

EcoSanRes Publications Series



Report 2004-5

**Norms and Attitudes Towards Ecosan
and Other Sanitation Systems**

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Norms and Attitudes Towards Ecosan and Other Sanitation Systems

Desk study by a group of experts on ecological sanitation

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This publication is downloadable from
www.ecosanres.org

SEI Communications
Communications Director: Arno Rosemarin
Publications Manager: Erik Willis
Layout: Lisetta Tripodi
Web Access: Howard Cambridge

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ISBN 91 88714 97 7

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“When development workers came to the Afar region they asked the indigenous people what priorities they had for development. The Chief of the Afar wanted schools for the children. The development worker walked around and asked: “Where is your toilet?”

The Afars answered: “We do not need toilets we shit in the bush.”

The foreigner emphasized how important it was to start with the toilet instead of the school. He also promised to build schools after the evaluation of the toilet. A pit latrine was dug and built to be used by the people.

The development worker came back after a year for a follow-up and found the pit latrine had been used very little. He asked why.

The chief answered: “We farmers and uncivilized citizens are used to go out in the bush, enjoy the scenery and breathe the smell of the vegetation while defecating. When the civilized man came to us and asked us what priority do we have. We answered – schools for our children. If you had started educating our children you might have succeeded to get people who can stand the smell of your pit latrine.” Cited by Almaz Terrefe (F5).

1 Background

Introducing and operating ecological sanitation (ecosan) installations in urban areas requires a thoughtful combination of technical and managerial aspects fitting the prevailing socio-cultural context. The amount of information regarding local experiences is rapidly expanding (Nanning 2001; Luebeck 2003). New technical toilet systems are entering the market. Research results are forthcoming on hygiene and on the application of human-derived fertilizer to gardens and fields.

Generally, there is a shortage of solid studies of socio-cultural aspects of ecosan systems, and what is available is mainly in the form of anecdotal accounts. A desk study of what socio-cultural knowledge is available at this point in time is therefore an important first step in developing further studies for which the desk study may be used as a baseline.

1.1 OBJECTIVE OF THE STUDY

The aim of this interdisciplinary desk study is to gain insight and knowledge about how people perceive and understand ecosan arrangements and recirculation of nutrients. It is a pilot study to identify factors and circumstances of interest for the Sarec-funded study to be carried out in Uganda and South Africa in 2004.

A second aim is to create a network with a team that can support its members in the years to come in project preparations and exchange of information. We also anticipate that the result of the study will present a good chance to apply for research funds to conduct further socio-cultural studies. The study will benefit from close cooperation with the hygiene and agricultural desk studies conducted as part of the EcoSanRes programme.

1.2 RESEARCH FOCUS AND RELEVANCE

An in-depth understanding of the social and mental fabric concerning people's views towards ecosan arrangements and recirculation of nutrients will enlighten authorities about motivational factors behind people's acceptance or rejection. Little has been done so far in this field of study, and therefore the present desk study will point to relevant future research. An emphasis will be put on individual values and societal norms in countries with different socio-economic status and varying ethnic backgrounds, and including gender conditions.

The study does not take for granted that improved health is the main driving force for a shift to ecological alternatives. When households contemplate a shift, other possible factors may be of concern, e.g. modernization arguments, less smell, improved security. User views are also related to how hygienically safe the design allows them to be.

The desk study will compile information about the degree to which urban residents:

- (i) have knowledge to manage ecosan systems, especially in respect to urban agriculture, biogas and to hygienic handling of excreta;
- (ii) possess skills and material resources and can afford the investment and operational costs;
- (iii) feel subjugated to societal norms (related to age, sex, social group, religion, occupation, etc.) and how they individually perceive faeces and urine and their use in food production;

and

(iv) vary in their valuation and understanding according to gender.

2 Method and cooperation

In order to reach beyond anecdotal information, the study builds on information from a number of experts working with local ecosan projects in various countries. The team is based on a long-standing cooperation with scientists and activists in many countries, established during earlier studies and ecosan training activities. It includes Almaz Terrefe (Addis Ababa in Ethiopia), George Anna Clark (Cuernavaca in Mexico), Lorna Grace Okotto (Kisumu in Kenya), Edmund John (Dar es Salaam in Tanzania), and Victoria Atakunda (Kabale in Uganda).

Each member of the expert group has written a paper containing local information concerning a set of jointly agreed issues (see Appendix I). The experts commented on and revised a preliminary list of questions to ensure that all had a common understanding. This was deemed important since comparisons were to be made. Louise Dellström, a Swedish student from Stockholm and presently studying at Leiden in Holland, also did the same exercise.

The ways to gather the required information differ somewhat depending on the inclination of the individual expert. Previous studies and evaluations make up the core of the data, but it was also thought important to record some of the tacit knowledge they have gained over the years. Each expert was also encouraged to include interviews with colleagues or residents especially concerning on issues that they were not up-to-date on.

Most of the information was compiled by the expert from his or her work in society. Some information, however, builds on the expert's personal experiences in his or her home. The experts have also been encouraged to indicate to what extent a view is common (a societal norm) or a more personal view (an attitude).

The experts' responses to the questionnaire were initially combined so that each question was followed by all the answers. We have also made a condensed version in the form of tables, where answers to similar issues were put together in a column. These tables facilitated the analysis, and made it easy to find where the information came from. Also, these tables were checked and commented on by the experts to ascertain that they made justice to the points the experts wanted to make.

The material from the experts was analysed by Jan-Olof Drangert and Louise Dellström, and a draft report was reviewed and commented on by the experts.

3 What is a sanitation system about?

A sanitation system is more than the toilet. It has to do with management issues, disposal and potential reuse of treated urine and faeces, greywater discharges, comfort, affordability, health aspects, etc. Design, reuse, hygiene, and greywater issues are being studied by colleagues in the EcoSanRes network and other institutions. These issues will be dealt with in the present study only as far as they relate to societal norms and individual values/attitudes.

The interface between practical-oriented issues and residents' perceptions is complex. The questionnaire has to be comprehensive and unambiguous in order to catch the intended response. For example, the question "Is there space to have the toilet indoor in the area?" is not clear to the respondents. Indoor was intended to mean inside the dwelling, but can also be interpreted as in a separate building in the yard. This example shows how the prevailing sanitation system shapes our interpretation of questions and potentially our ways of perceiving the system itself.

4 Physical parameters in the desk-study areas

The settlements in this study are mostly peri-urban areas, adjacent to a major city. The socio-economic composition of the population differs and it may comprise squatters up to middle class residents. The size of dwellings and number of persons in each reflects the socio-economic status of the residents. Also, the ownership of dwellings differ; from owning the house to renting a room. Plot sizes vary a lot depending on the kind of house being occupied. In summary, the conditions are as follows (Table 4.1):

Table 4.1 Some physical characteristics of the study areas

Study area/ population	City/population	Socio-economic composition	Ownership of room/ flat/house	Size in m ² of dwelling and plot
Addis Ababa	Addis Ababa/ 3 million	low income	mostly renters and others own house	20-40 m ² for 5-10 person households plot ? m ²
Manyatta 30,000	Kisumu/ 0.4 million	low and middle class, no squatters	mostly rented rooms, some own house	10-20 m ² for 4-8 person households plot ? m ²
Cuernavaca	Cuernavaca/ 1 million	squatters to middle class	own house	m ² varies for 5 person households plot 200-400 m ²
Majumba Sita 22,000	Dar es Salaam/ 3.5 million	low and middle class, squatters	own or rented house	7-15 m ² for 4 person households plot 100-400 m ²
Kabale centre 42,000	Kabale 42,000	low and middle class	Own house, rented room, flat or house	? m ² for 4-8 persons plot 200 m ²
Inner City 200,000	Stockholm/ 0.7 million	middle to upper class	2/3 own flat and 1/3 rented flats	ca 70 m ² for 2-3 person households plot 0-5 m ²

Population density may define both how crowded dwellings are, and how much open space there is between houses. Crowdedness sets a limit to the kind of sanitation that can be arranged in the dwelling, while the plot size gives an idea about possibilities for urban agriculture and recirculation of nutrients. According to the team of experts, there is indoor space for a toilet at least for high-income earners in all areas. There is no space for indoor toilets for the bulk of the residents in Addis Ababa, Majumba Sita, and Kabale. All pit latrines are dug in the yard outside the dwelling, despite all negative aspects of poor security in the night, no water for handwashing, misuse by others, etc. It remains an open question whether space is a factor for adopting a urine-diverting toilet.

In all these areas except in Stockholm city and central Cuernavaca there is an ongoing ecosan project. However, the proportion of ecosan toilets is very low, less than 1%, in the studied areas. In the city of Stockholm a third of the toilets were actually of a urine-diverting design a century ago and now there are none (Drangert & Hallström, 2002). The toilet arrangement in the study areas ranges from full coverage of WCs in Stockholm to predominantly open defecation.

Table 4.2 Toilet and household water arrangements in the study areas

Kind of installation	Addis Ababa (million)	Manyatta (Kisumu) (percent)	Cuernavaca	Majumba Sita (Dar es Salaam)	Kabale town	Stockholm (inner city)
No toilet	1 M	few	?	-	9%	-
Shared pit	1.2 M	60%	-	1%	55%	-
Own pit	0.7 M	?	4%	98%	13%	-
Bucket toilet	-	none	0 %	-	in prisons	very few
WC sewer		10% ?	64%	-	1%	100%
WC septic tank	0.2 M	25%	32%	4%	12%	-
Urine-diverting toilets	200 units	20 units	13 units	155 units	68 units	-
Wells	few	90%	no private wells	95%	few	-
Stream/lake	?	-	none	-	few	-
Vendor	?	some	-	yes	2%	-
Standpipe	?	5%	?	18 pc	70%	-
Tap water indoors	12%	5%	?	-	4%	100%
Pay for water?	?	all renters pay	yes, but not metered	20-50 Tshs per bucket	76%	2 USD per m ³

Access to water varies from indoor water tap to wells and vendors. Private dug wells are water-selling points where most residents in Manyatta and Majumba Sita get their water. A small proportion buys from vendors. A majority of the wells in Manyatta dry up during the dry season, and people gather at the remaining wells. In Addis residents fetch their water from a standpipe or they have an indoor connection. This is also the case in Kabale and parts of Manyatta, but the supply here is very irregular. Kabale residents have to revert to streams and rivers for their household water supply, despite its brownish colour. Most areas thus face water shortage at least during the dry season or from failure of supply. In Cuernavaca they have an indoor (or at least to the plot) connection or buy from water trucks. Many without an indoor connection collect rainwater in several ways (buckets, large trash cans, connect to a cistern) as a supplement. Those with no connection usually do not have a cistern to store all the water from the water truck, nor the money to pay the entire truck's worth. Thus communities with this situation often have a central storage cistern, which is then piped to the houses or the residents carry buckets from it. Supply is usually very irregular in this case.

