2.4 User perspectives

What are residents appreciating ? Why ?

Learning objective: be sensitized to variations in attitudes and norms.

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Piped water and sewerage appears to be rated as the most appropriate technologies for urban areas, which shows that a positive perception of this technology has been transferred successfully to almost all groups, including communities with no such services. Piped systems can provide a household with one cubic metre of water ”from the wall” and get rid of the same amount of waste water “through the floor” each day without bothering anyone in the household. These are two of several favourable properties of the piped system.

A typical water bill in Sweden covers about one-third of the total cost, while the rest is paid as part of the house rent and meets the costs of initial connection fees and installations in the kitchen and bathroom. The total cost for a day’s household water consumption of about 1 m^3 is some US$6 to $7 which is equivalent to an ordinary net income for half an hour’s work. This, in turn, equals the average time spent every day by rural women in Tanzania to fetch water for their families (Drangert, 1993). The difference is that the Tanzanian family gets perhaps 50–100 litres of water of lower quality. Piped systems provide good service, and their main limitations relate to the high investment cost and poor operation and maintenance in many countries.

Even if the investment cost for sewerage were to be subsidised in poor periurban areas, there is often insufficient water to service the number of toilets that would be needed. The ever increasing investment cost to develop new water sources affects decisions both in the North and South. It is being recognised that it can be more economical to manage the demand for water and provide various user groups with incentives to reduce their use of water. In this way the heavy investment involved in opening a new water resource can be postponed (e.g. slide 2.2-6). So far, some town councils have managed to defer new intakes by promoting devices like water-saving showers and pour-flush toilets and by separating rainwater from sewage so that rainwater can be used as a water source for households.

In this module we deal with the views of residents and how they are likely to be involved in the anticipated substantial changes to the management of sanitation arrangements in the future.

2.4 - 2

Often, our experiences of local conditions contribute significantly to the formulation of our attitudes and norms. For instance, poor solid waste collection triggers the response that the council should do more, rather than that residents should throw less trash onto the streets. Even rarer is the response that we need to change our consumption patterns. Often we – professionals as well as residents – need a global perspective to get a feel for resource flows, scarcity and depletion issues.

The left picture shows the globe in the daytime. It looks inviting with much water and large green areas, and it does not convey any message of limited resources. But, if we view the same globe in the night-time picture (right), we see large illuminated parts. This shows that we use enormous amounts of energy to light our houses, streets, and public places – to an extent that can easily be seen from the moon. Now, this informs us that although each of us contributes only a small bit, together we have a huge impact on the globe. Therefore, local or individual experiences are not always helpful for understanding environmental impacts. The period when we were just millions of humans on the globe is long gone, and now seven billion of us will live in a crowded world where nature is strongly affected by human activities.

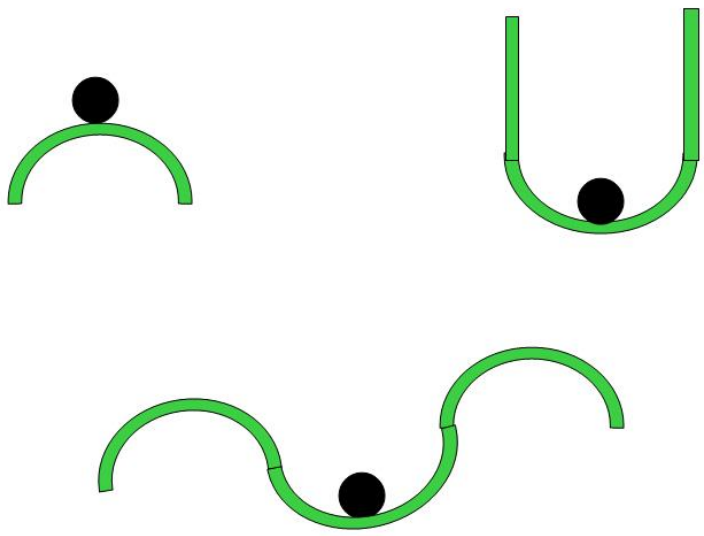
The impact is easy to understand if we take a global perspective. Climate researchers have confirmed this by their calculations of emissions and the effects of greenhouse gases on the thin layer of atmosphere around the globe that for so long has protected us from heavy radiation from the sun. Climate change is the first truly global environmental issue. Today, the question is "Did we create global warming because of something we did?" This is very different from the question in earlier millennia: "Did God create that hurricane because of something we did?" In earlier days we believed that only a supernatural power could create catastrophes in nature – in order to punish us for misconduct. Today, we know better – WE can cause catastrophes.

It matters what each one of us does in daily life since there are so many of us (slide 1.1-15).

The same conflict between local and global perceptions applies to all resources that human beings use: energy, metals, nutrients, etc. After use we move the waste products to places where it is difficult to process them for renewed use. We prefer to focus our thinking on the problem we solved but not the one we created. A global perspective tells that the food chain contributes some 20% of the Earth's greenhouse gas emissions (Module 4.4 on biogas). The present sourcebook takes a global view of resource flows in order to form perceptions about where to start planning and organising our resource use in a more sustainable manner.

