation Systems and Technologies” published by Eawag, available online in 8 different languages (<https://www.eawag.ch/en/departement/sandec/publications/compendium/>).

Ecosan toilets can be used almost anywhere. However, due the facts that it is waterless, watertight and that no digging is necessary, it is especially appropriate for water-scarce regions, rocky areas and regions with a high water table. The system does not require much space in order to be implemented.

Annex 2 Cooperation contract

Cooperation contract

concerning the construction of an ecosan toilet for household use

between

The Foundation “Filiala din Moldova a Fundației Skat” (hereinafter Skat), as implementer of the Swiss Water and Sanitation Project in Moldova (ApaSan), legally represented by the President of the Foundation, Mr. Jonathan Hecke

and

the household owners,

Mr -----ID document _____ CNP _____

Mrs -----ID document _____ CNP _____

address _____ village _____ raion _____ -

(ID copies of both household owners are attached to the contract)

I. Object of the contract

In order to improve sanitary conditions in their home, the household owners wish to build an ecosan toilet in their yard. Skat will support the household owners with technical assistance, certain special parts and a subvention of 3,000 MDL (three thousand Moldovan Lei) that will be paid after completion of works.

II. Agreed mode and conditions of collaboration

The household owners will build the toilet under their own responsibility and with their own means and resources (labor, equipment and materials), taking the model toilet built by Skat and the technical drawings/plans offered by Skat as a reference regarding minimum dimensions, functionality and quality of execution. The household owners are free to introduce any changes and improvements that do not affect the mentioned minimum standards. In case of doubt, Skat shall be consulted.

Skat will assist in determining the emplacement of the toilet on the household's plot and provide the following constructive elements (only those that are not deleted in the list):

- Ecosan toilet seat or pan
- Ventilation pipe
- Compost chamber cover or door.

The household owners agree to finish the building works so that the ecosan toilet is fully operational by _____2012. If the household owners complete the construction within the agreed time, Skat will disburse the subvention amount immediately in cash, and a reception document will be signed by both contract partners and the Mayor.

In case works are not completed by the agreed date, for whatever reason, it is agreed that Skat will not disburse any subvention and the household owners will return any received materials back to Skat.

The household owners agree to close and dismantle or demolish the old pit latrine on their yard no later than three months after the ecosan toilet has been put into operation, and to appropriately manage the urine and compost accumulated in the toilet as per instructions provided by Skat.

III. Information and training

During the construction phase and within the first weeks of use of the new toilet, Skat will provide information and training sessions with the following objectives:

- Promote the ecosan principles among the household toilet users.
- Assure that users are educated to use and clean correctly the sanitary facility in order to assure its normal functioning in accordance with ecosan principles.
- Assure that users and owners have enough knowledge and skills to deal correctly and in a proper way with the urine and compost and know where to use them after the retention period.

IV. General contract conditions

This contract will come into force upon signature by all parties and will end when each party has fulfilled all its contractual obligations.

Any amendments to the present contract shall be drawn up in writing and accepted by all parties.

The contracting parties shall neither offer a third person nor seek, accept or get promised directly or indirectly for themselves or for another party any gift or benefit which would or could be construed as an illegal or corrupt practice.

The contracting parties will resolve any eventual disputes arising from this contract in a peaceful and reasonable manner.

The present contract is drawn in two original copies. Each party receives one copy.

DI Jonathan Hecke
Președintele Fundației

Semnătura

Data/localitatea

Nume, prenume proprietar

1. Man
2. Woman

Proprietarul gospodăriei de la adresa

Semnătura

Data/localitatea

Statement of endorsement by the Mayor

Herewith I declare that the household owners that sign this contract of collaboration are known to the Primaria of and that the Primaria is in favour of the construction of an ecosan toilet in that household.

....., primar of

Signature

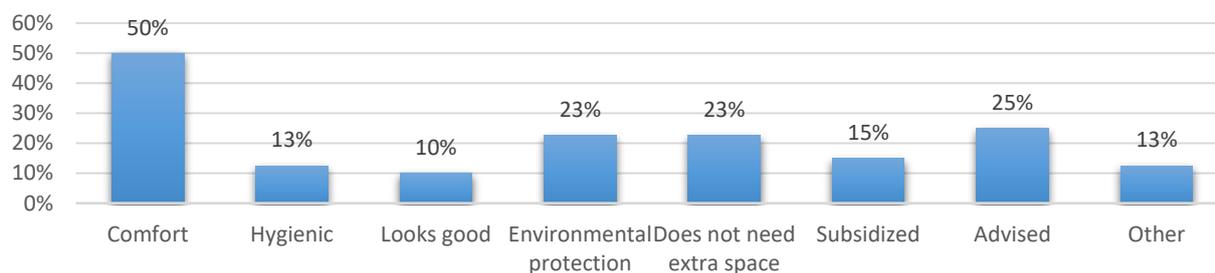
Date/location/stamp

Annex 3 Summary of ecosan toilets built by Skat and inspected during the monitoring 2014