Pipes discharge wastewater in nearby ravines or into the ground (Cuernavaca) and sewers leak into streets (Manyatta), while dug pit latrines and septic tanks overflow and/or collapse

during the rainy season (Addis Ababa, Majumba Sita, Manyatta, Kabale). This means that neighbourhoods are smelly part of the year. Urination in alleys and other obscure places add to the smell in all areas. The sanitation arrangements are considered inadequate, and open defecation is practised in most places, specifically by children.

An architect, Cesar Anorve, designed the first version of the so-called Mexican toilet in the early 1980s, and many NGOs including Espacio de Salud have promoted the toilet. They have also assisted groups to establish independent workshops to manufacture the pedestal cast in cement. The Society for Urban Development in East Africa (SUDEA) has promoted the ecosan ideas since 1996 in Addis and some other parts of Ethiopia. EEPCO, an NGO based in Dar es Salaam in Tanzania initiated promotion of the Mexican toilet in 1999. In Uganda, a government agency, the Directorate of Water Development, initiated a sanitation programme in ten small towns in the south-western part of the country and Kabale.

Table 4.3 Ecosan toilet design and implementation

	Addis Ababa	Manyatta	Cuernavaca	Majumba Sita	Kabale
Design	porcelain UD pedestal	Mexican pedestal	Mexican pedestal	Mexican and squatting pan	Plastic and concrete squatting and sitting pans
Manufacturer	ceramic factory	local entrepreneur	mostly female entrepreneurs	Simba Plastic makes mould	Crestank Ltd
Selling point	manufacturer	manufacturer	manufacturer	manufacturer and EEPCO	SwTws project
Price of toilet	4 USD	5 USD	20-70 USD	12 USD	20 USD
Preferred location for unit	attached to house, separate entrance	attached to house	indoor in dwelling or hut in yard	separate unit in the yard	separate unit in the yard or attached to house
Approximate building cost	100 USD incl. urban agric	300-600 USD	chambers 75, labour 75 USD	65-200 USD	350 USD bricks & cement, 90 USD if mud and wattle

The Mexican design is often produced with a mould imported from Mexico, and pedestal toilets are cast in cement locally. Therefore, the toilets are accessible for any resident who would like to install one. The cost for a toilet unit is higher than a cast floor covering a latrine pit, but lower than the cost of digging the pit. The toilet price differs a lot depending on design and material as seen in Table 4.3 and it makes up 5-50 % of the total investment for sanitation. The investment cost for a urine-diverting toilet, including the toilet unit and the building of chambers and ventilation pipes, can be reduced if it is built as part of the dwelling.

The urine-diverting toilets are usually closer to the dwelling than pit latrines. However, only in Cuernavaca is the preferred location mostly inside the dwelling, similar to the case with the WC.

5 Norms in communities about sanitation systems and the stakeholders

In this section we dwell on the various norms in the communities that affect what is being done or not done about sanitary conditions. The presentation includes soft data on expectations, push factors and disincentives, trust and lead agents, and environmental awareness.

5.1 RESIDENTS' EXPECTATIONS OF SANITATION SYSTEMS

The issue of expectations can be dealt with from various perspectives. In this section the community norms come to the fore, while the household aspects will be addressed in later sections. Already here, it should be mentioned that the experts tend to focus on the toilet part of the system more than on disposal and reuse of human-derived nutrients.

In section 7.3 it will be shown that residents strive in various ways to use clean toilets irrespective of its design and kind. The experts mention that there is no homogenous resident, however, and they span from poor to well-to-do. This in turn means that they have varying levels of expectations. For instance, in Addis Ababa, for *“those who are really in need of their daily bread, sanitation is of less importance. In the same neighbourhood one can find residents who are better off and it is more important for them as they are also often educated and informed of what to expect.”*^(B1) This is reflected in some of the expert comments on the issue: *“urban sanitary system is to have enough public toilets or latrines, safe, adequate and reliable water supply and adequate and efficient refuse-disposal facilities.”*^(B1) Increasingly, *“expectations are very high on the sanitation system.”* In Manyatta, *“people want to see proper water and sanitation facilities. The formation of a Water and Sewerage Company has heightened the expectations.”*^(B1) This reflects a changing norm in most areas. More generally, it is interesting that expectations have been raised lately partly thanks to the UN Millennium Development Goals that have prompted governments to make promises about improved sanitation.

Political promises may be more common today with multi-party politics, but it is not a new phenomenon. Some of the experts give examples of the mixed blessing of promises. In the case of Cuernavaca, *“all urban services are very important in the game of providing services, making political promises [and] getting elected. It is just understood that community members are expected to attend political rallies in exchange for receiving services. Cleanliness (and getting elected) is very important, but a holistic understanding of environmental consequences is severely lacking. On the other hand, the short term (three years) for functionaries is a very short time to convince politicians of other alternatives, and then if convinced, have time to put the system into effect. Also, budget constraints make their work difficult.”*^(B1) The report from Majumba Sita claims that *“there is no prestige or political capital to focus on sanitation because those who are most in need have the least political power.”*^(B1) In the case of Kabale, *“the expectations that residents have are not different from professionals' and political expectations. The origin of these expectations is that the few urban sanitary systems in existence are helpful, e.g. refuse tanks, yet are very insufficient. Politicians however use the people's wishes and expectations (theirs too) to make promises and solicit for votes.”*^(B1) We will come back to such patronage relations in the analysis in section 10.

The experts report that residents are paying or are prepared to pay for sanitation services, if these are of reasonable standard. Residents expect councils, NGOs and others to develop the sanitation sector and to maintain a high communal service level. Such expectations are often

not fulfilled for various reasons. The experts provide examples such as: *“in Addis Ababa the annoying scene has been the bulky containers full of garbage not collected by the municipality”* (B5); *“when it comes to promises on improvement in water supply and sanitation services [in Kisumu], the residents have a low level of trust since the promises have been there for long without much action”* (B5); and *“residents [in Kabale] do trust the professionals but trust of authorities is questionable. This is because the authorities have on many occasions frustrated the public expectations.”* (B5)

The residents' views on the capacity of councils to lead and cater for the services are as follows: *“Kisumu residents believe that it is the duty of the council to provide water and lead improvements in sanitation. Whether there is enough technical and financial capacity to do the same seem not to be a major concern to majority of the people. The main idea is that the city council is charged with this responsibility and should find a way of doing it.”* (B6) The same goes for Kabale, where *“residents think (not only think but know) that the municipal council has the capacity to lead sanitation improvements because the council normally collects funds from residents to maintain and manage the sanitation systems within the municipality and also feel that through soliciting the council can access some funds from government or other donors to do several improvements.”* (B6) In Dar es Salaam, *“the Dar Regional Commissioner suspended health officers who had not been able to curb the cholera outbreak in 2003. This is seen by residents as a clear sign that the council is responsible for sanitary conditions.”* (B6)

In Cuernavaca, however, the local council is *“accessed when larger infrastructure projects are required [...] sometimes, for example, families will get together to share costs and labour to repair an existing road or put in a stone road. But would not normally try to pave a road by themselves. It is not an issue of leadership, but rather trying to get a response to particular demands which are beyond the financial possibilities and expertise of the families.”* (B6)

It seems as if residents put a lot of their fate in the hands of councils. However, there may be a discrepancy between what they say they expect and what they anticipate, as evidenced by the experts' reports on the role and responsibility of residents: *“while not ignoring that their contribution is important if any improvement in the sector is to succeed, the residents who have taken initiatives [in Manyatta] see their efforts as miniature in the face of appalling environmental deterioration due to inadequate water and sewerage coverage.”* (B2) In Cuernavaca, *“low income residents often participate by providing manual labour for putting in services (piped water, streets, etc.) and often commit to pay services but also often fail to pay due to family financial difficulties.”* (B2) As for ecosan installations in Mexico, *“with few exceptions, government [is] incapable of providing adequate services. We in the NGO have much more knowledge/human resources than the government.”* (B3) Residents in Kabale seem to insist on council involvement and *“that the politicians should use their offices to bring these services to the people. While they expect so, their role and responsibility is viewed as maintenance and management especially in payment of the user fees for these facilities. Household sanitation is a responsibility of the landlord. Commonly, the council lets the residents down and people fail to organize themselves into a resistance force though the air is sometimes hot.”* (B2) In Stockholm *“residents' trusts [...] in some way can encourage the residents to make their voice heard. In another way it can restrain them from taking action, because they expect the authorities to know what they are to do.”* (B5) This indicates that more efficient service delivery may lead to fewer small-scale actions by households and neighbourhoods.

5.2 PUSH FACTORS FOR CHANGES IN SANITATION AND SOME DISINCENTIVES

In the initial phase of introducing a new sanitation solution the view of ‘early adopters’ can affect the speed of implementation. In Manyatta, *“people are cautious and want to take time and understand the systems well before they adopt them. Those who have adopted the system are viewed to be risk takers and bold.”*^(B8) A similar attitude of ‘wait and see’ is reported from Majumba Sita. The expert from Kabale brings in another aspect: *“people don’t have attachments to the early adopter or a late adopter but usually people tend to sieve out the package and adopt early because it is advantageous; technical assistance from technical people and in most case promotion is done with subsidies. Late adopters usually have to do [it] all by themselves.”*^(B8) However, this is not always the case. Early adopters of ecosan in Addis Ababa were real guinea pigs during the introduction phase, whereas *“the late adopters were given more training and lessons learned from the earlier ones.”*^(B8) The situation in Cuernavaca is mixed and *“if it’s considered ‘alternative’ whoever adopts is considered rather strange. Whereas if it’s a new, well-known modern technology or item, others would admire or perhaps be jealous of the acquisition.”*^(B8) Such views on early and late adopters make up restraining factors in Manyatta and Majumba Sita where a culture of ‘wait-and-see’ prevails. On the other hand, in Kabale, residents say that if you join a project early, you can expect some extra support. The kind of restraining factors connected to the urine-diverting toilets can be as in Cuernavaca, where people who adopt them early are often considered strange.

Push factors for improving sanitary conditions range from physical to socio-cultural ones as visualized in a table format (Table 5.1). Some disincentives or restraining factors may also be found.

Table 5.1 Push factors for change of sanitary conditions

Factors:	Physical	Legal	Economic	Health	Cultural
Addis Ababa	densely populated	compulsory, no follow up	less expenses for hospital bill	epidemics	pleasant and dignity
Manyatta	waterlogged, rocky	compulsory	reduce expense, income generat.	epidemics, foul smell	taboos, status and privacy
Curnavaca	ravines, rocky, permeable soil	WC compulsory little follow up	UD-toilets cost less than WC	epidemic in 1990s	high prestige WC indoor
Majumba Sita	waterlogged, sandy	compulsory, no follow up	epidemics		
Kabale	waterlogged	compulsory	affordable	epidemics	pleasant
Stockholm		compulsory	LIP-project		modernity

One category of push factors is related to physical conditions. In Majumba Sita and Kabale the water table is high, and during wet periods *“the area is waterlogged and water usually fills the latrine pits in a very short time and pits collapse at high rate.”*^(B9) Therefore, toilet rooms elevated above the ground would solve the problem. In Kabale and Manyatta, there are problems related to rocky ground that makes it difficult to dig latrine pits, so other solutions are sought. The Cuernavaca area has plentiful ravines and hard rock that make any piped system very expensive, but making discharge of raw sewage easy. These physical conditions promote dry ecosan toilet systems that do not require digging at all. Also, in crowded settlements there

are “*plots without room for shifting when the pit is full*”.^(B9) On the other hand, big compounds allow for new pits and thus may delay improvements and upgrading of the system.