How nature´s resilience can be viewed

2.4 - 3



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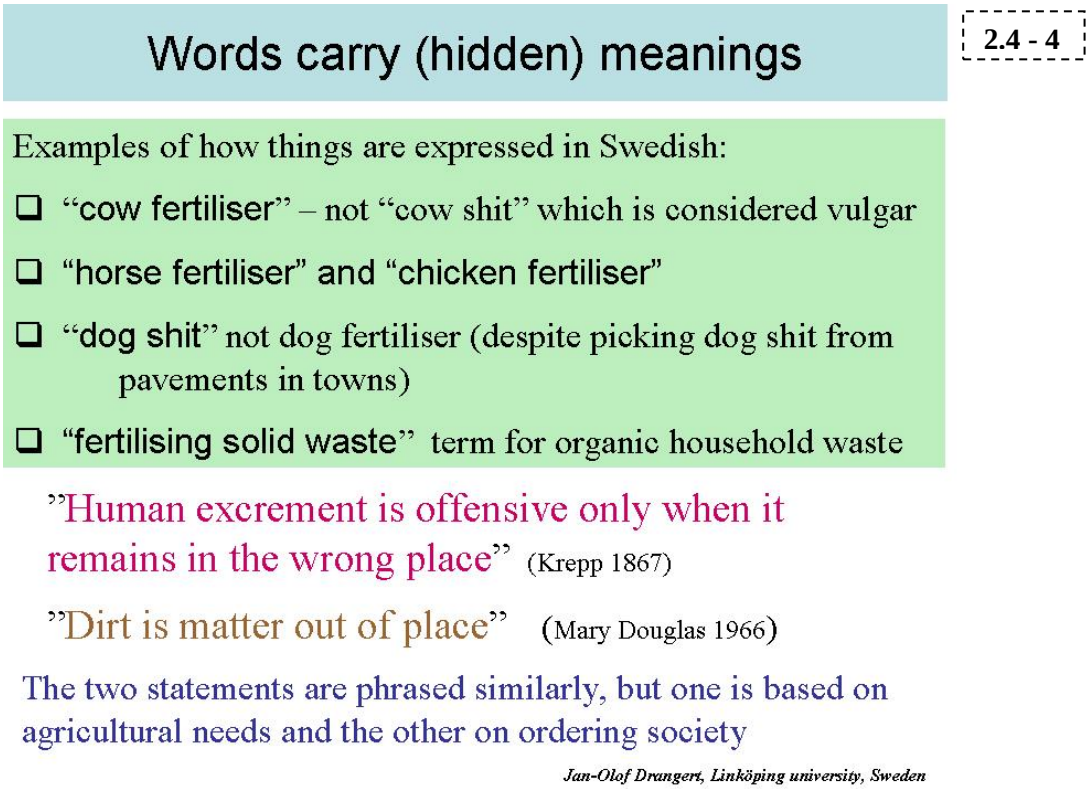
Most people entertain an idea of how our human activities may affect the environment – and nature's resilience (Schwarz & Thompson, 1990). For example, can human activities make the ice caps melt? People's opinions vary, but if it happens, all agree it is irreversible, since it would take millions of years and favourable conditions for an ice cap to build up again. The picture above presents graphically three fundamentally different ways of thinking about human impacts. The top-left represents a person who thinks along the lines that any activity (= hitting the black ball) will disturb and irreversibly change the equilibrium in nature. The ball will end up somewhere, and possibly in a new equilibrium, while nature has changed for good.

The top-right person believes that it does not matter what we do (kicking the ball in any direction) nature will always come back to the same equilibrium (the ball to its original position). This implies that this person is not worried that there will be lasting environmental problems – at most there will be temporary ones.

The third picture represents a person who thinks that nature is resilient enough to accommodate many, but not all, actions. Most actions will not change the equilibrium, but too much pressure may cause a permanent change. That means that if we are careful with our activities, nature will not be pushed away from equilibrium (see slide 1.1-16).

Understanding our underlying perceptions about human impacts on the environment may help us to grasp how difficult it can be to persuade another person. The increase in number of deniers of climate change or any other controversial issue illustrates the role of doubt. Media and other sources of information do not need to win the argument to succeed. It is enough to cause as much confusion as possible about the issue and doubts make people lose direction. There are examples of this tactic being used to discredit sanitation options. If someone claims that dry toilets cause bad odours, the doubts among listeners may make them decide not to install such a system. A vulgar attempt to stop the spread of odourless toilets in an HIV-inflicted area was to spread a rumour that using a dry toilet would cause HIV infection.

Another obstacle to raising awareness is when the consequences of poor environmental management do not affect an individual directly. For example, residents connected to sewerage are often unaware of on-going pollution simply because its impacts on nature are invisible. This ignorance of the effects of a technical system may be unintended, but is still perhaps the most important obstacle when it comes to raising awareness.



Words can carry meanings beyond their immediate definitions. Inbuilt meanings help us understand culture. Some words become obsolete and others are created when society changes, for instance from an agricultural one to an industrial or consumer one. Basic perceptions and societal norms may alter the language. The concepts of dirt, danger or reuse are interesting since they are embedded in the words we use. We focus here on words about excreta and wastewater. The Swedish language has a word for excrement from a cow – the literal translation being "cow fertiliser". It is not called cow excrement or dung. This indicates that the matter is so intimately associated with being spread on the fields that reuse is embedded in the definition of the word. The same goes for horse excrement and chicken droppings which are called horse fertiliser and chicken fertiliser. Dog excrement, however, does not have the same connotations and so it is simply called dog shit/poo. This implies that dog shit has never been seen as a useful resource.

An interesting aspect of our relationship with dirt and danger is that our perceptions depend the location of the substance being described. The Dutch engineer Frederick Krepp (1867) wrote about the right and wrong place for excrements during the period when flush toilets were being introduced in Europe. He viewed excreta as being in its right place when used as fertiliser, and promoted the collection and use of human excreta in agriculture. He saw excreta as offensive when transported anywhere else, since that disrupted the prevailing closed nutrient loop between households and agriculture (1850s and 1860s). A century later, the anthropologist Mary Douglas (1966) makes a similar but more general theoretical statement when she says 'dirt is matter out of place'. She contends that perceptions of what is dirt help to keep order in society. Without order one cannot talk about anything being "out of place". Excrement used as compost or in a biogas plant is not dirty or offensive. However, the same matter in a public space is.

Solid waste collection and reuse was made more efficient in Sweden at the beginning of the 20th century. It was sorted in '*fertilising solid waste*' (= organic waste including urine and faeces) and '*trash waste'* (= all other waste). The wording reflects that much of the organic (present-day vocabulary) waste was returned to agriculture as a fertiliser (slide 2.2-3). On the other hand, there is no word to denote the reuse of wastewater in Sweden, which reflects the fact that wastewater almost never has been used for irrigation or fish-farming.

