


Title	Cultural preferences for latrines and flush toilets with wetland treatment in North West Frontier Province, Pakistan
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Author(s)	Bahadar Nawab, Ingrid Nyborg, Kjell B. Esser, Petter D. Jenssen
Address	Department for International Environment and Development Studies, Noragric, Norwegian University of Life Sciences, Ås, Norway. P. O. Box 5003, N-1432, Ås, Norway
Telephone	++ 47 64 96 52 00
Fax	++ 47 64 96 52 01
Mobile	++ 92 304 9017469, ++ 92 303 6961758
E-mail	bnawabkk@yahoo.com , bahadar.nawab@umb.no
Short CV for Introduction Purposes (100 words max)	Bahadar Nawab, born in Pakistan. Did my MS in Environmental Sciences from University of Peshawar, Pakistan in 1993. Join the same University as a Lecturer and worked there since 1994 till 2001. Then got a Norad Fellowship in 2001 and did 2 nd MS in Management of Natural Resources and Sustainable Agriculture from Department for International Environment and Development Studies, Noragric, Norwegian University of Life Sciences, Norway. Registered with the same department as a PhD student in August 2003 and am expected to finish in June 2006. The focus of research throughout my master and PhD study has been, drinking water, sanitation and wastewater treatment through natural processes.
Photograph attached (jpg)	

Introduction

A little more than half of the world's population that has sanitary means of excreta disposal are practicing any one or a combination of the following sanitation models 'flush-and-discharge'; 'flush-and-forget'; 'drop-and-store' and 'sanitise-and-reuse' (Winblad; 1997; Drangert, 1998; Esrey et al, 2001; GTZ, 2003). Although adopting existing sanitation models has spared millions of lives, except for 'sanitise-and-reuse,' the rest of the models have serious health and environmental consequences. The first two are water-based, costly and are therefore inappropriate for the poor (Mara, 2003; Loetscher and Keller, 2002; Dinar, 1998). They lead to over-exploitation of water resources by using freshwater as a carrier and sink of human excreta. The 'drop-and-store' model is comparatively affordable, but it involve the risk of groundwater contamination and wastage of nutrients (Wilderer, 2001; GTZ, 2003).

A new model of 'sanitize-and-reuse' is emerging in some parts of the developed world, applying the principles of 'don't mix', 'don't flush', and 'don't waste' the human excreta (Winblad, 1997). This model is considered an alternative approach to conventional wastewater system (Werner et al., 2004a). It is based on an ecosystem approach that reduces health risk, prevents pollution of surface and groundwater and optimises management of nutrients and water resources (Langergraber and Muellegger, 2005). However, despite its many positive aspects, this new approach might take some time before it is accepted in different cultures. In areas where people have many other pressing needs and the demand for sanitation is low, and the introduction of relatively complex technology, requiring handling of excreta, may not be easily welcomed (Esrey et al., 1998).

In order for the new approach to be successfully adapted across cultures and regions, one has to understand people's behaviour, attitudes, culture and beliefs, and preferences regarding human excreta and its disposal. These aspects can vary greatly with respect to age, sex, education, religion, locality and physical capacity (Tanner, 1995). People without access to sanitation or those practicing water-based sanitation, might reject the new sanitation approach if it does not fit into the prevailing culture and tradition. However, water-based sanitation could be made ecological by passing the black and greywater through a natural treatment systems (constructed wetland) and recycling both nutrients and wastewater.

Natural treatment systems use much of the same physical, chemical and biological processes as conventional systems except under natural conditions, with a minimum input of materials and energy. The main advantages of natural systems are low construction costs, very low maintenance costs, low demand for skilled operators, and limited need for institutional structures (Haberl, 1999; Kadlec and Knight 1996). This system can totally supplant conventional treatment systems or at least act as supplementary to them in developing countries (Kivaisi, 2001). Natural systems are particularly effective in controlling pathogens (Perkins and Hunter, 2000) and are at par with the other wastewater treatment processes especially in removing potentially harmful chemical and biological agents, including viruses (Dinges, 1982).

This study aims, therefore, a) to gain an understanding of peoples' perceptions about human excreta and their prevailing sanitary practices, b) to explore peoples' preferences for existing sanitation options, and finally, c) to see how a better understanding of these issues can contribute to the development of sanitation models which can ultimately contribute to fulfilling the millennium goal for sanitation in rural North West Frontier Province (NWFP), Pakistan.

2. The study areas

The NWFP is bordered by Afghanistan in the North and West and covers about 100,000 km².

