

Title	Investigating the attitudes of several communities in Nakuru municipality (Kenya) towards sanitation issues and ecosan options
Keywords	Ecosan, community attitudes, urine diversion toilets, reuse, agriculture
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Short CV for Introduction Purposes (100 words max)	Presenter will be Moses Otieno; Graduated BSc (Civil Engineering) from the University of Nairobi, Kenya in 1990; then worked in the Water and Sewerage Department of the Nairobi City Council. He trained in Germany on water management and loss reduction in 1996/7. Currently works at the Nairobi Water & Sewerage Services Co. Since 2003, he is at UNESCO-IHE to study for his MSc in Municipal Water & Infrastructure with specialization in Sanitary Engineering.

INTRODUCTION

Nakuru municipality in Kenya is experiencing environmental and sanitation problems due to a rapid growth in population and lack of adequate town planning and financial resources. It is the fourth largest town in Kenya and its population has been growing rapidly at a rate of over 5% per annum (CBS, 2000). This is exerting a considerable strain on existing water and wastewater management facilities. The town is able to meet only 67% of the daily water demand of its population. Only 40% of the population or 19% of the built-up area is sewered (Mangat, 1998). Cesspools, septic tanks and pit latrines serve the other areas within the municipality. The sludge and wastewater from these facilities is disposed of in open drains or discharged into nearby Lake Nakuru. There is suspicion that liquid contents of unlined latrines and leaking cess pools may be transported underground to the lake along geological fault lines. This could lead to contamination of the ground and surface waters (Mangat, 1998).

The ecosan concept has to date not been widely tested as a viable alternative to conventional sewerage and sanitation systems in Kenya, despite its considerable potential advantages and cost savings. Limited awareness and socio-cultural barriers on handling of human waste have been constraints of large-scale adoption of this technology in this country. Several studies point to cultural taboos and attitudes as a hindrance to use of ecosan products because these are based on human excreta (Drangert, 2004). It is therefore important to include the attitudes and wishes of the community when developing ecosan projects.

The aim of this study was to investigate the influencing factors for application of the ecosan concept from a user perspective in Nakuru. This means a review of the existing sanitation practices, opinions, preferences and expectations regarding waste disposal and reuse. The results reported in this paper are part of a larger MSc study (Otieno, 2005), which is in turn contributing towards the ISSUE programme (Integrated Support for a Sustainable Urban Environment). The ISSUE programme is an initiative by WASTE (a Dutch NGO) in conjunction with the local partner Intermediate Technology Development Group (ITDG) and other stakeholders. See also WASTE (2005) for further information.

ITDG and the International Labour Organization were involved in a solid waste management initiative in Nakuru, which provided an environment to integrate sanitation under the ecosan concept. This in turn provided an opportunity for the Nakuru Municipal Council to seek appropriate solutions to their sanitation challenges; hence its selection as a case studies here.

DESCRIPTION OF SURVEY METHODOLOGY

As described in the introduction, we are investigating communities' attitudes towards sanitation (in particular ecosan); therefore it was deemed that the most appropriate research method would be to conduct a comprehensive household survey. The results from this community survey will, in a subsequent step, be coupled to technology selection (Otieno, 2005)

Three typical residential areas within Nakuru municipality were selected for the survey, namely kwa Rhonda, Lakeview and Millimani, all of which have no conventional sewerage system and experience regular water supply shortages. Kwa Rhonda is characterised as a low-income high-density area, Lakeview is low to medium income, high density, whereas Millimani is relatively high income, low density (NMC, 1999). Sample sizes for each area were based on statistical analysis to obtain representative results (sample sizes were 139, 71 and 29 for kwa Rhonda, Lakeview and Millimani, respectively; total of 239).

Sanitation and toilet habits are a very private aspect of one's life which people are usually unwilling to discuss openly especially with strangers. Generally, people also do not like to discuss handling of urine and faeces. The danger that accurate information may not be obtained from this survey was therefore ever present, and this is taken into account in the data analysis and discussion.