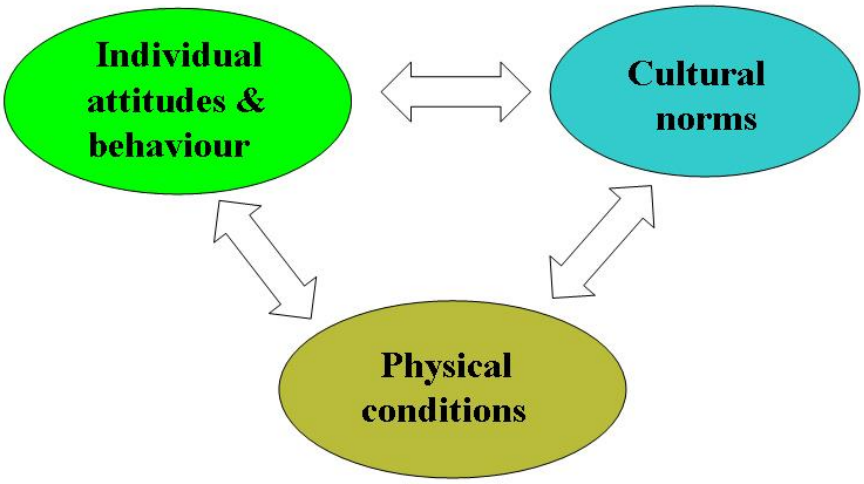
Every culture seems to have its own definitions of dirt and waste and therefore it becomes important to understand how these are linked with danger and reuse. The term ‘open defecation’ evokes strong feelings but its meaning is disputed (slide 1.1-10). Lay and professional views about what is considered ‘dirt’ and ‘out of place’ often differ. We define ‘open defecation’ as defecating in the open and leaving the excreta exposed (Kar and Chambers, 2008), like dogs (but not cats) do. A range of defecation practices do not qualify as open defecation (Drangert & Bahadar, 2011). Women going out in the dark to a designated place are not seen defecating, and they do cover the faecal matter. A man defecating behind his robe is not seen defecating, but any passer-by understands what is taking place. If he covers the faecal matter it is not counted as open defecation. The next level of being seen is when someone defecates behind a straw or mud wall; no one can see what is going on but everyone understands that the person goes to that place for urination or defecation. If there is only a ‘cat hole’ there, then this situation is little different from going to a toilet. If there is a pour-flush toilet, the discharge goes to a pit or to a sewer, or an open drain or to the street. The latter two cases represent a kind of delayed open defecation since the excreta end up in the open.

According to this definition, very little open defecation takes place among adults. However, children are often seen defecating indiscriminately, and their faeces are collected only when inside the house compound (slide 2.4-8). This indicates that although adults in all parts of the world view excreta negatively, children are not necessarily taught at an early age to shun excreta. The general perception is that children’s faeces are more or less harmless, and adults would find it difficult to take care of babies if they were repelled by their excreta. Therefore, in many societies child excreta are not considered to be in the wrong place when they are found in public places.

Covering faecal matter and washing hands after defecation are two crucial measures from a health perspective. Elderly people who follow the Sunna or the Bible and defecate in the open and afterwards cover the faeces and perform ablution follow a practice with low health risk to the person (WHO, 2006) and the health risk from buried excreta is minimal (Waterkeyn and Cairncross, 2005).

Components and relationships to consider

2.4 - 5



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Our perceptions or ways of thinking are influenced by personal experiences and behaviours, by prevailing norms in society, and by physical conditions. The interrelationships between these influences are shown in the picture. Every community has norms about what is expected of its members. Such norms are inculcated from childhood and they are often reinforced in various ways via radio, churches, political statements, elders, peer influence, laws and regulations, etc.

As members of communities we have a choice of whether to adhere to norms or to transgress them. The community response to transgression varies from frowning to strict punishment – in serious cases the person may even be ostracised. If there is no visible response the norm can be neglected more easily. Also, sub-groups may formulate their own norms that are different from the general ones.

Any norm and behaviour is supposed to take physical conditions into account. If there is a water shortage, one would expect austerity in using this resource. If dirty neighbourhoods are known to bring disease, one would expect action to clean them up. However, reality often tells another story, and logic is not in actual situations so straightforward. We need to discuss this phenomenon more in detail.

It is also a fact that norms are not cut in stone, but are prone to revision from time to time. In the next slides some examples are reported from the water sector that tell us about norms, attitudes and transgression.

A norm among the Sukuma people, Tanzania

2.4 - 6

Some findings on rural norms:

1. "***the Sukuma norm on water***" : *Men develop water sources, while women fetch water daily - unless they are sick.*

2. Transgressions of the norm:

- Man fetches water ⇒ ridiculed by other men
- Woman not fetching water ⇒ divorced
- Woman digs a well ⇒ husband exposed/provoked
- Man does not develop a source ⇒ no transgression

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We provide here an example of a societal norm and what happens when it is broken.
The Sukuma people occupy the area to the east and south of Lake Victoria in Tanzania. Today they number more than 5 million and many live in villages. Anthropologists have studied their culture and practices. Of late, a study of perceptions and practices concerning household water summarised their norm on water as follows: *men develop water sources, while women fetch water daily – unless they are sick* (Drangert, 1993). This corresponds to similar norms in most rural societies, where tasks are distributed according to gender (Whyte, 1980).

There are essentially four ways to transgress this norm. Men can fetch water if the wife is sick or handicapped, but if a man fetches water under other circumstances, he is ridiculed by other men. To avoid this embarrassment, a caring husband with an ox-cart may say he is fetching water for his animals, while he at the same time brings along an extra drum of water for the household.