The population of 18 million, plus 1.5-2 million registered Afghan refugees (Government of Pakistan, 1998) are mainly Muslim and of the Pashtun ethnic group. Eighty five percent of the population is living in rural areas and with the exception of Balochistan province; NWFP is the poorest in Pakistan with 46 % living in poverty (World Bank, 2002). Ninety percent of the poor people in the province are living in the rural areas (ibid). The number of religious Madarsas (1500) is almost equal to the collective number of public high schools, higher secondary schools, colleges and universities (1580) in the province (World Bank, 2002; Government of NWFP, 2002a).

The study site, Machaki Banda, is located at about 35 kilometres south of Karak, which is the dry southern district of NWFP. The village consists of 49 households with a total of 653 people. The whole population belongs to one clan, having little variation in socio-economic and power relationships. Being a typical rural village of a poor province literacy rate is very low. Out of the total population, only 7 persons have higher education of bachelor or master degree and 39 have 10th or 12th grades. The rest of population is below 10th grade and mostly illiterate. All the old and middle-age women are illiterate, though most of them can read Quran. Now, however, people are sending their girls to school. People give high importance to the study of religious education. The village has 4 Muftis¹, 8 Moulvis², 15 Hafiz-e-Quran³ and a number of Madarsa students are still getting religious education in different Madarsas.

The society is religiously conservative and male dominated. Daily life is more driven by tradition, prevailing culture and religion than by the state law. In the village, collective decisions are usually made in the Hujra⁴ and the Mosque. Disputes are settled in the Jirga⁵. The Hujra and the Mosque are two strong institutions, however, both are male institutions and women are strictly prohibited from attending them. The male community spends its free time entertaining guests and sharing daily matters with other villagers in the Hujra. The Mosque is used for praying (five-time daily) and discussing religious and other common matters of the village. Religious scholars and the Imam of the Mosque are well respected, and people are willing to listen to them. Women's activities are mostly restricted to within the boundary wall of the home and have little or no say in decision-making in daily matters. NGOs are not welcomed since people are suspicious of their motives and possible hidden agendas.

3. Methodology

The village was selected on the basis of the following criteria: location, size, socio-economic situation, literacy rate, religious and cultural attachments, water availability and sanitation practices, such that it represent a fairly typical rural village in the province. Community needs, desires, preferences and values surrounding human excreta and wastewater were explored using qualitative research methods comprising individual and household interviews, focus group discussions and participant observation. The issue of sanitation and greywater in the street was first raised in individual meetings with 20 male key informants in the village. The willingness and motivation for change of those key informants paved the way for the village elders being willing to meet to discuss sanitation. In the meeting, the adverse health consequences of existing 'lack of sanitation' were highlighted and the men were asked to brainstorm on remedial measures. After thorough discussion, the men realised the need of immediate action for adopting improved sanitation and agreed on convening another meeting for detailed deliberation. In the next meeting the potential positive and negative

¹ The highest degree in Islamic Madarsa education

² Religious scholars

³ A person who memorizes the Quran by heart

⁴ Meeting place and guest house for males

⁵ Local institutions where disputes are resolved by the village elders

consequences of urine-separating latrine and flush toilet were presented and they were asked for their preference between the two. There the community unanimously agreed on flush toilet followed by natural treatment systems. Following the consensus, detailed open-ended interviews of all 49 households were conducted, and separate group discussions with women and men were held in order to understand their different points of view. Detailed interviews of 10 key women informants and the Imam of the village Mosque were also held to explore the issues in more detail from the female and Islamic perspectives. The head of the local government (Tehsil Nazim) was interviewed to reflect on the government point of view.

4. Current trends of sanitation in Machaki Banda

More than 90 % of the village population is practicing open defecation, which is a culturally accepted norm in the area. This is representative of the practices in other rural areas in NWFP where more than 60 % of the people have no sanitation facilities and the majority therefore engage in open defecation (Government of NWFP, 2002b). The village is surrounded by vast agricultural land that provides enough space and the required privacy for open defecation. To avoid contact with human excreta, the local people often engage in 'shifting-defecation'. The females of the village, however, have restrictions on their mobility due to prevailing cultural and religious obligations. They have to defecate in some designated place inside home or outside during the early night or dawn in extreme secrecy from the adult males. The darkness of the night prevents them from visiting different places away from home, and as a result; they have a greater chance of contact with excreta. Out of 49 households, only 15 have pit latrines, which are mostly used by the females.