Comfort and privacy are important considerations in most areas. However in Manyatta for example, “*the momentum these have gained is still not enough to refer to them as a pushing force*.”^(B7) The same goes for health considerations in some instances when “*health improvement comes later*.” However, “*many [in Cuernavaca] are aware of the health risks associated with open defecation and fly breeding*.”^(B7) Cholera and typhoid epidemics help to enforce improvements (Majumba Sita, Manyatta and Kabale) but such preventative activities might be short-lived.

For men, push factors for improved sanitation include prestige and status in having a modern house and toilet (Majumba Sita, Stockholm). The status issue in Cuernavaca is described as follows: “*getting running water is a big deal, and a WC is a manifestation of this achieved status. Dry toilets are equated with poverty and rural-ness, as is having a toilet outside*.”^(B11) A more specific push factor is reported from Majumba Sita where “*when the girl reaches puberty age she is required to stay in the house till a man is found for engagement/marriage. During this time she is not supposed to move outside the compound. It can take a month up to two years and thereafter a big festival. All this process requires good sanitation services, so for them privacy is more important*.”^(B7)

Among push factors the economic one is deemed important in Manyatta due to “*high levels of poverty and unemployment. Water and sanitation solutions that provide opportunity for income generation, and relieving daily tasks are preferred*.”^(B7) In Kabale low-cost options make a solution more attractive, and in Addis Ababa “*in many cases when they see the production of urban agriculture growing and stimulating their household economy they appreciate the ecosan system better and better*.”^(B10) In Addis Ababa residents are restricting the use of tap water to water gardens, because they think that it costs more than they gain from the food produced.

A disincentive for adopting an ecosan solution can be that the image of the product is associated with old-fashioned and temporary solutions – generally unpopular among residents, professionals and politicians. In Stockholm “*in particular toilet promoters will have to be very careful about the image one is creating. In Sweden the push factors are namely also to be modern, hip, and ‘cool’ [...] especially in the bigger cities as Stockholm. [...] energy saving articles are cool, dry toilets are not cool*.”^(B7+8)

5.3 AWARENESS ABOUT ENVIRONMENTAL EFFECTS

The awareness among residents of the study areas about environmental effects is discussed by the experts. In the case of groundwater pollution from sewers and dug latrines, there is a growing concern among residents in Manyatta. In this area, where they rely heavily on groundwater, there is “*a general awareness that well water could be polluted or contaminated. The main sources of pollutants are seen as open sewers, garbage (solid wastes), pit latrines and septic tanks*.” In Majumba Sita, however, “*people are trusting the groundwater source as the safest compared to other sources. However, the recurrence of outbreaks of cholera and diarrhoea in the area has been assumed to come from un-managed waste and poor hygiene practices. The linkage of groundwater pollution to pit latrines or sewers is of less concern to many of the residents*.”^(B15) Residents in Addis Ababa, Cuernavaca, Kabale and Stockholm, who hardly use water from wells, are vaguely aware of the pollution of groundwater. The

Cuernavaca case is interesting, however, since there is a known water-quality problem and yet residents do not know *“how their toilet/latrine spreads disease. In the early 1990s, 95% of the state’s public wells were contaminated with faecal matter – few people understand how this happens, and few people read the newspaper where they would see this information.”*^(B13)

Professionals, on the other hand, are reported to be knowledgeable about groundwater pollution. However, they display varying interest in monitoring the quality. For example, in Addis Ababa *“one can find some intellectuals who argue it is a luxury to talk about contaminating the groundwater while we are contaminating the surface water with human excreta. Even those who are defending VIP (ventilated improved pit) latrines use the above argument.”*^(B15) In Majumba Sita *“professionals believe in this route of contamination, but there is no coordinated effort to monitor the quality of water from wells.”*^(B15) Water professionals in Sweden have been reluctant to talk about leaking sewers that pollute the groundwater, seemingly in an effort to protect the hegemony of the sewerage.

Pollution of surface waters is obvious in many places, and therefore more known, as in the case of Cuernavaca where *“many residents understand how ravines and streams can be contaminated – and some are so dirty one cannot avoid understanding it. But others are considered clean because they ‘look’ clean.”*^(B15) Again, disposal of untreated sewage causes *“a lot of noise both in the media and by people over the pollution of Lake Victoria by raw sewerage from the municipal sewerage system.”*^(B16) Individual residents may have a laissez-faire attitude towards their contribution to the pollution, as reported from Cuernavaca: *“one friend told me about driving up to a person who was throwing trash away in a ditch. When concern was expressed over this practice, the person responded ‘no problem, the rain will just wash it away’.”*^(B3) It is reported from Stockholm that *“one does not blame oneself when hearing on the news that lakes and rivers are not as clean as they should be. The blame is on the government and the professionals for not taking their responsibility.”*^(B16) Even if the surface water is visibly polluted like in Kabale *“some people swim in it – or leave their children to. But usually people don’t use this water except for dirty jobs.”*^(B16) According to the expert from Kabale, the following passage in the Bible has an impact on their attitudes, *“Deuteronomy 23:12–14 is a chapter usually used by preachers to insist on God’s laws for a clean environment and use of toilets.”*^(B11)

6 Aesthetic aspects of urine and faeces (individual attitudes)

Aesthetic aspects such as smell and appearance of human excreta play a role in acceptance as well as rejection of a sanitation system as well as for avoidance. The expert group describe how individuals view smell and appearance more generally. They also provide examples of avoidance and, to some extent, views among users of urine-diverting toilets.

6.1 SMELL

Perceptions of excreta, or more specifically urine and faeces, differ, according to the expert team. There is a common view that smell from faeces is more pungent than that of urine. However, both faeces and urine smell. One expert stresses that urine can have a very strong smell, although still not as pungent as faeces. The smell is said to be related to the food intake. One expert makes the distinction that food affects the smell of faeces, while urine is affected

by what has been drunk. This is not a general idea, however, as indicated by a comment that the faeces of alcoholics are the smelliest. Another expert reports that faeces from red-meat eaters have a very bad smell. A third expert mentions that urine smells if a person is on medication. Perceptions regarding smell may go the other way around, as mentioned by some people in Manyatta who feared that *“the tomatoes smell like faeces and taste like urine”* if fertilized with excreta.^(C11)

Responses to the question whether there is smell in the toilet room, are somewhat ambiguous. Some experts come to think in terms of differences between toilet designs (WC, latrine, urine-diverting toilet) while others report on smell in the room irrespective of the kind of toilet. Three experts say that there is smell in any toilet room directly after use. If there is a water shortage the WC smells like the other toilets. The proposed measures to reduce smell ranges from maintaining the toilet, to installing ventilation pipes and using air freshener. For urine-diverting toilets the recommended measures include adding ash, and one expert reported *“in ecosan toilets the ash usually reduces the smell to minimal levels, but urine does smell and occasionally there is a flow back that keeps the urine smell for a while. People are advised to use oil as a seal for the urine pipe.”*^(C1)

Another comment from Addis Ababa puts smell into a social context: *“we thought that all toilets smell, so we thought that even the ecosan would smell. The smell you feel just now is not from my ecosan toilet. It is from my neighbour’s latrine. We share our coffee time and many other happy occasions. But, I wish I could do something not to share this horrible smell for the rest of my life. If I mention this to my neighbour, we will only lose the good friendship we have, so I think I will have to live with it.”*^(C1)

The experts have experience of how smell released from urine changes over time, since they empty urine containers. The general view is that urine becomes more offensive because the urea is converted to offensive ammonia gas. One expert tells that the smell *“can be so strong as to make a person feel odd”* when using it in the garden. They were not requested to comment on what happens to the smell when urine is applied to the soil. However, one expert mentions that the smell is reduced if humus is added to the urine.

One expert reported that *“the other [pipe] carries the ablution water to some kind of small filter bed or they direct it to the trees. The ablution water does not smell because it is only in small quantities and it even dries after a short time.”*^(C1)

Another issue relates to how people react to smell and sound from intestinal gases. Sound from the stomach is accepted as a biological fact and may be interpreted as: *“somebody is hungry.”* However, sound from the anus is different. *“Sounds are embarrassing and unpleasant and must be avoided around other people (embarrassing to tell). Around family it can sometimes be acceptable, very much depending on the situation! Sometimes some do it to annoy others, or as a joke. To do it in public [in Stockholm] is absolutely not accepted! Smell is not accepted!”*^(F7)

It is of interest to see that most of the experts report a connection between smell from excreta and the person’s health status. Bad smell can cause ill health in general, or more specifically nausea, shigella and vomiting. However, one expert reports that there is no such relationship, and another mentions that you can be very healthy despite bad smell from the faeces. There seems to be a component of miasmatic view of cause of disease, but as will be seen below the contagion theory is probably stronger among the experts.

6.2 APPEARANCE

There is also a connection between the appearance of faecal matter and health according to the experts. They report that it is possible to use the appearance of faeces as an indicator of a person's health status: *"people who are suspicious of being ill will check, or if they are ill already they may want to see, what has come out. Adults, mothers in particular, like to check the faeces of their children between 0-3 years to determine their health status."*^(C6) Another expert expands on the issue: *"yes, this has been a traditional way of diagnosing the disease and treatment required. There are traditional doctors who are mostly favoured by the community due to their small charge. Because the health services have been commercialized so to avoid to be charged, they normally diagnose themselves. Mothers also take the same procedure for her child, however when things go unexpectedly then they consult the health centre."*^(C6)

In normal instances, however, people do not want to see excreta around: *"the absence of faeces in the toilet is believed to indicate high hygiene standards or general cleanliness and good environment."*^(C7) In Cuernavaca and Stockholm, residents do not want to see faeces and they try to hide them by the toilet design; in fact they should not exist, and be flushed away. This view presents a design challenge for urine-diverting toilets.