If a healthy woman refuses to fetch water, it is reason enough for a divorce. She can not expect to receive any support and the toughest consequence of the divorce is that the husband becomes the sole caretaker of their children. No such transgression has been reported.

Women are not supposed to dig wells, only to excavate pits in the dry river bed from where to get water. This is not a man's task since the hole collapses and has to be excavated every time water is drawn from the dry river bed. However, there are reported cases where women come together clandestinely to dig a well without the knowledge of others. In this way a woman may avoid exposing or provoking her husband, which would be tantamount to telling him that he is not fulfilling his obligations.

The fourth transgression is when a man does not develop a household water source. The norm prescribes no consequences when that occurs and the husband himself can decide whether the situation is grave enough to prompt him to act. His inactivity is certainly not followed by any punishment by society. The situation is totally different from that faced by women, whose inescapable chore is to fetch water every single day.

A societal norm, and more so the punishment for not fulfilling the requirements of the norm, guides most people. Therefore, norms are important and can determine the behaviour of individuals. This is obviously the case for women in the example above but it is also true for the men, since a lax norm gives them the option of remaining inactive. This may explain why so few private wells exist in many rural communities.

When women in Sukumaland were asked what would happen if *men* were to fetch water, they said laughingly that a man could not carry the bucket and after a day he would refuse. There are several possible explanations for women's reluctance to the idea of men fetching water. Men do not know that women often use water from different water sources for different purposes, so they suspect men to bring the wrong water quality. The women may also have been worried that their husbands could become a laughing stock or that they could be attracted to one of the many women they would meet at the communal well. Also, if a woman no longer had to fetch water, she would lose the opportunity to meet with female friends outside the home. She would also lose an important task in the family that brought her responsibility, power and dignity.

When men were asked the same question, they all responded that women had always fetched water and it cannot be otherwise. Had men fetched water from the beginning it would have been okay, but not now. Some pressure was exerted to get them to really think of what would be the outcome. For instance, what if God decided that from tomorrow the men were to have the task to fetch water? They responded that "God cannot decide that." After some time the men agreed to think through the outcome, but after a few seconds they gave the answer: "Then I would dig a well near the house!" Instead of being determined by their culture, their thinking became driven by the desire to save effort and time. It would take them a week to dig the well but save hours every day. This indicates that norms and expectations have to be adjusted in order to achieve improved access to water.

An interpretation of the responses is that the interviewees are harmony rational rather than time rational. Some readers may be surprised by this interpretation since they expect a couple to be an integral unit and not an assembly of a husband and a wife with partly separate agendas. As an integral unit the couple is expected to be time-rational for the unit and decide to dig the well since it will save time and reduce daily chore. On the other hand, if the couple is viewed as rather independent parties it seems likely that the couple is harmony rational and avoid to quarrel about who is to fetch the water every day. Harmony is a common aspiration for the parties, but it puts the burden on the female in this case.

The need to develop water sources and fetch water also applies in urban settings. Men have actually taken on the task of providing water to urban households, but this time as engineers developing a piped supply. The crucial difference is that men are being paid to do it, and they are probably not thinking they have taken on a female task, but are proud of having contributed to better services. This concern with money and self-image among men turns out to be an obstacle to voluntary work in urban areas. Groups of men doing voluntary work are unheard of, whereas there are women groups involved in various development activities.

A norm among Pashtuns in rural Pakistan

2.4 - 7

In rural Pakistan where in-house sanitation arrangements are rare, these are the norms among Pashtuns for excreting:

'Men excrete outdoors in designated sites or in the privacy of a *chadar* (cloth), while women excrete inside the house or compound, or outside in the dark under strict privacy from men.

Children may excrete anywhere.

Women take care of their own excreta and those of children and the sick.

There are no explicit norms for the use human-derived nutrients as fertilizer.'

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When this norm evolved a long time ago, the population density was low and the amount of excreta available for agriculture was small. Simple but hygienic rules about where not to defecate and how to cover faeces with soil were sufficient. The whole issue of defecation in designated areas, and more particularly in agricultural fields, fits well with Mary Douglas's theory: order is maintained when human-derived nutrients are considered to be disposed of in the right place (Douglas, 1966). The norms do not involve building anything; they only require walking to the appropriate place, not being seen by the other sex, and observing ablution rules.

There are few transgressions of these norms. Skipping ablution or neglecting to cover faecal matter is a religious offence. If a woman was seen defecating by a man, she would be socially punished. However, none of these potential transgressions have been reported. These norms now need to be adapted to more densely populated villages and the new pour-flush toilet seems to be a common response. These toilets are being installed by men.

The fact that there is no expressed intention to reuse humanure in agriculture is not the same as saying there is no such practice. Waste heaps with excreta and other organic household waste were observed to be left lying in the open for months and even a year before farmers would collect and apply the partially decomposed material on their fields. They viewed this material as a nutrient-rich manure called *desi fertilizer* (Drangert & Bahadar, 2011).

Untreated wastewater is *najas* (impure) but the wastewater usage decree by the Council of Leading Islamic Scholars in Saudi Arabia supports the reuse of wastewater for irrigation. Interviewed farmers who were not willing to apply their own urine and faeces as manure on their fields were prepared to pay a high price for irrigation water. This is in line with studies showing that farmers pay a high price for raw sewage to irrigate crops in parts of Pakistan due to its high nutrient content (Ensink et al., 2004). This is an example of how perceptions may change due to the desire for the financial rewards of increased crop production, which seems to be a stronger incentive than potential health risks and religious rules about excreta.

Nowadays fewer villagers are farmers, and so their views on defecation practices are bound to change. Non-farming sections of the communities have no experience of nutrient loops, so they may adopt more restrictive views on what is acceptable. Reuse is becoming less common and is likely to fade away as pour-flush toilets rapidly replace dry latrines and defecation in the open. Interviews and discussions about urine-diverting toilets and reuse of urine and faeces indicate that many villagers are unaware that most plant nutrients are in the urine rather than faeces (Nawab & Cassandra, 2008).