The village has mud houses with a room or two made of bricks in those households that can afford this. In most of the sleeping rooms, in any one corner, a square elevation of (around 4 feet*4 feet) is made from the floor and is specified as an 'open bathroom' where the households take ablution, showers and also urinate. The greywater and urine from that corner is discharged to the street and gets stagnant there since there is no drainage system in the village. This is also quite common in other parts of the province, where 40 % of the rural population are either discharging their excreta or other wastewater into the street drains or pits (Govt of NWFP, 2002b). While this poses an apparent health risk, local people are in fact more concerned about the bad smell, dirty mud in the streets and making impure (Najas) their praying clothes. This situation risks the contamination of drinking water due to possible leakage of greywater into the drinking water pipes under the streets. Therefore, unless the rainwater washes the streets or sunrays dry it, the greywater stays in the street as a potential health risk, especially for children playing there.

5. Priorities and cultural preferences of villagers in choosing sanitation models

Rural people were reluctant to talk about excreta, toilet and sanitation in the beginning partly due to cultural barriers and partly due to the fact that they were not concerned about it. To engage them in a discussion, we adopted a simple and indirect approach of discussing the opportunities and challenges associated with the water that enters and leaves the home after use. We found that once the wastewater came out of the home into the street, then even reserved people started talking about it. Speaking of "greywater in the street" can thus be an effective entry point for discussions in the village. In their local tradition, people call these types of discussions 'stirring the faeces', where an existing problem is brought up by the people in front of the community in order to find a solution; a form of 'brainstorming'. This exercise sensitised the community on the need for an effective approach for proper sanitation.

Once a rapport with the community was developed, the villagers in their elders meeting discussed the different sanitation models along with their modified versions that were

⁶ A man who gives Azan (the call for Muslims to come for praying in the Mosque)

introduced by the investigator. The options discussed included more conventional systems such as street pavements, pit and flush latrine and toilet with and without treatment, as well as newer, ecological sanitation systems like high-tech urine-separating latrines and low-tech dry latrine with source separation. In Pakistan, there is no high-tech urine-separating commode in the market, therefore the investigator presented pictures of urine-separating and old-fashioned dry latrines. Their primary criteria for choosing a sanitation model were privacy and comfort followed by health, which is consistent with research findings from other cultures in, for example, South Africa and Zimbabwe (Holden et al. 2003; Guzha and Musara, 2003). After a few weeks of discussion amongst themselves, the villagers came up with a consensus that they wanted sanitation through flush toilets (squatting commode) connected to an underground sewerage. Many have used flush toilets on some occasion, while still others have only heard of it. People also want water within the toilet or latrine for anal cleansing. They prefer squatting commode since it is considered helpful in anal cleansing and in observing sitting for defecation according to Islamic teaching, which cannot be easily followed in urine-separating latrine using English commode. The village community, while concerned about final disposal of wastewater, had no vision or plan for treatment of domestic wastewater. The investigator introduced the option of constructed wetland, which the community members accepted once they understood its potential benefits.

While the majority of villagers favoured flush toilets, there were exceptions. A few men from the older generation continue to favour open defecation. They feel at ease while defecating under the open sky in nature, where they escape the smell of others and are not conscious of time spent and with no fear of being disturbed. They also feel that none of those facilities can be availed in any latrine or flush toilet system. This is evident from the routine of an 80-year-old man who was seen going out for open defecation during heavy rainfall, on a rough, muddy and uneven path, despite having a latrine in his home. Ironically the man, who was religious and had been the Moazan⁶ of the Mosque for decades, considered himself too old and weak to walk the comparatively short and straight distance to the Mosque. However, the women's response was quite opposite to that of the males'. In open defecation women have little chance of 'shifting-defecation' since they can't go far away from home in the dark and therefore are more likely to have contact with excreta. Being in the open, women still feared being disturbed and for them defecation is always a troublesome job. Their first priority is privacy, and there is little concern about health, hygiene, and recycling. Therefore, women see the existing open defecation as a problem and strongly favoured an in-house flush-toilet arrangement. By having toilet or latrine inside the premises, they will not need to wait for the dark or hide from the male members of the household for defecation inside the home. Women also feel that having a toilet in the house would save their precious morning time and also relieve them from the disgusting job of throwing their night soil in the designated areas in the village. They feel that it would also help in getting rid of the uncontrolled defecation of children.

The idea of a urine-separating latrine was absolutely new in the village. They see it quite similar to the age-old dry latrine when night soil is manually removed in the morning. Such a latrine is considered a sign of poverty, underdevelopment and low-status. When the modus operandi of urine-separating latrine was explained to the village community, people came with many cultural and religious reservations about it. For example, the villagers dream of development and a higher standard of living, and thus think of faeces and urine resting in their home or backyards for months as backward, much like their feelings towards the traditional dry latrines. More serious, however, was the importance of water for cleansing. Being Muslims they prefer water for anal cleansing, which is a bit challenging in urine-separating latrine since one should preferably use toilet paper to keep the faeces dry. The provision of anal cleansing in a separate place within the toilet was rejected since people don't want to move unclean after defecation.