Views on the appearance of urine are more complex than faeces. Nobody is allowed to urinate in the open, and women never do. However, men do it *"even where they can be seen by others."*^(C8) This gender difference seems universal according to the team of experts. Later in the report we will see how urine is being used as an antiseptic drug. It was reported in Addis Ababa that menstrual blood influences behaviour, and *"in connection with using urine as fertilizer there is often suspicion of transmitting diseases like bilharzia and HIV-Aids."*^(C11) Furthermore, some residents in Majumba Sita wonder whether ecosan toilets require them *"to be playing with menstrual blood produced by women in their time."*^(C11)

6.3 AVOIDANCE

There seems to be a general societal norm that touching or handling excreta should be avoided. Yet, circumstances force societies or households to deal with excreta in concrete ways. Ethnic groups like the Teso in Kenya^(B14), Bhangis in India and Bacha in South Africa are traditionally sought after to carry out sanitation jobs. One example of residents' attitudes of such occupations in Stockholm is that *"it is greatly appreciated! Although...my dad always said that if I did not study well I would end up as a garbage man!"*^(B14) In Addis Ababa most residents dislike the task and would never do it if they could find another job.^(B14)

Apart from sanitary occupations, babies and sick people in the home need help to manage defecation. Women are said to be conditioned to accept the task: *"it is seen as nature's conditioning since toddlers cannot clean themselves, and so someone has to do it for them."*^(C4) The expert team reports that babies' faeces are considered less offensive than adult faeces. Some argue that this is because of the food eaten. Those of potty-going age *"eat less complex stuff and therefore the outcome is also better in appearance."*^(C4) There is a variety of views, from little difference between the two to the extreme that child faeces is viewed as clean. *"Adults' faeces is viewed as repulsive so no one would like to handle them unless forced by circumstances, for example, in cases of sickness."*^(C4) However, there is a more relaxed view of child faeces: *"the fact is that culture does not have any negative views about babies' shit. It is viewed as clean and of no problem, so water from nappies could as well be poured in the garden (most times) or in the toilet."*^(F2)

Spread of disease may also take other routes as reported by one expert: *“cockroaches and sometimes rodents reside in the pit and can go back and forth to the house and contaminate water and food stuff.”*^(C7)

6.4 ANIMAL DUNG AND APPRECIATION

Another aspect illuminated in the desk-study is how human excreta compare with cow dung and dog faeces. This information may add to the understanding of perceptions and norms.

Cow dung enjoys a special position in that people have no or few reservations to touch or use it. Also, there seems to be a positive connection between the cow and cow dung, whereas pigs are considered dirty for religious reasons or because of their scavenging habit. Dogs and dog faeces represents something in-between. In Addis Ababa, dog faeces is deemed to contain more hazardous bacteria than human faeces, while in Manyatta, Kabale and Cuernavaca it is considered less offensive^(C9). In Majumba Sita, however, residents make no difference between the two.

It is common that dogs and pigs scavenge human excreta, despite the general opinion that faeces are not an appropriate feed^(E12). Yet, scavenging is reported not to influence people's perception of the scavenger^(C10). One expert expressed it as follows: *“many residents alluded to the fact that even though hens scavenge on faeces, they think that the amount taken could be very small and many times faeces is really not part of the major feed for dogs, hens and pigs. It is also believed that once inside, the body system of these animals has a way of making it useful and cannot affect people who eat hens after it is killed and cooked. Religiously, some people consider pigs unclean and they cannot be eaten, but not because they scavenge on faeces occasionally.”*^(C10) Dogs are not eaten, but hens are, and in Majumba Sita, *“hens that are free scavenging faeces and other waste are more expensive than the poultry because they taste nice. The same [is true] for pigs' meat which is more than one and a half [times more expensive] compared to beef.”*^(C10) In Cuernavaca, scavenging dogs are not considered to be pets. In rural Mexico, the danger of eating pigs who have scavenged on faeces is widely known and pigs are required to be penned or tied up.

7 Management at household level: habits and routines in the bathroom/toilet

Managing sanitation includes activities in the home as well as in the community. The focus in this section is on household-oriented practices. The gender-specific aspects are dealt with in section 9. A background is given initially on some behaviours and norms prevailing in rural areas that are being changed when moving to town.

7.1 CHANGES OCCURRING IN THE MOVE TO TOWN

Defecation patterns are likely to change when moving from rural areas to town. Causes may range from habitation patterns to views of modernity. The experts describe some of these changes: *“in rural areas having a toilet is not priority, for many are used to go to the bush. The practice had to be dropped when they went to town.”*^(F5) This change is outlined more

in detail for the Luo community in Kenya: *“in the rural area the most common methods of sanitation is the use of a pit latrine and – in the absence of one – people use the bush or the gardens where they dig shallow pits, defecate and then cover. Some residents noted that among the rural Luo, the sons and daughters-in-law have their own pit latrine separate from that of the parents-in-law. When people move to town one of the most notable changes is lack of space for shallow pits so all must use the toilet. Also there can be no separation of toilet like in the Luo case, people and even visiting in-laws must share the same toilet.”*^(F5) The expert from Kabale points out some more specific changes that urban residents experience: *“in rural areas people might visit the toilet more times compared to those living in towns due to no expenses for services, e.g. in town there is a service fee for every toilet visit (public places). Yet in the villages sharing latrines is acceptable and the use of bushes is possible. Meanwhile in urban homes, people lock their toilets. You find for example on a building occupied by ten homes, each two homes share a toilet stance. So they lock it to avoid misuse.”*^(F5)

The common belief that faeces can be used by people to hurt others is reported to fade away when moving to town (Kenya, Tanzania, Uganda). Traditionally, *“Luo people believed that faeces was a waste and should be disposed ... in a safe place, especially that of a child, since an evil person could pick it and use it to bewitch the owner.”*^(B11) The same belief is reported from the lake regions in Tanzania, where *“faeces have been associated with evil when found at the door front or any other place of the house.”*^(B11) The situation in Kabale is similar: *“what people know (and it is true) is that faeces or urine can be used by witch doctors to harm (even kill) people. Sometimes they will use your excreta to harm you or use any human excreta.”*^(B11)

There seems to be a mix of several sanitation systems working in parallel in present-day peri-urban areas. This comes about for physical as well as cognitive reasons. A close relationship is reported between the position of the household in its housing career and its sanitation provision. The Mexico case brings this to the fore: *“in rural areas there’s a lot of open defecation, on the other hand, some of this takes places out in the corn field or the forest where I can’t see that there would be much of a problem. When migrating to the city many people, if on the peri-urban fringe they would not have a facility at all at first, would try to find “bush” or practice open defecation as well in their yard (but put up some kind of curtain) and perhaps build a pit latrine. Eventually a WC is usually built, which often results in direct and concentrated (due to population density) water pollution. If one has the misfortune to move into a tenement building within the city, families have to share their toilets and showers.”*^(F5)

7.2 TOILET-RELATED ASPECTS FOR CHILDREN AND ADULTS

The expert team was asked to report on the defecation training for various age groups in their communities. For infants and toddlers disposable diapers are rarely used, except in Sweden and urban Cuernavaca where paper and cloth diapers are universal. Infants, i.e. under one year of age, are not trained to sit on the toilet and the mother or carer takes all the responsibility for cleaning and helping the baby. It is common to sit on the mother’s feet leaning towards her legs while defecating (East Africa). Toddlers are trained to eventually be able to visit the toilet on their own: *“when the child urinates the mother holds the child up and lets the urine often flow down on the floor. By time, the child notices that it is not pleasant to pee in the clothes. In most cases between one and two [years of age], the child is trained to defecate on the ground where the mother cleans afterward.”*^(F1) The method differs depending on economic and other circumstances, so paper or potties may be used. In Manyatta, *“in some households, because of*

the poor superstructure of the pit latrine, children of one to five years are trained to defecate on a piece of paper and then they call their mothers to throw the same into the toilet.” In Majumba Sita: “toddlers between one and three normally do not use the same toilet as adults, instead they defecate in the house surrounding and later the mother come[s] and take[s] care of the excreta. Few who are well-off can afford to buy a pot and train the toddler how to sit and excrete. When three to five years old, the mother or anybody home has to assist them on how to use the toilet properly.”^(F1) The case of Cuernavaca is similar and “in rural areas, the child is left to defecate in the yard (anywhere) outside of the house, where the faeces may or may not be picked up. Usually the dog would get there first. Potties are common in urban areas.”^(F1)

Later, “by the age of six to 15, the children are comfortable with the facilities, and no guide is necessary. In fact operation and maintenance duties largely fall to this category of children.”

The picture given above is that young children urinate indiscriminately in the yard, while the faeces are picked up and disposed. Diapers, usually a piece of cloth, are washed with soap. In Manyatta and other places, “diapers are washed either in the washrooms (bathrooms) or outside of the house. The latter is the most common practice in Manyatta as most households do not have in-built washrooms. The water is either poured in the pit latrines or just poured out in the grass/compound.” There appears to be little concern about disposal of the wastewater from washed diapers (see section 6.3). Adults in urban areas use a variety of toilets as shown in Table 4.2. They may squat or sit on a chair when defecating. If only urinating, men generally prefer to stand up. A reason for this practice was said to be that “their organ touches the ground or the toilet surface and it feels very uncomfortable. This could even cause some infection.”^(F6) Females usually urinate in a squatting posture.

The team reports that people try to use as clean toilets as possible, and they take a number of precautions: “a special study [by Almaz Terrefe] in Bahir Dar has shown that the women avoid using the toilets at work due to shortage of flushing water and filthiness. The water closets often do not have water and often they could not use the toilets. Sometimes the water shortage remained for many weeks. They have trained themselves to avoid urinating until they go back home for lunch or after work. Some did avoid drinking water during the day. Out of 21 women, nine of them had headache more than once a week.”^(F11) The quality of toilets also differs: “many people prefer defecating at home because toilets in the working places are used by many people (people feel more relaxed and comfortable at home). Anyway this applies to what level of people you talk about. In some instances the opposite happens because the toilet at work is better and more hygienic than the one at home.”^(F11) For example, “people who work in formal offices feel they have good toilets, which are clean and are well maintained since there are people employed to clean them. However those who work in the informal sector also known locally as ‘Jua Kali’ do not have good toilets and sometimes they say no toilet is available for their use.”^(F11) In some cases the toilet in the home is deficient and so “some do [use the toilet at the work place] due to the fact that where they come from either you have to queue for the service (e.g. one toilet for five households) and it is sometimes a toilet and a bathroom in the same cube or the toilet is full, collapsing or no water in the area.”^(F11) There are other instances where a person may use a toilet in the workplace, “for example, the domestic worker who doesn’t have any infrastructure and goes to work in a middle class home with a WC.”^(F11) When the toilet standard is the same, however, people may still prefer the quietness at home.

Another aspect of people's perceptions concerns behavioural change in connection to using the toilet after a sick person has used it. Some experts report that residents do not mind: *"residents do say that sharing toilets with sick people does not influence their behaviour even though they agree also that they try to keep the toilets clean especially if a sick person uses the same so as to avoid possible spread of diseases."*^(F9) The behaviour is *"not [changed] if the sick person is a family member. And if it's not a family member, I generally wouldn't know if they're sick. Unless the toilet's not cleaned afterwards and in that case it doesn't matter if they're sick or not, I look for another stall!"*^(F9) However, others are cautious: *"people usually fear to share [a] latrine with sick people, especially diarrhoeal diseases and in many cases they provide potties for them."*^(F9) The precautions may be very strict as indicated by Swedish experiences: *"defecating in a 'sick' toilet makes me as much possible to avoid the toilet. If it has to be used, hands are washed thoroughly afterwards and I try to touch the toilet as little as possible."*^(F9) Precautions such as these are in line with the views about faeces that were reported in section 6.