2.4 - 8

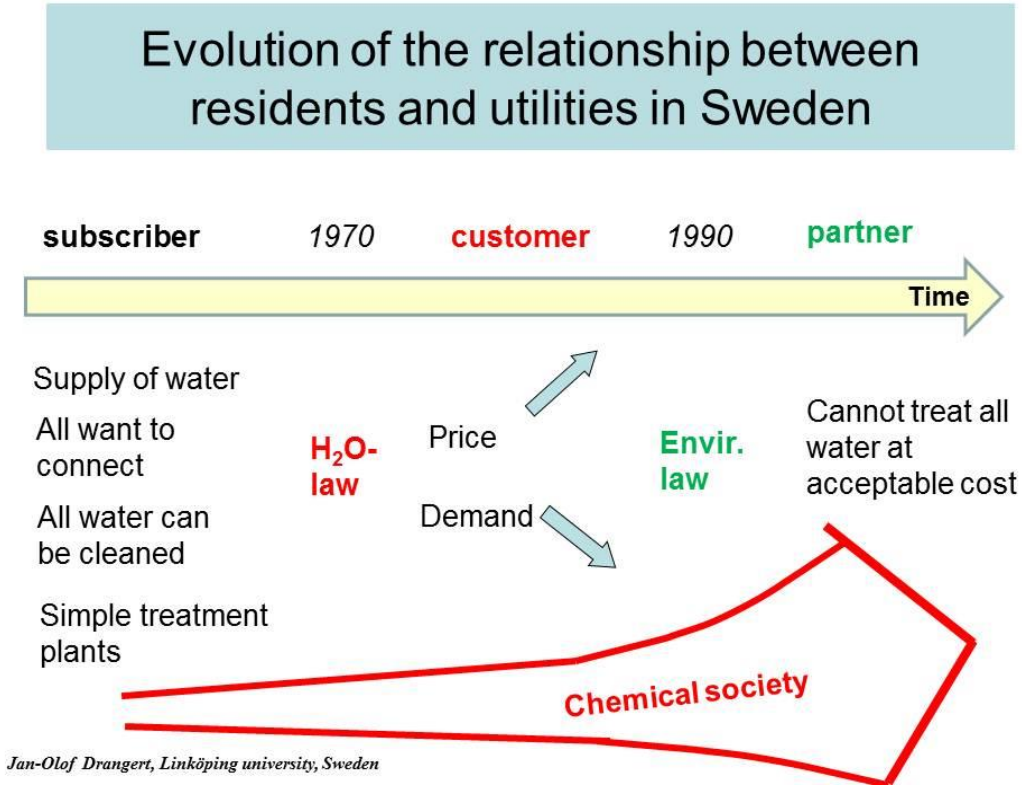
In Bangladesh Dr. Kamal Kar introduced Community-Led Total Sanitation (CLTS), a unique method to achieve excreta-free communities as a result of residents' own initiatives. Its basic idea is that even some open defecation is a health hazard to the whole community. CLTS focuses on igniting changes in residents' sanitation behaviour rather than constructing toilets. It does so through a process of social awakening using mapping, transect walks and provocative public discussions (Financial Times, 2008).

CSLT applies participatory methods to enable local communities to analyse their sanitation conditions and collectively understand the often terrible impact open defecation has on public health and on the entire neighbourhood environment (see picture). The approach takes only one perception into account – people's disgust for fresh faeces. The trick is to force the residents to see things they have become blind to. The eye-opener is to observe the current conditions.

The background is that open defecation close to living places has increased as urban and rural populations grow and properties are fenced in. In line with Mary Douglas's theory, faeces along the roadside are so common that it has almost become the right place for them. This is true for children's faeces since they are viewed as harmless. Residents go around inspecting not covered faecal matter and observing the flies feeding on them and later entering people's homes and landing on their food. Kamal Kar managed to break this norm about child faeces by making it likely that people eat other's faeces. No human being can stay indifferent once they realise they are ingesting other people's fresh shit. This new approach provokes the residents by calling excreta by its local name and visiting the dirtiest parts of a village. It surprises residents to learn that many villagers visit these poor and dirty areas for defecation, believing that by doing so they avoid the hazard. By analysing their own practices, residents are disgusted and feel shame.

This is provocative and also fun. The CLTS campaign encourages residents to use their own judgement at all times and initiate locally appropriate approaches and tools to enhance community participation and empowerment, leading to total sanitation and beyond (Kar & Chambers, 2008). The policy of not providing subsidies for hardware, and leaving decisions and actions to the community, often provoke urgent collective local action to become a totally excreta-free community. The no-hardware subsidy approach makes communities, not the campaign, responsible for the outcome of an intervention. Whether the community decides to act or not is entirely up to its residents.

2.4 - 9



The urban situation is addressed in this picture. The relationship between residents and utilities is a dynamic and interesting one. It changes slowly over time for various reasons, and here we follow the example of Sweden for the period 1950 to 2000. Other societies are likely to experience a similar evolution but the time period may be somewhat different. As is usually the case, development patterns are surprisingly similar – at least at the level of material flows.

The decades prior to 1970 were characterized by supply management thinking (slide 2.2-5). Utilities had the capacity to supply water, and were often given some form of subsidy. In the Swedish case, the central government subsidized trunk lines for water and sewage, and, in some years, it also provided soft loans for house owners to retrofit. The general view in society was that all wastewater could be cleaned well, and simple treatment plants mushroomed in small communities. All house owners wanted to be connected to utility services, since it was seemingly cheap (if they did not take into account that they had to pay via government taxes). Householders were treated as subscribers. They paid a fee for water and expected the utility to provide all the services they required (*turn-key* arrangement as defined in slide 2.3-6).