The most compelling reason why the Machaki villagers prefer flush toilets, however, was

because faeces and urine are considered Najas (impure) in Muslim culture. It is thus likely that similar attitudes could also be present in other Muslim communities across the developing world. For example, Islam advocates adopting all necessary measures to restrict a body or clothing to come in contact with urine or faeces, as this would disqualify a person from praying until he cleans himself. There is thus a religious dimension to peoples' repulsion of human excreta, and likewise the preference for anal cleansing and sitting for defecation and urination. Learning and practicing these things from childhood produces a sense of disgust about human excreta. On the other hand, Muslims consider water as a purifying agent. The daily five-time ablution where Muslims wash parts of their body to purify themselves for praying gives water a central place in their physical and spiritual everyday lives. They are still considering excreta as a waste and not a resource. Therefore people prefer not to see or think about excreta once they are relieved from it.

The villagers also feel that urine-separating toilets are costly and complicated. For example, one has to install a specially designed commode to separate urine and faeces, then collect faeces and urine in two separate containers and store it for months. Then one has to take care of the collected material and properly treat the faeces. The application of urine and faeces to crops also needs some technical expertise. When the village people compare these requirements with the flush latrine or open defecation, their immediate response is that they are not ready to sell the freedom they see in flush toilets or open-field defecation and replace it with a complicated, urine-separating toilet, particularly with their meagre resources. The village people are mostly poor, but are proud of having a simple life style that avoids complicated, labour intensive systems. While the villagers of Machaki were aware of the needs to clean flush toilets, they would need to learn new ways to maintain urine-separating latrines to ensure that they remain a facility and not become a health risk. Proper maintenance is necessary particularly in the case of urine-separating latrines, since there is no or limited use of water both in use of latrine and in handling of excreta (Peasey, 2000). Many people living in a single house, struck by poverty and low levels of education, and without proper training, might leave urine-separating latrines without proper use and maintenance. In Machaki, as in other NWFP villages, not everyone in the family takes on the responsibilities of use and maintenance – the entire family defecates, but it is the women who have to clean the latrine or toilet. Thus, for urine-separating latrines a whole new set up of culture, behaviour and responsibility would be needed.

Also, it was clear from the discussions of sanitation options, that investments in what they perceive as costly technology, are not a priority. Particularly the poorer members of the village are much more concerned with meeting basic needs such as food and water, irrespective of their quality, than new ideas of sanitation and cleanliness. The cost issue appears not only at the household level, but at the community level as well. The urine-separating latrine, for example, does not contribute to the treatment of greywater, rather it only complements it through the recycling of nutrients and excreta (Johansson and Nykvist, 2001). The stagnant greywater in the streets, which is a major sanitation problem in Machaki Banda and other rural villages of NWFP, will still be there until properly disposed of and treated. Therefore the villagers argued that they couldn't afford two separate sanitation systems of urine-separating latrine and drainage system for disposal of greywater. They suggested instead putting both in one pipe and recycling them afterward away from homes.

The villagers also had strong views on the restrictions connected to the use of excreta as fertilizer. Despite the fertilizer value of faeces and lesser-known nutrient richness of urine (Wolgast, 1993), the psychological and religious concern about the impurity of faeces and urine overrule their fertilizer value for the villagers. 'We prefer dying than eating back our own faeces' was the reply of an old farmer while discussing ecological sanitation. Thus, the village farmers are resistant to recycling and re-use of nutrients from urine and faeces due to misconceptions and cultural barriers. Therefore in Pakistan and in most other developing countries there is a lack of a proper market for the recycled nutrients from urine-separating

latrine. People thus, with little understanding of recycling mechanism prefer to use artificial fertilizer rather than compost.

The repulsion from faeces and urine, however, changes significantly with the change of its physical appearance from excreta into black water. Rural people can more easily discuss the attributes of black water as opposed to excreta. The reason is that excreta decomposes in the septic tank of water-based sanitation and change its colour, odour and hence has little repulsion. Psychologically, they pretend that the sewage is just dirty water (Sawyer, 2003). Thus, many farmers in NWFP who normally are reluctant to use recycled urine and faeces are nevertheless promoting the use of raw sewage for crop irrigation. The same psychology prevails in Machaki Banda. After thorough discussions of the transformation of faeces and urine into black water, they agreed to make their sanitation system ecological by passing the domestic wastewater through a constructed wetland and thus reuse the recycled wastewater and nutrients in agricultural production.

