

# The soul is willing but...: Exploring Community Sanitation Preferences for Environmental Sustainability

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## Abstract

*Sanitation has been identified as an essential aspect of development as it affects the quality of life and productivity of the population. But sanitation facilities are only sustainable when people make their own choices and contribution towards obtaining and maintaining them. This paper therefore examines sanitation preferences of residents of Efutu, a peri-urban settlement in the Central Region of Ghana. Using a descriptive design, data were collected from 154 randomly-selected households using questionnaires, focus group discussions and observation. It was found out that 65% of the respondents mentioned the household water closet (WC) as their most preferred toilet facility, though 58% presently use Kumasi ventilated improved pit (KVIP) public toilets. Least handling of excreta, convenience, security and avoidance of smell represent some of the very important factors that determine respondents' choice of a particular sanitation facility. Additionally, 78% of the respondents wanted their toilet facility to be sited in the house, mainly due to convenience/comfort and the security associated with an in-house toilet facility. The study recommends that since the majority of the people use KVIP public toilets, it will be easier, through community consultation, to introduce ecological sanitation, a more sustainable and ecologically friendly sanitation system, in the community.*

**Key words:** sanitation, preferences, toilet, ecological sanitation, environment, sustainability

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## Introduction

The Joint Monitoring Programme (JMP) of the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) reported in 2004 that the number of people who lack basic sanitation services rose from 2.1 billion in 2001 to 2.6 billion in 2004. Nevertheless, progress in improving sanitation for the world's population remains slow: diarrhoea from unsafe water, poor sanitation and lack of hygiene causes 1.8 million deaths per year, 90% of which are children under 5 years of age (Stockholm International Water Institute (SIWI), 2005). According to Morgan (2007), a good toilet, together with a safe reliable water supply and the practice of good personal hygiene, can do much to improve personal and family health and wellbeing. However, most of the rural and urban population of Africa does not have access to safe and reliable toilets. In Ghana, for example, the proportion of the population with safe and reliable sanitation in 2004 stood at 35%; 31% of the rural population and 40% of the urban (Community Water and Sanitation Agency (CWSA) 2005).

Meanwhile, there are several sanitary means of excreta disposal including any one or a combination of the following 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 these sanitation models has saved millions of lives, with the exception of sanitise and reuse, the rest of the models have serious health, economic and environmental consequences (Winblad & Simpson-Herbert, 2004). The first two models, flush and discharge and flush and forget, are costly and lead to wastage of water by using fresh water as carrier and sink of human excreta. Thus, both models are, as a result of these shortcomings, unsustainable. They are designed on the premise that human excreta is waste and only suitable for disposal, and that the receiving environment has an infinite capacity to

assimilate this waste (Esrey *et al*, 2001). The drop and store model is comparatively inexpensive, but involves the risk of groundwater contamination and keeps nutrients out of the agro-ecological cycle (Welderer, 2001; GTZ, 2003; Dellstrom & Rosenquist, 2005).

An alternative model, sanitise and reuse, also known as the ecological sanitation (ECOSAN) model (though not a new concept), is emerging in some parts of the developed and the developing worlds. Sanitise and reuse applies the principles of “don't mix”, “don't flush” and “don't waste” to the treatment of human excreta (Winblad, 1997). In this system, urine and faeces are separated, pathogens killed through treatment and nutrients are recycled through composting. It is based on an ecosystem approach designed to reduce health risk, prevent pollution of surface and groundwater and optimise management of nutrients and water resources (Langergraber & Muellegger, 2005). The Ecological Sanitation model has therefore been promoted as an alternative approach to conventional sanitation methods (Werner *et al*, 2003). Though ecological sanitation is not new (ancient Chinese and Arab scholars have extolled the benefits of using human excreta for fertilizer), today's large and increasing populations, coupled with the extensive pollution associated with the conventional sewerage systems, has called for a fresh look at alternatives. In addition, chemical fertilizer (on which most peri-urban agriculture is dependent) is becoming more and more expensive (Cordell *et al*, 2009) and has the potential to pollute both surface and ground water through run-offs and seepage. Consequently, there have been calls by environmental and civil society organisations and experts to look for “systems” alternatives to the use of chemical fertilizer that do not exacerbate the pollution problems presented by human excreta and, at the same time, contribute to an increase in peri-urban food production.

The use of organic fertilizer from human excreta could only be achieved through the adoption and use of ecologically sustainable sanitation options. But sanitation facilities are only sustainable when people make their own choices and their own contribution towards obtaining and maintaining them. In order for sanitation to be successful, people have to experience the toilet as an improvement in their daily life. Therefore, sanitation systems have to be embedded in the local institutional, financial-economic, social-cultural, legal-political, and environmental contexts (Netherlands Water Partnership (NWP), 2006). Moreover, the preference for any kind of sanitation facility is influenced by a number of factors, including the absence of smell, the least handling of excreta, low capital and maintenance costs, ease of maintenance, security, privacy and comfort (Holden *et al.*, 2003).

The main objective of the paper is therefore to investigate the sanitation preferences of residents of Efutu, a peri-urban settlement in the Central Region of Ghana. In any public intervention, having an understanding of what the public desires is very important. Therefore, an understanding of the sanitation preferences of the people is a necessary condition for the successful introduction of ECOSAN in the community.