Then, in 1970, a revised water act was passed which stated that no cross-subsidies were to be given to the water and sanitation sector. Therefore, the municipal-owned utilities had to increase their fees drastically to cover the interest rates on the loans they took in order to build infra-structure. This was not a problem for the utilities since they were monopolies and house owners could not leave the system. What residents, and to a greater extent industries, could do was to reduce water use to cut their costs. As a result, utility incomes dropped and they had to raise tariffs even more. The utilities tried to arrest the drop in demand by informing users about the good quality of the supplied water and by claiming that they treated the wastewater so well that the raised tariffs were justified. In other words, the utilities had to start treating the users as customers, not only as subscribers. It took about 15 years of adjustment before the utility's incomes covered their costs.

In 1990, the utilities faced another challenge. A new, stricter environmental law forced them to improve the quality of the effluent from the wastewater treatment plants. At the same time, consumers have gradually shifted toward more complicated chemical products, which eventually end up in the WWTP. In a fully-fledged chemical society, it became obvious that not all wastewater could be treated satisfactorily (see Module 4.5). This was not because the treatment plants did a bad job, but because the content of the wastewater they received from households contained too many chemicals. The utilities have had to start to cooperate with households in order to reduce the load of unwanted ingredients in the wastewater. The only solution is for householders to become partners in the process to improve the quality of the effluent. Therefore, many prevailing norms and expectations among households and staff need to change to fit this new paradigm.

What do urban residents dispose of ?

2.4 - 10

- 98% of all Swedes are connected to communal water supply and sewerage
- Each year, the average Swede disposes of:
- 73 m^3 of greywater
- 70 kg of dewatered sludge
- 350 kg of solid waste (43% biodegradable, 27% incinerated, etc)
- Each family uses 150 kWh of energy per square meter of house area annually, of which 40 kWh is electricity

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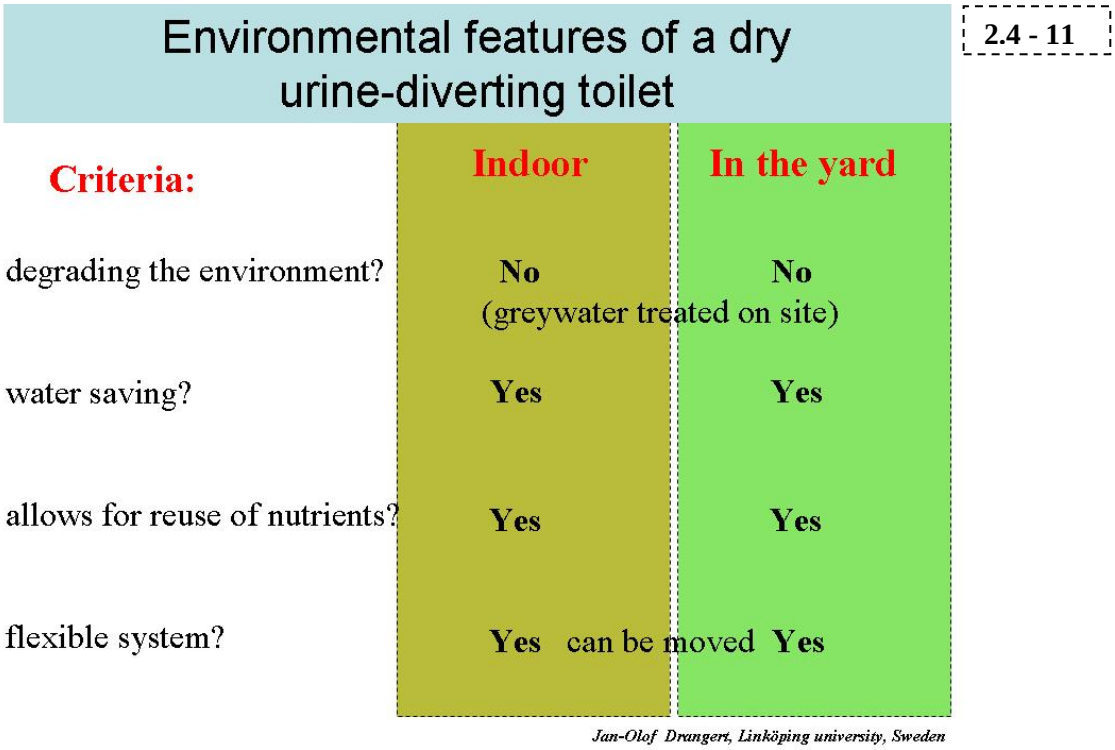
One individual does not dispose of waste in volumes that can harm the globe, but together we do. What volumes are we talking about? Well, it differs between societies and the picture shows some discharges from an average Swede. As mentioned in the greywater chapter, wastewater is by far the largest waste in terms of volume, and the partly treated water is discharged to rivers and lakes. After treatment some 70 kg of dewatered sludge remains in the treatment plant. In a town of 100,000 inhabitants, the utility needs to know what to do with 7,000 tons of sludge containing all kinds of pollutants that would otherwise destroy the receiving water body. This sludge is composed of the items we have put into the water while using it. Had we not mixed unwanted substances in the sink and WC, the treatment plant would have a very simple and manageable task.

The solid waste from households is to a large extent biodegradable, which means that it can be composted and recirculated gainfully to the soil. As much as 27 % is incinerated to produce heat, but it also leaves contaminated ashes behind in the incinerator. Some pollutants will also leave through the chimney and add to greenhouse emissions and other gases.

The energy use is considerable in a cold climate like Sweden's. Warming up the house or flat and heating tap water takes about two-thirds of the energy, and the rest is electricity for lighting and equipment such as stove, freezer, radio, and computer. Most energy sources, other than hydro, wind, and solar power, produce waste products that have to be taken care of. Nuclear waste is the worst.

People usually agree that one should not be wasteful with natural resources, but they would hesitate to reduce their comfort for the sake of a better environment. Again, it takes a global understanding to raise the awareness of resource scarcity and depletion (Module 5.1 on phosphorus).