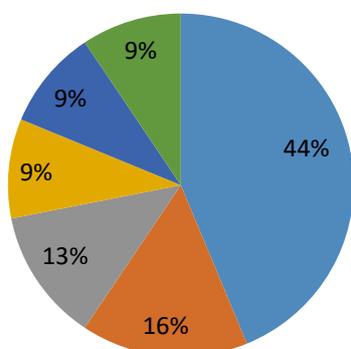
	# interested households registered	# Toilets constructed	# Toilets visited	% ecosan visited during monitoring in 2014
Floritoaia				
Veche	23	18	15	83%
Ciorești	20	20	16	80%
Buciumeni	20	7	7	100%
Voinova	27	6	4	67%
Codreanca	25	2	2	100%
Zîmbreni	18	2	1	50%
Ruseștii Noi	26	11	7	64%
Total	159	66	52	79%

Annex 4 Results of the monitoring campaign from 2014

a. Why did you decide to build an ecosan toilet?

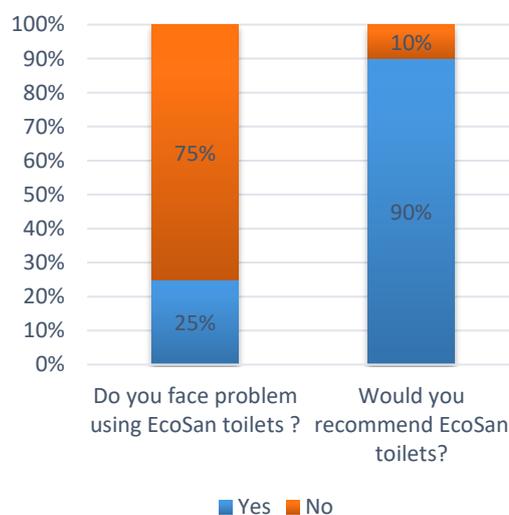


b. Reasons for still using the old toilet

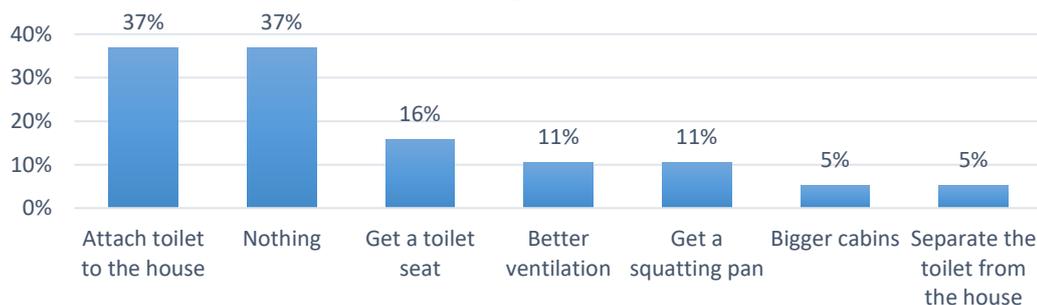


- I don't know
- Ecosan toilet is not finished
- EcoSan for the guest
- When I work in the garden
- More comfortable than Ecosan
- Other

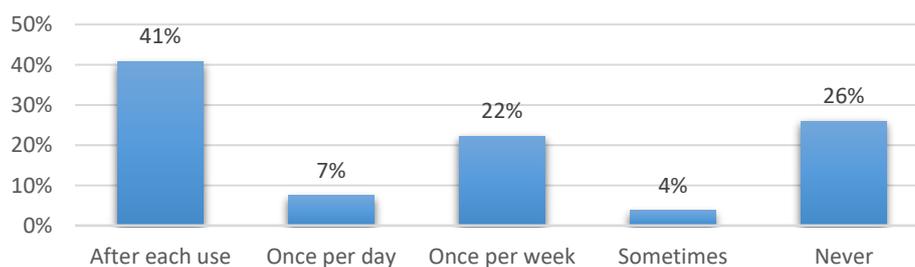
c. User's satisfaction



d. Changes wished



e. Application of covering material



Portfolio



Picture taken at the moment of the contract signature and at the emplacement of the toilet, with recommended ecosan toilet design.



(left) Construction of an ecosan toilet, (right) Three generations together in front of their ecosan toilet, hand-rail to help climbing stairs, but no aeration. Misconception: filled eave, no window.



Ecosan toilet, located at the end of the backyard. Misconception: Filled eave and no aeration nor window.



(left) Inside of a toilet, with urinal. Missing cover for the unused vault. (right) Ecosan toilet with filled eave (misconception), but a small aeration is present on the right.



Nice ecosan toilet cabin, but no aeration (misconception: filled eave, no window) and stairs which may be dangerous in winter and for challenged people, as there is no hand-rail and the steps appear to be weak (one till already broken).