The cleansing materials differ from water to paper^(F4). People may use toilet paper or just any paper like old newspapers. The monthly expense for buying toilet paper ranges from 1 USD per month in Kabale to some 10 USD in Sweden which makes it unaffordable for many residents^(E13). The paper is thrown into the latrine pit or, as in Mexico, *"disposed in the yard, eventually burnt or thrown in trash collection truck."* Religion may prescribe behaviour such as ablution: *"water is commonly used among the Muslims in areas like Manyatta Arab where a majority are Muslims. Sometimes water is also used on the children and such water like in the question above is either disposed by pouring into the pit latrine or just on the grass."* Again, there is little concern of the potential transmission of disease from child faeces. The disposal of cleansing water in Majumba Sita is often done in the pit latrine, *"while those with urine-diverting toilets direct it to the fields/trees or into small wetland built with sand and aggregate on top."*

7.3 MAINTENANCE ISSUES FOR THE HOUSEHOLD

We mentioned earlier that young members of the household may have the responsibility of keeping the toilet in good order. We return to this question in section 9 when dealing with gender issues.

The cleaning is done as follows: *"pit latrines are simply swept regularly and occasionally (say once a month) they are smoked (using burning grass). Flush toilets are cleaned using detergents, water and brushes and the cleaning brush has a holder for it. Ecosan toilets are swept regularly and in case a need to use water arises, then they are mopped and not scrubbed. The cleaning cloth is tied on a stick so the user does not worry to touch it. Meanwhile, the stick that is used to push the cone sideways is usually left in the toilet [faecal collection compartment]. So after six or so months, two or three sticks are dehydrating in the chamber."*^(B14)

The kind of material used for scrubbing a dry toilet is depicted as follows: *"some in Cuernavaca will use a cloth, others will use a "fruit" from the cucumber family which is good to scrub with (called "loofah" in the US). They are used instead of a handcloth when bathing, and when it gets too old to use in the shower, you can use it for dirty jobs such as these. Afterwards, they can be thrown into the chamber with the faeces. Likewise, little natural fiber brushes are used. I like the idea of leaving the stick in the chamber! We use an old broom handle but take it out (they are too long to leave there) and stick the end of it in an old can or small (milk) carton."*^(B14)

The cleaning procedure for a WC is well known: “*water mixed with soap is splashed into the toilet, a brush is then used to scrub the floor and then cleaner water is splashed again on the floor. A piece of cloth is then used to dry the floor. The brush and the cloth are either kept in the bathroom or in the store. In some instances especially where the toilet is private and indoors the brush is kept in the toilet.*”^(B14)

There are several ways to act when the latrine pit is full. If there is space, a new pit is dug and a tree may be planted over the abandoned pit. In crowded places in Manyatta, “*the ethnic group Tesos are normally hired ... to empty filled up pit latrines manually.*”^(B14) In Majumba Sita, “*they normally pour kerosene in the pit to kill the insects [and] microorganisms, then it is believed to be safe to empty.*”^(B14)

The urine pipe in urine-diverting toilets may be blocked by crystals adhering to the pipe wall. This occurs mostly if the pipe has a small dimension and when the slope of the pipe is almost level. However, it can also happen in another way: “*in Ethiopia it is recommended to powder ash, soil, sawdust, soil and other biodegradable material over the faeces. People tend to drop those substances into the urine pipe and it gets blocked.*”^(B14) Often, just pouring enough water will flush out the crystal blockage, and sometimes “*unblocking with a straight metallic rod (or long straight sticks) through the pipe or opening up the T- junction*” is sufficient.

8 Management: treatment and reuse of products flowing through the household

The impression given in the experts’ responses indicates that most excreta have been disposed of without intentional reuse. In this section we present some important ways that some of the faeces and urine have been gainfully utilized.

8.1 USE OF URINE AND FAECES IN VARIOUS PRODUCTS

In the previous section we saw that urine can be used as a diagnostic tool to assess a person’s health status. All experts but one claim that urine has antiseptic properties and is used to clean or smear wounds. Some experts give examples of how urine can be used to treat other ailments^(E1). Urine is used to treat eye disease and athlete’s foot as well as persons intoxicated by alcohol (Kabale) and as poison neutralizer (Majumba Sita). In Cuernavaca, a known but not widespread practice is to dilute and drink human urine in order to cure allergic reactions. In Kabale, cow urine may be drunk to treat measles. The Luo community in Kenya use cow urine to preserve milk. In Manyatta, however, the expert reports that urine has no use whatsoever and is exclusively seen as waste.

Human urine is also used as an insecticide to kill banana weevils in Tanzania and Uganda. The experts report contradicting perceptions whether urine attracts flies or not^(D5). Some claim it does, while some say it repels flies. In Manyatta, “*the general attitude is that flies are neither attracted to toilet paper soaked with urine nor do they breed in urine soaked pits because the acid present in the urine repels them.*” It remains unclear whether urine could act as a repellent.

Human faeces, on the other hand, are hardly used nowadays for medical purposes. In case they are, the ingredients in medicines administered by local/traditional doctors are not well

known to the buyer, which is similar to the case of urine in cosmetics sold in Swedish shops. Two examples of use of faeces were reported and they both connect to rare health perils that require strong action. In Kabale faeces are used to treat thunder-struck persons, and in Addis Ababa they are used to treat a serious wound called chife.

8.2 FERTILIZING GARDENS WITH URINE, GREYWATER AND FAECES

Urban residents are reported to have an interest in gardening. Depending on the available space, the activity ranges from flowers in flats in Stockholm to agricultural plots planted with trees and vegetables. Table 4.1 showed that the size of plots range between 400 m² in Majumba Sita and Cuernavaca to 0-5 m² in inner Stockholm.

A majority of the houses in Addis Ababa, Cuernavaca, Majumba Sita and Kabale have gardens and fruit trees are common with the exception of Addis^(E3). Some examples are given on growing other items such as chilli pepper, corn (Cuernavaca) and vegetables (Kabale). Manyatta residents seem to be least interested in gardening with only one-fifth using the gardens and they also display a cultural reluctance to any farming.

The experts were asked to list disincentives for gardening and food production in urban areas. In Addis Ababa these disincentives included lack of tools, lack of seedlings and diffused security of land ownership. In Cuernavaca, the risk of pests as well as the produce being destroyed by dogs and chickens are disincentives. In Manyatta the disincentives have a cultural origin with a lack of interest, a lack of space as well as little appreciation of flowers. The case of Kabale is very different, since *“almost every home has a flower or two. A majority have some plants and trees. The trend has recently changed to growing trees in the garden and instead of having a big compound, a space for small garden is left. Homes with ecosan toilets are harvesting urine and using it to grow fruits and flowers. ... People have eventually learnt that shopping for food is very expensive.”*^(E2+3) Ecosan families in Ethiopia grow a lot of food. There is no mention of problems of theft from the gardens.

Rural traditions to apply organics and excreta are not being practised in the urban setting. However, residents in Kabale plant trees or banana stand on the abandoned latrine pit, and ecosan owners there and in Majumba Sita use composted faeces as soil conditioner. Generally, cow dung and horse dung (Sweden) are viewed as good fertilizers. An exception is pig dung in Majumba Sita with its predominantly Muslim residents, where avoidance is strong to the extent that *“... even the pig dung is not used as a fertilizer.”*^(C10)

In East Africa, peeing on banana plants is considered good if not done too often. Reuse of urine is still not accepted in Kabale, and not practised in Cuernavaca since it may burn or scourge the plants. Apart from the scourging effect, *“some anthropologists told us that the Ethiopian people would not accept to eat vegetables fertilized by urine. Some of them mentioned especially the Muslims. Our experience in Ethiopia is different. People are only suspicious if the introduction of the system is done badly.”*^(B11) In addition, the experts provide comments on hazards connected to application of urine and/or faeces. Handling of urine seems not to be a health hazard, whereas handling of faeces is a health hazard. A general perception in the case-study areas is that anyone can get sick from touching faeces that has not been sanitized. In Manyatta there is the idea that it is not safe to reuse excreta because *“faeces [can] find its way into water or food to be eaten.”*^(E6)

Such a perception of potentially negative effects of applying urine has a bearing on the promotion of urine-diverting toilets, and will be discussed in the final analysis. The hygienization or treatment of urine and faeces before reuse seems to be crucial factor.

The content collected in urine containers and faecal deposition compartments depends on what products go along with them. If the toilet is used also as a waste bin, the disposed material will also need to be hygienized. The experts report on a variety of disposed products such as poisonous materials, broken glass and plastic (Kabale), chlorine and paints (Stockholm), any liquid (Cuernavaca), things that are dangerous for children (Manyatta), women pads and any waste with human blood (Majumba Sita). Such additions, except human blood and vomited matter, may render the product unfit for applying in the garden.

Greywater is produced in all households irrespective of the kind of toilet in use, and it is disposed of in various ways. Washing water may be thrown on the ground or lawn, this unintentional reuse is also widespread in compounds with a sewer. In Kabale, *“many people don’t even mind using greywater (from kitchen and shower) for irrigation, but usually people don’t harvest water from the shower.”*^(B17) In Manyatta, on the other hand, *“there is no widespread use of wastewater, except for pouring into the flush toilets in few households.”*^(G3) Soap and oil are not considered harmful.

Dishwater is claimed to be smelly, dirty and unpleasant to handle (Cuernavaca, Kabale, Manyatta, Stockholm) but rarely hazardous. The experts do not report whether soap and oil is considered harmful, but the Cuernavaca report raises a concern that bleach entering the greywater could kill plants^(E6). Greywater from the kitchen sink may be infiltrated in the ground or going through some kind of treatment. Greywater is, however, generally considered easier to treat than blackwater. The state government in Cuernavaca prohibited the use of mixed wastewater for *“the production of vegetables [...] in most of the state about ten years ago due to the water pollution problem.”*^(B15)

9 Sanitation, ecosan and gender

We have presented management issues at household and community levels leaving out gender-specific aspects. In this section we will discuss gender in two categories; division of tasks between men and women, and relationships between men and women with respect to sanitation systems.