As more and more people move to urban areas, the requirements on ecological sustainability increase. The criteria for assessing private toilets can be divided into two categories. One is about the socio-cultural and management aspects related to the toilet and toilet room, and the other category is about environmental aspects. In slides 2.4-11 to 2.4-13 the flush toilet is compared with an indoor urine-diverting toilet, and two outdoor options, the pit latrine and the outdoor urine-diverting toilet. We start by assessing dry urine-diverting toilets.

Sustainability criteria related to the environment may include the ones in the picture above. Demand for water, nutrients and energy is increasing, so sanitation systems need to contribute to resource conservation and recovery. Therefore, new requirements have been appearing for the water and sanitation sector: as little degradation of the environment as possible, saving on water, recycling and use of nutrients, and flexibility of the system.

The urine-diverting toilets are designed to meet these requirements. As can be seen in the picture above, the indoor and outdoor versions perform equally well. The faecal matter and urine is contained and later used with no leakage to water bodies. The small volume of ablution water can be infiltrated or treated in a wetland. No water is needed except for hand washing. The nutrients in urine and faecal matter are easy to transfer to urban or conventional agriculture.

The dry toilet system is very flexible. The pedestal or squatting pan can be moved easily, there are no water pipes to retrofit – only a plastic hose for the urine collection. The collection system where urine is collected in jerry cans or by a vacuum truck can easily be changed or adapted to new management structures, and so can the collection and treatment of faecal material.

This and the following slides can be used as an exercise. The participants are divided into groups of 6-8 in each, and there is no limit to the number of groups. If there are many groups, the reporting can be organised so that each group only reports one response or only the criteria that has aroused discussions. The participants are requested to individually fill in Yes or No in the four (emptied) columns from slide 2.4-13. After that, the group members compare their answers and discuss the options where they disagree.

If the schedule allows an extra hour or so, the exercise can be extended by asking each group to start by discussing whether the criteria cover the most important aspect. The participants should be encouraged to suggest alternative criteria.

Features of a dry urine-diverting toilet

2.4 - 12

Criteria:	Indoor	In the yard
- smell?	**No**, if installed correctly	**No**, if well managed
- flies and maggots?	**No**, if installed correctly	**No**, if well managed
- control and security?	**Yes**	**No**
- easy and safe to clean and maintain?	**Yes**, if proper design	**No**, since outdoors
- hand washing facility?	**Yes**	**No**
- hygienic handling of urine & faeces?	**Yes,** if proper design	**Yes,** if proper design
- affordable to most residents?	**Yes** one for each pocket	**Yes**
- space required indoor?	**Yes**	**No**

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Management and hygiene improves when the toilet is indoors

Several common criteria or requirements concerning socio-cultural and management are given in the picture. Yes/No assessments are suggested, and they tend to be more value-laden here than for environmental aspects.

Smell is an important issue for users, and the general perception is that a toilet should be odourless. Some people may even use deodorants to reduce or hide foul smells. The urine-diverting toilet evacuates foul smell immediately so that it does not spread in the toilet room. Users also demand that the toilet be free from flies and maggots – flies because they can transmit diseases and are a nuisance and maggots because they look disgusting (Drangert, 2003).

Users also value a toilet which gives them some control and security. Control can refer to privacy and controlling who uses the toilet and who is responsible for cleaning etc. Security is a high priority in many densely populated areas where women especially are at risk of harassment and rape when going for defecation in the yard – in some peri-urban areas even when the toilet is on their own premises.

If the toilet room is neat and clean people will like it more and use it more. Many public toilets are so filthy that workers and school children postpone their visit till they get home. A pre-condition for cleanliness is that the task is relatively easy, in the sense that floors are smooth and fittings well made – and that the toilet is close to the home and preferably indoors.

Hand washing has been on the agenda for a long time. Yet, it is not generally practised even in modern bathrooms with taps and basins. Outdoor toilets without water are much more likely not to promote hand washing.

Closely related is hygienic handling of urine and faeces. If fingers are soiled with faecal matter, hand washing is of prime importance. When the toilet has to be emptied by someone or a blockage in a sewer has to be cleaned out, it must be done in the safest possible way.

The cost of installing the toilet has to be affordable if it is to be commonplace. And, lastly, indoor toilets take up space that may not be available, but it could also be attached to the house with an entrance from one of the rooms. Moreover, toilets in the yard also require space (2.6-6).

In the table above, the columns for dry toilets indoors and in the yard are filled in with general information from field experiences. The two kinds of toilets differ on four aspects and are equal for four. It is obvious that the indoor toilet allows for better hygiene and management.

Comparison of options

2.4 - 13

	WC	Dry urine-diverting *indoor*	Dry urine-diverting *in yard*	Dug latrine
Socio-cultural features:				
- smell?	Yes	No	No	Yes
- flies and maggots?	No	No	No	Yes
- control and security?	Yes	Yes	No	No
- Safe and easy to clean and maintain?	Yes	Yes	No	No
- hand washing facility?	Yes	Yes	No	No
- hygienic handling of urine & faeces?	Yes	Yes	Yes	Yes
- affordable to most residents?	No	Yes	Yes	Yes
- space required indoors?	Yes	Yes	No	No
Environmental features:				
- degrading the environment?	Yes	No	No	Yes
- water saving?	No	Yes	Yes	Yes
- allows for reuse of nutrients?	No	Yes	Yes	Yes
- flexible system?	No	Yes	Yes	Yes

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Now, we compare the two kinds of dry urine-diverting toilets with the 'ideal' flush toilet and the common dug latrine. We use the same set of criteria as before.

It turns out that the dug latrine has many features in common with the dry urine-diverting outdoor toilet. The two differ when it comes to odour, flies and maggots. This is because the faecal matter is almost dry in the urine-diverting collection unit (vault, bucket or other bin) and is also emptied more frequently than in the case of dug latrines. One may try to have a fly screen on the vent pipe of the VIP latrine, but the general experience is that it will corrode quickly and is very difficult to replace. So, in practice the fly screen does not perform well (see alternative in slide 2.1-9). The dug pit is likely to pollute the groundwater, while urine-diverting toilets do not.