Face-to-face interviews were conducted in households selected randomly within each residential area for ten successive days in February 2005. Besides the first author of this paper, four graduate assistants of Egerton University, Nakuru and two other assistants with extensive experience in social surveys conducted the interviews. Some aspects of sanitation such as current conditions of toilets, distance to toilet and on-site separation of grey water were recorded by taking photographs or by direct observation (instead of direct questioning).

EXISTING SANITATION SITUATION FOR SURVEYED HOUSEHOLDS

General results for the three residential areas are presented in Table 1, which gives some background information on each of these areas.

Table 1: General data for three residential areas surveyed (Otieno, 2005)

	kwa Rhonda	Lakeview	Millimani	Overall	Remarks
Average family size	4.3	5	5	4.7	1999 census recorded a value of 4.0 for Nakuru
House occupancy by majority	Rented (86%) ¹	Rented (92%)	Rented (62%)	Rented (85%)	
Principal source of water supply	Piped supply	Piped supply	Piped supply	Piped supply	Options are: piped supply to yard, water kiosk or in house. In general, availability of piped water supply is irregular.
Most commonly used toilet type	Pit (in the yard) (95%)	Pit (in the yard) (77%)	Standard flush to septic tank (100%)		
Median monthly income (Ksh ²)	1500-5000 (51%)	1500-5000 (59%)	Over 20000 (48%)	1500-5000 (47%)	Legal minimum monthly wage is 4900
Average plot size (ha)	0.08	0.45	0.60		1 ha = 10,000 m ²

Kwa Rhonda and Lakeview are the most affected by inadequate water supply. Between 50-70% of the respondents in these areas listed problems such as smell, flies and lack of hand washing facilities. These problems result in an unhygienic state of the toilets. In order to maintain toilets in a usable condition, ready availability of water supply was selected as a key requirement by 64% of total respondents over other factors such as regular cleaning and maintenance schedules. An important observation from this study was that a significant number of respondents (36% and 20% in kwa Rhonda and Lakeview, respectively) were unable to use their toilets during the night due to personal safety concerns.

The respondents in Millimani had minimal problems in comparison to residents in the other two areas even though they also faced water supply shortages. This could be attributed in part to the fact that the toilets in Millimani are all used by household members only. Sharing of one toilet by 15 or more people was not uncommon in the other two areas. This was more so in rented houses with latrines located outside in the yard.

There is a lack of hand washing facilities at the toilets in kwa Rhonda and Lakeview. This presents a health risk especially for small children who may not be able to clean themselves well. In these areas water is often bought from vendors at a high cost compared to monthly earnings and is therefore used sparingly. Even in Millimani where there is exclusive flush toilet use and minimum number of problems associated with toilet use, lack of water resulted in other associated problems like pipe blockages. This means that lack of adequate water is a principal cause of most problems expressed in all three residential areas.

When asked about most desirable elements of an ideal toilet, respondents ranked “no bad smell” and “ease of cleaning” as the first two most important elements. Even though “guarantee of privacy” was provided in the questionnaire as a choice, it does not seem to be an issue despite the visual observation that it is lacking in many cases.

¹ Percentages are expressed with regard to the sample size for each residential area

² 1 Euro = 96 Ksh (Exchange rate in March, 2005)

RESPONSES OF COMMUNITIES TOWARDS ECOSAN PREPOSITION

Figure 1 below demonstrates the respondents' level of awareness of ecosan concepts in the study areas. For simplicity reasons we limited the ecosan approach to urine diversion (UD) toilets, whether they are 'wet' or 'dry'. Only an average of 9% and 15% of the total respondents had knowledge of UD toilets and re-use of human waste as fertilizer respectively, suggesting a very low public awareness of ecosan options. Hence a public awareness campaign is recommended before any ecosan projects are undertaken.

On the other hand, there was a high proportion of people with a positive outlook towards use of treated waste as fertilizer, which is highly encouraging (over 65% of all respondents expressed willingness to consume products grown on sanitized human waste). Only 18% of all respondents were unsure or voiced cultural taboos and health fears as concerns.