9.1 GENERAL DIVISION OF TASKS BETWEEN THE SEXES

There seems to be a difference in composition of households during daytime. The proportion of women working outside the home is substantial in Cuernavaca and Stockholm, while women constitute a large portion of those in the home during office hours in the other study areas. Jobless men seem to be away from the homestead. This fact may have had an influence on the division of household tasks. We, therefore, commence the reporting by focusing on single-person households. Such households are incredibly few in Cuernavaca, and *“most young people live with parents until they marry, then some continue to live there, build an extra room or separate house in the same lot. He lives with his mom who cooks.”*^(G1) Single-person households constitute half of the households in inner-city of Stockholm and *“the person cooks and cleans him/herself, unless the person is sick and helpless.”*^(G1) In the study areas in Africa,

a moderate number of single-person households is reported. They differ, however, when it comes to what tasks are carried out by the single person. In Kabale, *“a majority of bachelors eat in hotels while the minority hire services of maids and houseboys. The common practice for single women households is they have maids for help.”*^(G1) Bachelors in Manyatta *“do the cleaning and cooking for themselves in most instances. Some, however, say that they only do light cooking and light cleaning while for the heavy ones they make arrangements with neighbours to do [it] for a fee.”*^(G1) The situation is no different in Majumba Sita, where *“the tenants do all the cleaning/cooking for themselves and since the toilet and bathing places have to be shared, a systematic timetable or roster is agreed for cleaning it. There is no compromise, either you pay somebody to take up your duty or you do it yourself.”*^(G1) The impression is that residents, both single men and single women, take on most household chores.

The expert team provide information of what tasks are given to men and women respectively. A fairly uniform picture emerges from the accounts: females are responsible for chores in the kitchen and bathroom/toilet, while men carry out construction and repair of installations. The situation in Manyatta is typical for the African situation: *“generally women are more concerned about sanitation than men as a result of the particular social, economic and political structures. In this societal structure, women are responsible for various domestic duties including water collection, and its use for laundry, cooking and domestic hygiene. Women cry that their duties of caring for the sick, laundering and cleaning soiled clothes are particularly hazardous tasks when water supplies, sanitation and washing facilities are inadequate.”*^(B7)

The team report on who in the household cleans the toilet/toilet room or floor in the latrine shack. Women and girls, and occasionally young boys, are responsible in the four African study areas. In the case of tenants sharing toilets, *“female tenants in a given compound organize themselves to clean the toilets in a rotating manner.”*^(B14) In Mexico, the task belongs to women or girls, and in Stockholm only women are responsible. In the case of Cuernavaca the picture is more elaborate concerning community work projects, *“in the case of a two-adult household, the man participates, but also lots of single mothers so the women also participate in digging but generally not in construction.”*^(G3)

Wastewater reuse and horticulture is done by women in Cuernavaca and Kabale, while no one is doing it in Manyatta since *“there is also no widespread horticulture practised”*. In Cuernavaca, *“most families do not use the urine, but rather channel it to the ground.”*^(G5) The fact that women are expected to take on food production does not mean that they can decide as they wish. The expert from Majumba Sita reports as follows: *“the ability of rural women to promote the economic security of the family and their own economic security is limited by the following factors: women generally do not hold title to land; women are over-represented due to their tribe background where they come from to prevent them to voice their needs; men tend to lead and dominate decision making.”*^(G5) In rural Mexico, men may contribute by emptying *“the faecal heap and use the content in the cornfield, still more apt to be by men, as it is a ‘heavy’ job.”*^(G5)

9.2 THOUGHTS CONCERNING URINE-DIVERTING TOILETS

The expert team was not requested to deal with the value-loaded issue of who is taking decisions of various kinds. However, the experts provide some comments. In families with urine-diverting toilets in Cuernavaca, *“both women and men initiate the idea. These families tend to be non-traditional regarding gender roles. Both sexes work outside the house, many men*

work inside the home while the woman goes to the office! They share cooking responsibilities, etc. So, one can say that the urine-diversion families are perceived as a little weird.”^(B9) In Kabale, *“women (sometimes) initiate the idea of the new technology since they are usually the most concerned with health in homes.”*^(B9) In Majumba Sita, *“it has been the residents’ decision to install the urine-diverting toilet, first they have to decide in their home then send a name to the committee or contact directly the local masons trained in the ecosan technology for installation. It has only happened in one case that a husband preferred the seat pan while his wife wanted the squatting pan. After a long dialogue they reach a consensus of having both options in their compound, incorporated into the design and they are happy in using. There was another situation where the head of the house decided on his own to install the toilet and later gave the rules to his tenants. Other decisions are done after they have under gone hygienic awareness training.”*^(B9)

The experts were asked to dwell on revised division of tasks between men and women that are anticipated^(G9). However, few comments were reported. The expert in Manyatta reports, *“the most likely change is expected on the men’s side with them showing concern and taking more interest in sanitation than they ever did before. This may hinder the introduction of ecosan, as men are normally reluctant to such kind of cultural changes and especially if it is not accompanied by any monetary benefit or general improvement in household income.”*^(G9) The expert from Kabale directs the attention to the fact that *“promotion of ecosan does not focus on changing roles and responsibilities (and it may not happen) but rather on the change of attitude of people (men and women, in their respective capacities) towards recycling and handling (treatment on site and reuse of sanitized material) of urine and faeces.”*^(G9) Thus, ecosan concepts may not contradict societal norms about the division of tasks, but rather the prevailing ideas about whether to recycle nutrients or not.

The new sanitation-related tasks that come along with urine-diverting toilets seems to be more equally shared among the sexes. For instance, it was reported from Manyatta that *“socially, women are the ones responsible for sanitation, but with the introduction of ecosan, the households already using urine-diverting toilets reported that anybody, that is both the man and the wife, would all empty the faecal container.”*^(G5) The expert from Addis Ababa tells that, *“in the case of ecosan, all family members are trained to take equal responsibility.”*^(G5) However, there is also a move towards organizing the collection of faeces on a community scale as indicated from Majumba Sita: *“the household owner or the tenants and sometimes the committee is paid for doing that job and they are the ones who have the responsibility to make sure that proper maintenance is adhered to.”*^(G5) Ecosan installations have the longest history in Cuernavaca, and there the professionalization of collection has reached farthest: *“Recently one person (male) has offered his services to households with urine-diverting toilets. This is a new type of job altogether, as pit latrine emptying is unheard of and septic tanks – although the machinery exists – are rarely emptied either. (In rural areas, I know of at least one instance where a farmer empties another family’s faecal container because he wants to use the dried faeces on his cornfield.)”*^(G5)

The design of urine-diverting toilets is commented on by the experts. The designs used in the African setting are rated as convenient to both sexes. However, some concern is voiced from Manyatta that *“more gender sensitive toilets could be invented and be introduced”*^(G7) for females. In Cuernavaca, *“women visitors often express that worry. Success depends a lot on the model as well as body size and proportion.”*^(G7) There is reason to believe that there will be new designs entering the market that are adjusted to all users.

A crucial point is whether residents view the ecosan installation as permanent or temporary. In the latter case they anticipate something else to emerge in the future. For instance, in Manyatta *“those [few] who have urine-diverting toilets view it as a temporary solution to the problem of sanitation as funds are being looked for by the city council to make improvements in the water and sanitation sector.”*^(G7) However, in Cuernavaca the line of argument is different and they can be *“both temporary and permanent. If inside it’s considered to be permanent.”*^(G7) The Kabale case is similar in that the expert reports that it *“depends on the materials used and the plan of the landlord. If he/she wants to later incorporate a toilet indoors, then the yard one is temporary. But usually the yard toilet is as treasured as an indoor toilet.”* The residents of Majumba Sita seem more certain and *“they all believe that the toilet is permanent due to its principle of operation, i.e. recycling of human urine and faeces and secondly the materials used in the construction of toilet.”*^(G7)

10 Analysis and interpretation of the information

The analysis will focus on attitudes and norms relevant for ecosan arrangements that affect the household. Ecosan solutions such as vacuum toilets with anaerobic digestion of blackwater belong to another analysis. The expert information is drawn from urban areas with one-storey buildings (except Stockholm). Water supply and sewerage is available in the central parts of the cities, but normally not in peri-urban areas where the experts carry out their ecosan activities (Table 4.2).

10.1 INTERPRETATION OF THE ROLES OF VARIOUS STAKEHOLDERS

The expert team report a universal societal view that it is the city councils’ responsibility to provide services of a high standard (section 5.1). This could be due to the residents’ wish to challenge the decision makers to provide and manage adequate sanitation systems. However, this view could also reflect an attempt to escape individual and community responsibility for household-centred sanitation activities to resolve the problems. Irrespective of the validity of the view, attention, and cooperation across the stakeholders, should be focused on installing toilet designs that provide comfort, security and reasonable operational robustness.

The alternative to ecosan arrangements, the WC, often suffers from operational problems caused by water cuts and other factors. Thus, operational security becomes a valued characteristic. Poor performance of sanitation systems may be caused by technical deficiencies, but often it is due to managerial problems, including poor monitoring of contractors.

The relationship between residents and politicians is sometimes described as an exchange of votes for favourable services (section 5.1). Such a clientelistic relationship has been described by social scientists. For residents with political connections it is often possible to use their influence in order to be connected to a water supply or sewerage, or to receive the service of a vacuum truck to empty their septic tank. Other residents may only have a faint hope that they be favoured in such a way. Therefore, sanitation designs that are installed and operated by the household can be a tempting alternative for the less influential.

A new framework for division of responsibilities requires new words and concepts. We use the term ‘own-key’ to indicate activities and arrangements that are managed and controlled by local communities or individual households by employing locally available knowledge, skills

and materials. The other end of the continuum consists of 'turn-key' arrangements that are being utilized by the residents without them being involved in the development or running of the installation. The latter requires the extraction of financial resources from residents to the service provider either as fees or through taxation.

The experts have given some examples of own-key arrangements in most of the study areas. In some countries these are encouraged, while decision makers in other places are reluctant to support them. There is no clear indication in the present study whether a clientelistic relationship supports own-key arrangements.

10.2 THE ECOSAN TOILET IN FOCUS

The expert reports concentrate almost exclusively on the toilet part of the system. This is to some extent a consequence of the formulation of the questions. It is interesting to note that the experts do not discuss the location of the toilet; inside the home or out in the yard, with the exception of Cuernavaca (section 5.2). It is well known that the WC has gained popular support by being indoors and thus simplifying operation and maintenance, and increasing security and privacy. There is reason to investigate further how various stakeholders view the pros and cons of having the dry (ecosan) toilet indoors. In this study it is not possible to draw definite conclusions as to whether the experts or residents are worried about potential smell problems of an indoor toilet. Poor operation, accompanied by bad smell, could ruin the success of a whole project.

There are also mixed perceptions of whether an indoor ecosan toilet is permanent or not. If any toilet in the home is considered to be permanent, stakeholders may become reluctant to install an ecosan toilet indoors for fear of not being eligible for a WC in the future.

The focus on the toilet could also be ascribed to the lack of systematic experiences of treatment and reuse of urine and/or faecal matter. Collected urine is largely not used intentionally, except for Addis Ababa (section 8.1). Collected faeces (and paper) are small in volume and probably just dumped on a heap somewhere or in the container for solid waste collection.