In short, the dry urine-diverting outdoor toilet performs better than the dug latrine.

The WC and the indoor dry urine-diverting toilet have most socio-cultural features in common, while their environmental features differ for ALL criteria.

The issue of odour could be argued as follows. The water seal in the WC does not prevent the creation of bad smells when the faecal matter drops from the anus to the water, and the odour has to be evacuated by the ventilation system in the bathroom. We tend to accept the smell from our own faeces, but prefer to delay entering the toilet after somebody else has used it. The urine-diverting toilet is designed to draw all air down through the drop-hole immediately and exhaust it above the roof top. Therefore, there is no smell at all in the bathroom.

The other issue that is often discussed is whether a urine-diverting toilet is easy to clean and maintain. Cleaning is done with a damp piece of paper that is thrown into the drop-hole afterwards, whereas you may use a brush and flush the WC. A key question is about maintenance including collecting urine and dry faecal matter. This is easy once you get the habit and overcome worries. Unfortunately, many interviewers ask potential users of dry toilets whether they are prepared to deal with fresh faeces, and the answer is always negative.

The proper question should be whether they are prepared to deal with composted or dry faecal matter. The answer is then often more positive. As in the case of WCs you may also pay an entrepreneur to do this service. The dry urine-diverting indoor toilet has an advantage over the flush system in that it is affordable for many more people.

The sanitation system must not degrade the environment. Examples of degradation are leaking latrine pits, septic tanks and sewers. Untreated wastewater disposed of into water bodies may contain contaminants such as endocrine disrupters, nitrates, and hormones. In the case of urine-diverting toilets, both faeces and urine are contained.

The system should also conserve water and nutrients. Dry toilets use no water. The design of a flush toilet determines the volume of water for each flush. Dual-flush toilets use only a fraction of the water used by earlier models. The inclination of pipes decides how much water is needed to prevent blockages, but more important are the types of products we flush down the pipe in our homes. Leaking joints and taps constitute a major portion of the water we 'use'. So, both design and maintenance routines are important elements in water saving.

Wastewater treatment plants are faced with the problem of reducing the nutrients in the wastewater, in particular nitrogen and phosphorus. The consequence is that receiving water bodies are eutrophied with algal blooms and as a result they contain less oxygen for fish and other creatures. The nutrients from our food could instead be recycled as fertilizer for plant production after being collected directly from our homes. In that way communities can contribute to improved ground and surface waters, reduce the burden on utilities, and postpone the looming scarcity of phosphorus in the world.

A sanitation system lasts for several decades; a latrine pit may last for ten years while a flush toilet probably lasts for 30–40 years. Therefore, it is important that the system has some flexibility to adapt to technical and other developments without exorbitant cost.

The comparison shows that a dry urine-diverting indoor toilet has one or two socio-cultural advantages over the flush toilet. As for the environmental features, the dry indoor urine-diverting toilet out-performs the WC on all counts.

Consider the changing local culture

2.4 - 14

Residents: Reuse requires space and also enough motivation to do so. Many societies do not practise urban agriculture, but when given the opportunity many residents become involved and accept the idea of recycling human waste in gardening. A major reason is that sanitised urine and treated dry faecal material is used, not fresh excreta.

Professionals: Well-maintained urine-diverting toilets are odour-less and can be installed indoors. However, professionals often believe that toilets in poor housing areas have to be in the yard. Repeatedly it has been shown that residents prefer an indoor toilet, once they are aware of the odour-less option.

The benefits of indoor toilets are for example better privacy and security, easy to clean and maintain, convenient for sick and disabled, etc. From a health point of view the indoor toilet increases the likelihood of hand-washing after defecation.

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If the users are uninterested in, or rejecting a sanitation arrangement, it will not be taken care of. However, cultural views are rarely cut in stone, and tend to adjust to new realities. When farmers move to town, a number of rural conventions are modified or done away with. Men and women start using the same toilet – even young men and their mothers-in-law. Strong norms such as having large families begin to have less impact and the numbers of children are reduced, sometimes drastically. Therefore, projects which try to introduce new technologies or behaviours should be culturally sensitive without assuming all prevailing traditions and attitudes to be rigid.

Increases in the prices of food and fertilisers may gradually change people's understanding and attitudes about alternative fertilisers as well as urban agriculture. Today, a lot of food is produced around several cities in the world. In many European cities there are allotment gardens and roof-top cultivation (slide 2.1-20). During the "World" Wars in Europe most urban areas were heavily cultivated. Food security has always been a strong incentive for urban agriculture.

Knowingly or not, professionals tend to propagate sanitation systems that they view as beneficial to their careers and status. This human instinct can lead to vast improvements in sanitary arrangements. However, it can also prevent improvements from taking place, in particular in areas with little prospect of successful public interventions. In the case of urine-diverting toilets, experience shows that professionals tend to talk and think about fresh faecal matter rather than composted or dry faecal matter. Therefore, they tend to promote odourless urine-diverting toilets to be sited in the yard away from the home. They may also entertain the view that poor residents should not have an indoor toilet similar to the WC. The fear may be that if dry, urine-diverting indoor toilets work well, the case for installing WCs, with the water supply and sewerage system they require, would be much less convincing.

There is certainly room for all kinds of decent technologies in a world where more than two billion people lack proper sanitation. There is no risk of professionals becoming jobless. But if professionals continue to promote WCs indoors and latrine pits in the yard, billions of people will end up with inferior, inconvenient arrangements which threaten their health.

When professional pride takes precedence, experts offer hopes for future improvement, but no immediate remedies. Mankind has progressed further than just hiding the excreta in a pit (which is a good thing) and now we can improve hygiene and health by providing hand washing facilities to most residents. This cannot take place with a toilet in the yard. Professionals should be ethically bound to promote indoor toilets for this reason.

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