6. Community designed and implemented ecosan project in Machaki Banda

Poor people in Pakistan and other developing countries expect free or subsidised services of sanitation from the government. In NWFP, the sanitation services, if existing, are free; nobody pays for sewage connection nor wastewater treatment. The majority simply cannot afford sanitation charges and the government has not tried pricing the service knowing the community is not willing to pay. But since sanitation for government means 'street pavement' and is free, rural people use all their influence to get that service, more for easing their mobility and less for disposing their wastewater. However, the open drains in the paved street often get blocked due to un-control solid waste and refuse such as plastic. The facility soon becomes a risk since the black water that was once going to pits is now directly discharged to the street drain together with greywater, increasing the health and hygiene problem. On the other hand urine-separating latrine is in-house arrangement and the household has to make all the investment from installation to recycling and re-use.

The issue of sanitation was thoroughly discussed with the village community, first with the key informants and then with the village elders group. In the first meeting of the village elders the community agreed on 'street pavement' as a solution for greywater disposal and mud control and decided to approach local government for assistance. The local government agreed to support the community proposal as it was in line with a technical approach, which was commonly implemented by the government for rural sanitation.

After having open discussions on sanitation in different sessions with the elders, the local people better understood the pro's and con's of different sanitation models. Once the village people appreciated the link between their local knowledge and practices with the scientific theories about urine and faeces, they were willing to change their behaviour and adapt an entirely new approach about sanitation. The conventional approach of 'street pavement, was abandoned and they reached a consensus on flush toilets along with greywater connected to the sewerage system. The village people also agree to treat the wastewater and recycle the nutrients through a constructed wetland. However, they had to work hard to convince the local government since this approach is new in rural NWFP. For this task, the community made a village committee and got it registered with the local government. The committee wrote a brief project proposal and negotiated with the local government agreeing on an 80 % and 20 % cost share by the local government and community respectively. In addition to the community providing a 20 % share, each household would have to construct at least one toilet and will be responsible for the in-house sanitary network to discharge the black and greywater of the house to the underground sewerage at their own cost. The community planned, designed and is implementing the project. The domestic wastewater of all 49 households is collected into one pipe and has to pass through a constructed wetland. All the construction materials are locally available and the system is designed such as to give enough retention time to

wastewater for pathogen removal. The nutrients will be recycled and wastewater will be used for small-scale irrigation in the adjacent farm. This village is thus implementing an ecological sanitation model as an alternative to close-loop urine-separating latrines; a model, which seems to be appropriate for cultures still insisting on water-based sanitation.

7. Conclusions and prospects of ecological sanitation

Ecological sanitation will no doubt help improve health, water and food production problems. It is logical, sustainable, and cost effective both in theory and in practice. The technology can be equally pro-poor and pro-rich, for men and for women and for water-scarce and water-rich areas. However, despite its many positive aspects, this approach will be of little use unless the target people are willing to adapt it. In urine-separating latrines, for example, the focus is on recycling, health and environment whereas the majority of people without access to sanitation hardly share any of these concerns. Their prime priorities are privacy, dignity and security. Therefore, for ecological sanitation to flourish, one has to understand the prevailing cultures, preferences and practices and made that technology target and cultural-specific. To tackle this challenge, more open discussions around sanitation need to be undertaken in the villages, such that people can relate their cultural and religious knowledge and perceptions with scientific knowledge on sanitation, health hygiene and recycling.

One must also recognize the limitations of certain types of ecological technologies. The urine-separating latrine, for example, can only complement other systems by recycling of nutrients and excreta. Stagnant greywater in the streets, which is a major sanitation problem in rural villages having no drainage systems, will still be there until properly disposed of and treated. The arguments made by villagers that they cannot afford two different sanitation projects in the same settlement, is probably true in other developing countries where the demand for sanitation is low.

Thus, urine separating toilets, while theoretically sound, were not appropriate in Machaki, and may not at this time be a practical and attractive option in other Muslim communities due to prevalent socio-cultural and religious influences. There are, however, alternative ecological sanitation systems, which, with careful discussions with the community, could have a good chance of successful implementation. In Machaki village, a constructed wetland was successfully introduced and adapted to local conditions after consensus-building in the community. Thus, this case shows it is important that the general principles of Ecosan models be adapted to local conditions, rather than specific technologies, developed under completely different contexts, being introduced as a universal solutions.

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