The impression is that the basic desire among experts is to create a 'nutrient loop' has not yet materialized, with the possible exception of Ethiopia. Does this lead us to conclude that this goal should be abandoned? It is important to remember that this is a young system that requires time to get all components in place. Most people agree to the rationale of nutrient reuse and of saving on chemical fertilizers. However, it is not a simple process introduced only to reuse hygienized nutrients in urban food production. The practice has to be incorporated in residents' daily routines in a way that fits local aspirations and conditions and this may take time. Thus, advocating reuse of nutrients may be done, but not necessarily with high turn-out of followers, since experts report modest interest in such tasks.

The collection of stored urine has to be simple and straightforward, either daily collection or in a bigger storage tank. Forgetfulness or temporary inability to collect should not lead to a disaster (overflow and the like) but be cushioned by the system. Urine collection should mimic faecal collection in a two-chamber toilet, where you can delay emptying the chamber for some time without negatively affecting the outcome.

10.3 NORMS AND PERCEPTIONS OF URINE AND FAECES

The large difference in appreciation between faeces and urine can be deduced from the reports; that faeces in extreme cases can be used as a medium to hurt enemies as well as to heal thunder-stricken persons (section 8.1). It takes an extraordinary potent measure in both cases, and human faeces are disgusting enough to exemplify the saying that ‘evil should be fought with evil.’ Urine could hardly play such a role, since it is not pungent enough and in fact is being used as a positive treatment of lesser needs and ailments (section 8.1).

The rate of acceptance of an alternative sanitation arrangement is likely to improve if there is no or very little smell of faeces and of urine. People seem to accept the smell of their own faeces whilst actually using the toilet, but find the smell from stored waste unacceptable (section 6.3). Therefore, reduced smell from faeces by adding ash for example, would be a significant improvement, and make the situation similar to the little smell released from faeces before being submerged in the water in the WC. This will only happen, however, if the faecal material is not wetted by misplaced urine or water. Further improvement could be gained if the design of the toilet were such that the fresh faeces are not easily seen. A dry, urine-diverting toilet could easily emulate the WC where you can decide whether to watch the fresh faeces or just flush them away. There are designs where a flap covers the pan when not in use, while it automatically opens once you sit on it. This choice, to be able to watch the faeces if you want to, seems to be appreciated according to the reports given about checking health by the appearance of one’s faeces, especially of infants or children (section 6.2).

Any attempt to fundamentally change residents’ views of fresh faeces seems futile, since the negative attitudes are so strong (section 6.1). Residents entertain an avoidance culture to faeces (section 6.3). However, that does not necessarily mean that they always stick to hygiene practices that prevent transmission of faeces-related diseases. Only rarely do we acknowledge the fact that human beings do occasionally come into direct contact with their own faeces, and the important issue is in what way they act on soiled fingers.

Mary Douglas (1966) developed a cultural theory about dirt where she concludes her treatise as follows:

“... if uncleanness is matter out of place, we must approach it through order. Uncleanness or dirt is that which must not be included if a pattern is to be maintained. To recognise this is the first step towards insight into pollution. It involves us in no clear-cut distinction between sacred and secular. The same principle applies throughout. Furthermore, it involves no special distinction between primitives and moderns, we are all subject to the same rules. But in the primitive culture the rule of patterning works with greater force and more total comprehensiveness. With moderns it applies to disjointed, separate areas of existence.”

If we were to apply this to toilet design, we may hide the excreta by a flap and install an efficient ventilation system. However, we could also think in terms of transforming the faeces to another product that has no connection to fresh faeces. Were they take on another shape before being handled or touched, this could be a breakthrough for the acceptance of the non-flushed toilets. Here, the drying and composting process will play a central role. The dried or composted faecal matter and paper can come out as humus or soil by turning and moisturizing the aggregate diligently. There is no reason to believe that people will maintain or transfer their perception of fresh faeces to such a new product. One support for this argument would be that people do perceive (running) water in rivers as clean, even though it has been polluted by

excreta upstream. The common view is that the river water has been cleaned by nature during its travel for a mile or so.

A main area for further investigation is to find out how residents view dried or composted faecal matter. The change in appearance into something soil-like may be pivotal to acceptance. A difficulty may lie with the professionals who sometimes show a 'zero-tolerance' to micro-organisms in the environment. They may therefore discourage any improvement in the absence of foolproof solutions.

10.4 MANAGEMENT OF ECOSAN SYSTEMS

The design and management of an ecosan system should take the above points into account by developing a handling-sanitizing-reuse procedure. Ecosan systems can be for a single household or for a group of households. In both cases it is an open question whether household members or someone else should monitor the stored urine and faecal material, and 'transport' the nutrient-rich products out of the compound or area. If a person is employed for the task, the reports indicate that residents would be grateful to the person performing this task and prepared to pay for the service (section 6.3). On the other hand, it is not expected that a public servant would be an ideal solution, since residents do not have high expectations of the rate of dedication among council staff (section 5.1). Therefore, there is room for trials with various forms of managing the removal of faecal-based products. Cost considerations will play a part in what organization to choose.

Much current thinking suggests that residents should use the treated urine and faecal matter in urban agriculture. At the same time the experts report on few instances where this actually takes place. A less constrained approach needs to be implemented in which a range of options can be explored. These options will inevitably vary dependent on different geographical conditions and communities, and will also shift over time as community aspirations develop. The Chinese way of viewing even fresh faeces as a fertilizer to be applied right away is hardly possible or preferred in the African or European context. Treated faecal matter and urine may be used in situ, but for crowded communities it seems more feasible to arrange for the nutrient-rich products to be used on surrounding farmland. Generally, farmers seem to have a positive view of their fertilizing value and they may select to use it on crops that are not sensitive to market reactions. The poorly developed use of compost and urine in the existing ecosan project areas indicates that substantial development work remains to be carried out (section 8.2).

References

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Appendix 1

Questions to be addressed by colleagues in the desk study for EcoSanRes:

A General background

1. What kind of urban settlement is in your focus? Peri-urban middle class, squatter area, city centre, etc.? Two-storey and taller buildings?
2. Is there space to have a toilet indoor in the area? Explain.
3. What is the population density? Crowded with no space for a pit latrine or a small garden?
4. What proportion of households have a well in the yard?
5. Is there seasonal or permanent water shortage in the area?
6. Approximate coverage of WC connected to the sewer, WC to a cesspit, pit latrine, bucket, urine-diverting latrine (indoor and in the yard), other.
7. Is sanitation an issue in newspapers, radio, and TV, and/or discussed by councillors? Any political promises? Is the council water and sewerage utility active in sanitation?
8. Smelling neighbourhoods? From sewer manholes or leaks, WCs, latrines open defecation etc.?
9. Are occasional excreta on the ground cleaned up by city council, dogs, chicken or pigs?
10. Is there a difference in house rent depending on if there is a toilet indoors or in the yard?
11. Are there NGOs or small entrepreneurs active in providing water, latrines, urban agriculture, etc.?
12. Do you use the toilet as the bathing place?
13. To what extent do residents own the house and/or plot? Do they have a deed or contract?
14. What organizational structure is there in the area: communal, NGO, private well owners, entrepreneurs, etc.?
15. What happens if a house-owner does not have a toilet/latrine on the plot? Fine? Bribe? Is there any inspection by the council?

B Mental views in the community

Example: Interviews of residents in a new, fashionable housing area in Stockholm (Hammarby Sjostad) show that the visibility of the waste product leaving the household after use impact on residents' assessment of how the environmental responsibility is shared between the residents and other actors. The use of electricity leaves no trace in the home, while consumed goods produce solid waste that has to be handled. Use of hot and cold water does not leave waste products that have to be handled in the home: it is flushed into the sewer together with other products that have been used (soap, detergent, etc.). Residents do take the responsibility for sorting solid waste, they feel that the building industry should install water-saving devices (low-flush toilets and showers, repair leaking fittings, etc.) and energy-saving measures like improved insulation of houses, energy-saving washing machines, etc.

The interviewees claim that first priority should be given to environmental improvements where conditions are worst (dirty industries in Eastern Europe), second priority to built-in water and energy-saving devices in the houses. Only then do the residents show an interest in changing their routines in a more environmentally sustainable direction (Drangert 2002).

1. What are the residents' expectations about urban sanitary system? Are they different from professionals' and political expectations? What is the origin of these expectations?
2. What expectations do residents have on support from the council, NGOs or others, and how do they view their own role and responsibility?

3. Is the view similar to that of residents in Hammarby Sjöstad above?
4. Is there a general view of where the toilet/bucket should be placed: indoor or in the yard?
5. Do residents tend to trust/believe professionals and authorities? Does this encourage or restrain them from carrying out their own small-scale improvements of their sanitation system?
6. Do residents think or claim that the city council has the capacity to lead sanitation improvements? Why/why not?
7. Are there any general push-factors in the area like demand for comfort, privacy and improved health? Difference between women and men?
8. Is there a positive or negative connotation attached to be an 'early adopter' or 'late adopter'?
9. Is the installation of a urine-diverting toilet as much a matter of community dynamics as of individual decision making? What role do women play?
10. Is there a successive change of perception over time among those who have a urine-diverting toilet? Describe.
11. Is there cultural meaning attached to faeces and/or urine? To what extent does the rural idea of evil eye persist? What religious commandments exist? Any differences between men and women?
12. Are there gendered tasks related to ecosan? Explain why.
13. How are potential transmission routes of pathogens from the individual's own faeces perceived? From public toilets? What measures do users take to protect themselves in a public toilet?
14. What is the residents' perception and appreciation of employees emptying buckets, sewer cleaners, latrine diggers?
15. What perceptions do residents have about groundwater pollution from sewers, dug latrines, petrol stations, etc.?
16. Do residents make a connection between household disposal of waste and polluted rivers, streams and lakes? Explain.
17. Do residents perceive greywater (from kitchen and shower) as polluted? Do they think it is easier to treat water from the flush toilet than greywater? If so, how do they explain this in light of that they may rate faeces as the most objectionable waste?
18. Is it acceptable to rent a room or house, or is ownership not an issue that inflicts on residents' decisions on sanitary system?
19. Do residents think about moving to another house with better service or installations rather than thinking of improving the house they are presently staying in?
20. Are there worries in the society about resource depletion locally or regionally?
21. Do people claim that they are too busy to collect information on pros and cons of an alternative system, or to take on new household tasks?
22. Is there a norm to perceive the toilet as waste bin?

C Aesthetic aspects of urine and faecal material

Example: To conclude, if uncleanness is matter out of place, we must approach it through order. Uncleanness or dirt is that which must not be included if a pattern is to be maintained. To recognise this is the first step towards insight into pollution. It involves us in no clear-cut distinction between sacred and secular. The same principle applies throughout. Furthermore, it involves no special distinction between primitives and moderns, we are all subject to the same rules. But in the primitive culture the rule of patterning works with greater force and more total comprehensiveness. With moderns it applies to disjointed, separate areas of existence.