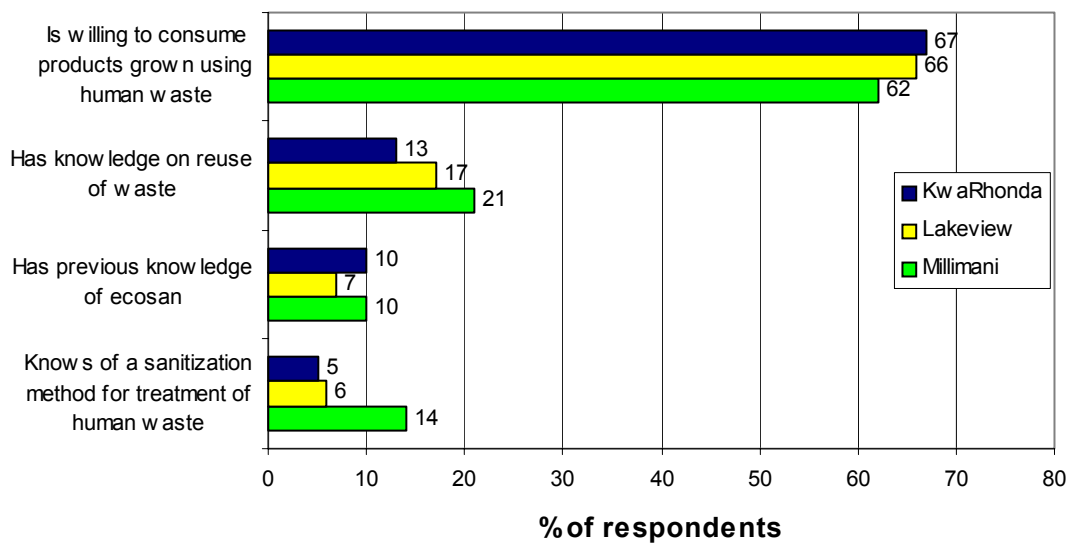


Figure 1: Current level of awareness of ecosan practice amongst residents

The respondents were asked to comment on photographs of different types of UD toilets (both wet and dry types) in order to capture their first impressions. The results were very similar for the three residential areas as shown in Figure 2 below. On average, the respondents indicated a positive attitude towards UD toilet use.

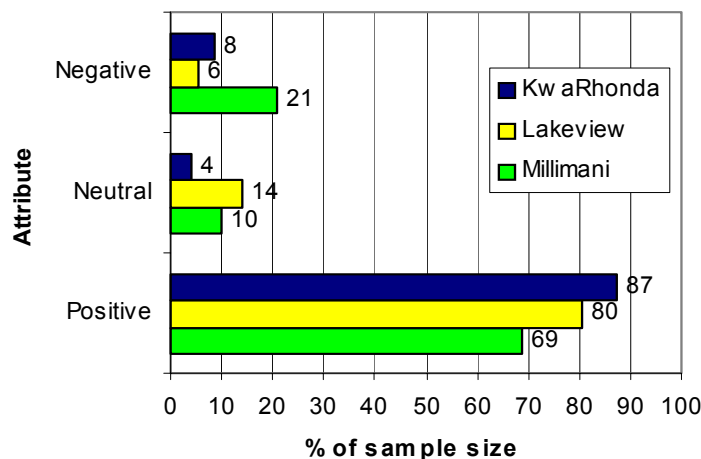


Figure 2: First impression of users when shown pictures of UD toilet types

It is surprising that 69% of the residents or more in each area had a positive impression given that for many it was the first time to see or hear about this kind of toilet. This result is supported by the indicated willingness to use ecosan products as mentioned earlier (see Figure 1). However, there is a possibility that respondents gave positive responses to “keep the interviewer happy”. Nevertheless, the output gives an indication of the general feeling of the respondents towards UD toilets.

The biggest challenges towards use of UD toilets as currently perceived by the residents are high installation costs, lack of know-how to maintain and not being able to use the toilets properly. Due to the low median income of the respondents, reasonably low cost of construction and installation is very important for a successful sanitation solution. Increased public awareness and long-term demonstration projects would help to dispel the fears raised above. When asked about their preferred toilet type, the residents made selections as shown in Table 2.