From Mary Douglas (1966) *Purity and Danger*.

1. Is there a smell of excreta in the toilet room when using the WC? Dry toilet? Urine-diverting toilet? If this is an issue to consider, what measures are taken to make sure that the next person to use the toilet does not come across your smell?
2. Describe the difference in smell between faeces and urine. Can urine and faeces from the same person smell differently from one day to another? How is that change explained or interpreted?
3. Does the smell change when urine is stored for a day or so? Try to describe.
4. Is there a difference in aesthetics between child faeces and that of adults? In what way?
5. What relationship, if any, is there between bad smell and your health? Describe.
6. Do people check the appearance of faecal matter to determine their health status?
7. What importance is attached to faeces not to be seen in the toilet? Male/female views.
8. Is it acceptable that men pee outdoors? Women? If so, why a difference?
9. What is the difference between dog shit and human faeces (smell, appearance, etc.)?
10. Dogs, pigs, and hens scavenge faeces. Does this affect our perception of these animals in any way? Explain.
11. Does menstrual blood influence behaviour or views on excreta handling?
12. When is the toilet flushed; when sitting on the chair or when you stand up?
13. Other

D Content and properties of urine, faeces, and greywater

Example: 150 years ago, the German chemist Liebig investigated the content of excreta and found that most of the nutrients are present in urine, not faeces. The reported proportions were very similar to today's figures.

1. What is in urine? 95% water, and what else? What is left after evaporation (stench on toilet floor)?
2. Why does the grass turn brown when you urinate on the same spot several times?
3. What effect occurs if we pee in the maize field or banana stand? Explain.
4. Are the antiseptic properties of urine generally recognized? How?
5. Are flies attracted to toilet paper soaked with urine? Do flies breed in urine-soaked pits?
6. Why were man created to urinate and to defecate through two different channels?
7. What happens to faeces when buried in the soil for some time?
8. What happens with faeces when flushed in a sewer into a lake?
9. What proportion of nutrients (phosphorus and nitrogen) in the household wastewater originate from human excreta?
10. We often use our bare hands to wash the dishes without hesitation, but we regard cold greywater as unpleasant. Why?
11. Are there any compounds in the greywater that are harmful to the receiving water or soil?
12. Do residents believe that there are environmentally questionable contents of greywater? Does this guide how they dispose of greywater?

E Reuse issues

Example: An anthropologist is engaged in a study of how urban residents view the recirculation of human-derived nutrients into a fertilizer. In his first preliminary discussions to formulate relevant questions he interviews a few people (open-ended interviews).

The first interviewee is a former farmer whose farm has been occupied by the expanding town. He remains with a one-acre plot where he keeps a few cows and a small garden.

Answering a straight question from the anthropologist, he tells that he has never heard of the reuse of human excreta. In the course of the following discussion he explains that he empties the latrine pit every second year. Where do you place the waste, asks the anthropologist. "On the cow-dung heap. Then I mix it and apply the mixture in the garden. When neighbours hear that I harvest three maize cobs on each stem, they wonder how I manage. But, I cannot tell them the secret."

1. Are faeces or urine used in medicine or other products? Give examples.
2. Is there a general interest in gardening, growing fruit trees or flowers?
3. What proportion of the households have some flowers, bushes, trees, etc. in the garden? What about vegetable gardens?
4. Is there a tradition to compost excreta and use it as a fertilizer? If so, how is it done?
5. All excreta produced by one person in a year can be used to fertilize the fields. What proportion of the eaten food can be grown using the human-derived fertilizer?
6. Ideas about benefits/hazards with using urine, faeces, greywater on soil or for vegetation?
7. Who may get sick from contact with faecal matter? Why?
8. What happens to urine when it infiltrates in the soil?
9. What happens to the faeces (and paper) when put on a compost? Explain.
10. What happens to rainwater when infiltrating in the soil? Greywater?
11. Rate residents willingness to apply greywater on grass, plants (above or under ground), fruit trees.
12. Are excreta viewed as appropriate feed for animals especially dogs and chicken?
13. What is the monthly cost for toilet paper in your household?
14. Other.

F Management: habits and routines

Example: Erasmus's treatise on human excreta and excreting from the year 1530 points to the curve of civilisation which represents, on the one hand, a notable rise of the shame threshold, compared to the preceding epoch; and on the other, compared to more recent times, a freedom in speaking of natural functions, a 'lack of shame,' which to most people adhering to the present-day standard may at first appear incomprehensible and often 'embarrassing'. But at the same time, it is quite clear that this treatise has precisely the function of cultivating feelings of shame. Reference to the omnipresence of angels, used to justify the restraint on impulses to which the child is to be accustomed, is very characteristic. The manner in which anxiety is aroused in young people, in order to force them to repress display of pleasure in accordance with the standard of social conduct, changes in the course of centuries.

Norbert Elias (1978) *The Civilizing Process. The history of manners.*

1. What kind of defecation training is given for infants (0-1 yr), toddlers (1-5 yrs), children (6-15)? What arguments are being used to enforce compliance?
2. Where and how are dippers washed? Where is the wastewater disposed from washing dippers or child's bottoms?

3. What kind of wiping material are adults using? Paper, water, grass, etc. Disposed where?
4. Describe the change in defecation pattern when moving from rural areas to a town. Are there positive aspects that are lost in the move?
5. Are residents defecating at work (to avoid defecating at home)? Why? Or the opposite? What does the toilet in the workplace look like? Well-maintained?
6. Do men prefer to stand up when peeing?
7. How do people rate sounds from escaping intestinal gases?
8. How is the toilet/latrine cleaned? How and where is the brush or cloth cleaned?
9. Does defecating in the same toilet as sick people have any influence on your behaviour?
10. How is a blockage in the urine pipe solved?
11. Other.

G Gender issues

Example: The family has invested in a cement-block house despite having no deed for the plot. The ground consists of mainly rocks and they have to bring soil to fill up depressions. Louisa uses the composted soil from the no-mix toilet to extend her garden each year. This gives only little soil and she responds positively to the question if she would like to add compost from other toilets in the area, given that the product is good. She has planted flowers and medicinal plants, project staff have discouraged her from planting vegetables. She says that the idea of ‘evil eye’ has receded and now one can talk about it. Also, she has not used the urine as a fertilizer yet since she did not know it would be possible. She sees no problem using it since urine has traditionally been used as a medicine. They have had problems with lime trees that died, possibly after the husband brought soil of unknown origin. Her husband, who is the one emptying the toilet chamber, is in favour of sewerage in the area and they expect to have it later. He also wants to level the plot and make a lawn.

1. Are there single-person households? Who is cleaning/cooking for a bachelor?
2. Are men using the night-bucket in the night? If not, where do they pee?
3. What tasks are given to men and women respectively? Wastewater reuse, horticulture, washing, caring for elderly, etc.?
4. Who in the households cleans the toilet/toilet room, or floor in the latrine shack?
5. What perceptions do men and women respectively have about faecal matter? Urine?
6. Who is (expected to) empty the faecal container? Urine container?
7. Are women expected to succeed in directing the urine into the urine bowl?
8. Some behavioural changes/revised division of tasks between men and women can be anticipated. Which ones are important? Describe how a change may hinder or facilitate the introduction of ecosan.
9. Are there cultural images that men do not visit the toilet? Are men uncomfortable with using toilets inside the house? They are not used to be seen “doing it”?
10. Do men and women view a urine-diverting toilet in the yard as temporary or permanent?

Project team

Jan-Olof Drangert, associate professor at Linköping University, Sweden, Department of Water and Environmental Studies, works with socio-cultural and management aspects of water and sanitation at household and community level. His interest comprises urban areas in developing and developed countries, and the evolution of water supply and sanitation systems, especially ecological sanitation arrangements.

Almaz Terrefe, Country Director of Society for Urban Development in East Africa (SUDEA) with a BA in Social Science from Stockholm University, gained interest in an Eco System approach in 1974 while working at the Department of System Ecology. For the last ten years she has been working with ecosan systems, and in 1996 she started the first pilot project in Ethiopia. She trains communities in recycling of household refuse including human excreta and in urban food production.

Edmund John is an Environmental Engineer and Project Manager at the Environmental Engineering and Pollution Control Organization (EPECO). He specializes in water supply and sanitation in rural and low-income urban communities in Tanzania. He has considerable experience of training, planning, design and project implementation in various regions of Tanzania. In recent years he has focused on the provision of improved and sustainable water supply and sanitation systems for rural and urban residents.

George Anna Clark has coordinated the Environmental Area of Espacio de Salud, A.C. since 1991. Espacio de Salud (ESAC), a small civic organization in Morelos, Mexico, works with communities in participatory eco-sanitation programs – providing information and training so that the actors involved on the community level can become self-sufficient in sanitation services and a resource for information, skills and hardware for the region.

Lorna Grace Okotto is an environmental sociologist and also the Director of Finance and Administration of VIRED International, an environmental NGO in Kisumu, Kenya. Her field of interest is the dynamics of gender relations and Natural Resources Management in the context of values to communities and how such communities relate with, perceive, integrate and harness resources of their immediate and wider environments.

Victoria Atakunda is on the staff of the government's South Western Towns Water and Sanitation (SwTws) project in Uganda. She is promoting ecological toilets and reuse of nutrients in small-scale agriculture. She is a specialist on gender issues.



EcoSanRes is an international research and development programme sponsored by Sida (Swedish International Development Cooperation Agency). It involves a broad network of partners with knowledge/expertise in various aspects of ecological sanitation ranging from management and hygiene to technical and reuse issues. The partners represent universities, NGOs and consultants and they are involved in studies, promotion activities and implementation of projects in Asia, Africa and Latin America.

The network hub is Stockholm Environment Institute (SEI) which holds a formal contract with Sida. EcoSanRes has become an authoritative networking body within the field of ecological sanitation and also collaborates with other bilateral and multi-lateral organisations such as WHO, UNICEF, UNDP, UNEP, GTZ, WASTE, IWA, WSP, etc.

The EcoSanRes programme has three main components:

- outreach
- capacity
- implementation

The outreach work includes promotion, networking and dissemination through seminars, conferences, electronic discussion groups and publications.

Capacity building, is achieved through training courses in ecological sanitation and the production of studies and guidelines, with content ranging from eco-toilet design, greywater treatment, architectural aspects, agricultural reuse, health guidelines, planning tools, etc.

Implementation puts theory into practice with ecological sanitation pilot projects in diverse regions around the world. Because the most important factor to successfully implementing an ecosan system is local adaptation, EcoSanRes provides a logical framework for prospective pilot projects and insists the projects meet stringent criteria before approval.

EcoSanRes is currently running three major urban pilot projects in China, South Africa and Mexico. In addition preparations are being made to develop similar projects in Bolivia and India.

For more information about the partner organisations and programme activities please consult

www.ecosanres.org