Table 2: Preference of respondents for various toilet types

Residential area	Preferred toilet (% of sample size)					Sample size	Toilet currently in use
	Standard flush	Dry UD	Wet UD	Other	VIP latrine		
kwa Rhonda	18	36	5	0	41	139	Pit latrine (95%)
Lakeview	25	34	6	1	34	71	Pit latrine (77%)
Millimani	59	7	31	3	0	29	Standard Flush (100%)
Total	25	32	9	1	33	239	

As can be seen, residents in those areas with the highest water scarcity and where dry sanitation technology is currently in use, showed preference for dry UD technologies. The probable reason is that their choice is strongly influenced by their currently used toilet type, which they can identify with. Those residents with both flush toilet and no severe water shortages preferred standard flush or wet UD toilets (i.e. residents of Millimani).

Few households in kwa Rhonda and Lakeview grow crops or keep animals (see Figure 3). ITDG (2004) found similar results in a baseline survey for similar areas in Nakuru. Results of this survey suggest availability of space as a limiting factor for urban agriculture. Agricultural activities were higher in Millimani where larger plot sizes (see Table 1) and better organization (fencing for animals, poultry and cropped areas) facilitated agricultural patches. On the other hand, in Lakeview, which is close to the national park, wild animals destroy the vegetables and therefore the incentive to farm is lower than in the other areas.

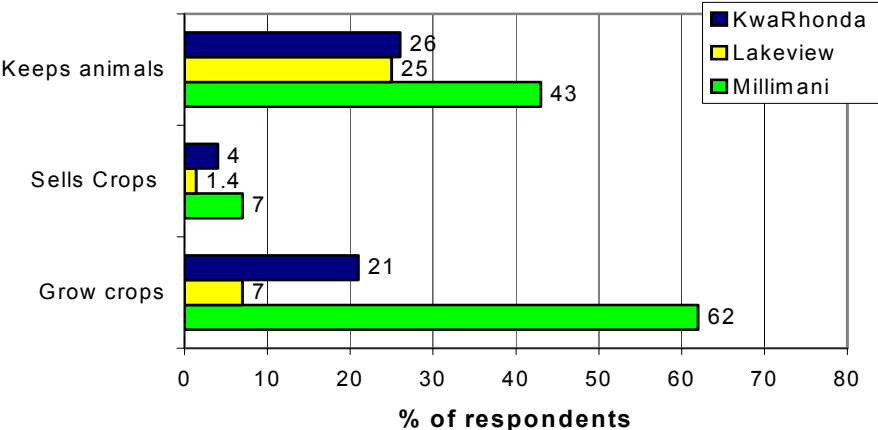


Figure 3: Current urban agriculture practices in the surveyed areas

The surveyed residents grow crops mostly for their own consumption, and only 3.7% of them sell their crops. Nakuru is an agricultural centre, and therefore fresh vegetables are easily and cheaply available at most times. For this reason there is relatively little incentive to engage in farming activities in the areas surveyed, unless cost savings can be realised by the families.

CONCLUSION AND FUTURE WORK REQUIRED

This study revealed that:

- Current sanitation problems are in part caused by lack of readily available water; hence, sanitation technologies that are not water dependent or are water saving may be appropriate for Nakuru.
- Sharing of toilet facilities by more than one family or five users may significantly increase the extent of problems experienced.
- Preferences for ecosan supporting technology (such as UD toilets) in waste management are strongly influenced by toilet type currently in use.
- There is low awareness of re-use options for human waste in Nakuru.
- There is indication for a strong willingness to adopt and use ecosan supporting practices and technologies if hygiene and technical concerns can be addressed.
- Agricultural practices within residential areas are currently limited, except for Millimani.

Although not presented in this paper, it was found that matching ecosan-compatible technologies to community expectations also has to consider issues such as cleansing material used, existing grey water separation, institutional and economic factors. Related relevant issues such as potential for biogas generation, use of readily available ash and urban agriculture practices are currently in the process of being analysed (Otieno, 2005). The results from this study will be used together with other factors as mentioned above to select sustainable sanitation systems for Nakuru, which will be incorporating ecosan principles as far as possible, in an integrated sustainable approach to technology selection (WASTE, 2005).

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