### **Conceptual issues**

According to Thrift (2007), the Kumasi Ventilated Improved Pit Latrine (KVIP) was developed by Albert Wright at the Kumasi University of Science and Technology (now the Kwame Nkrumah University of Science and Technology) in the early 1970s. The KVIP is a twin-pit VIP latrine which allows the contents of one pit to compost while the other pit is in use. By the time the second pit is full, the contents of the first pit should be fully composted, and can therefore be removed manually and spread on fields without health risks. KVIPs have a number of advantages over other sanitation technologies: they require almost no maintenance, any anal

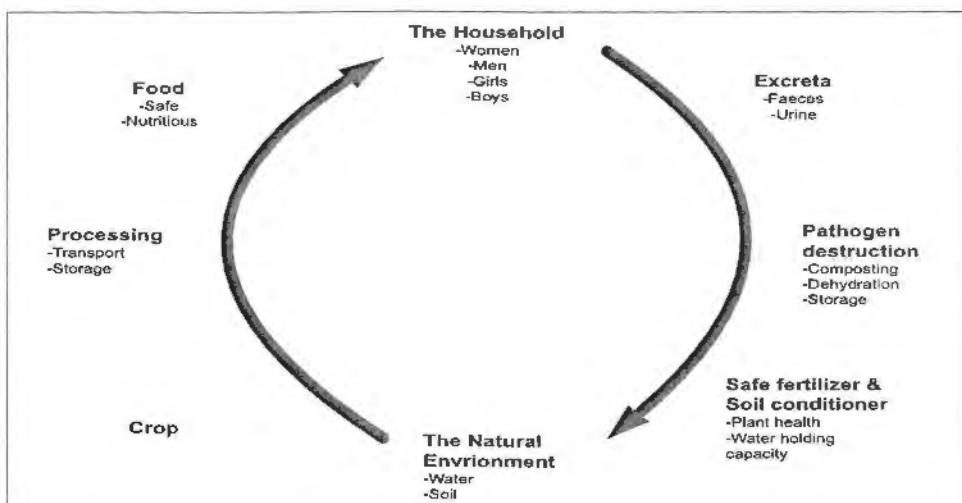
cleaning materials can be used, and they do not require water. They are now the most common technology used by urban households and the second most common technology used by rural households (50% of rural residents use pit latrines, and 27% have no toilet facilities; Ghana Statistical Service 2000). Various improvements have been made to the KVIP latrine, including fans to increase ventilation, extra vent pipes and solar heated processing chambers.

Ecological sanitation (ECOSAN) is an emerging paradigm (although not new) that utilises the design of KVIP and recognises human excreta and water from households not as a wastes but as resources that can be recovered, treated where necessary and safely used again. If the nutrients in human excreta are reclaimed using hygienically safe practices, they can be used locally as fertilizer in agriculture and contribute to food security, poverty alleviation as well as environmental sustainability. As shown in Figure 1, households' excreta can be sanitised through composting, storage and dehydration, and be used as fertilizer for agriculture. This saves the natural environment from the pollution associated with chemical fertilizers and increases crop yields to enhance food security and poverty reduction.

Thus, ecological sanitation systems can make an invaluable contribution to sustainable livelihoods and poverty reduction, including in urban areas, by increasing food security through the return of nutrients from excreta to the soil to increase soil fertility and by reducing pollution and health risks. Such systems also impact positively on food security through better management of scarce water resources and contribute to health through reducing the transmission of disease and increasing nutritional intake (Esrey and Andersson, 2000b). The compost produced can be sold or used for household food production. The establishment of home gardens and sale of produce can be facilitated and the resulting increased income can lead to greater

nutritional well-being for families. The establishment of an ecological sanitation system can also create opportunities for local entrepreneurs to design and build toilets as well as provide training on the building of the toilets and the use of the end product, creating further income generation potential.

Despite many positive aspects, however, the ecological sanitation (ECOSAN) model faces a number of challenges. According to Esrey et al (1998), in areas where people already have many other pressing needs and where sanitation awareness is low, the adoption of new excreta handling approaches may not be readily welcomed—particularly where the new methods are at odds with the prevailing cultural understanding and practices. Reusing sanitised human excreta for agricultural purposes requires that the excreta be collected and stored, but in many developing countries the task of collecting urban nightsoil is regarded as employment for people of very low status. As a result, it is becoming increasingly difficult for urban authorities to recruit people to collect and store nightsoil.



**Figure 1: Closing the nutrient loop.**  
Source: Esrey and Andersson, (2000b)

Furthermore, sanitation facilities that do produce nightsoil, such as bucket latrines, are being replaced by those that do not, such as pour-flush latrines (WHO, 2006). Indeed, in some countries (e.g., India, Ghana), the governments are promoting programmes to replace bucket latrines (pan latrines) with Kuiiasi Ventilated Improved Pit (KVIP) latrines and pour-flush toilets (water closets) not only for reasons of improved health but also because of the urgent need to do away with the degrading practice of human beings carrying nightsoil loads (Venugopalan, 1984). In Ghana, the government has banned the use of bucket latrines in homes. From the viewpoint of excreta-related disease control, this is to be welcomed, as pathogen load, and hence the potential risk to health, is substantially reduced (WHO, 2006). All these efforts are geared towards ensuring the sustainability of the sanitation system.

Moreover, gender issues are primarily a concern when toilet facilities are multi-family or public (Warner, n.d.). Toilet provision is essential to make public areas accessible, whether they are cities or villages. Greed (1995) notes that women generally have fewer facilities than men, and the lack of provision particularly affects women because they are more likely to be the ones out in public places in the daytime either shopping, travelling on public transport (for essential food gathering) or making care-related trips. The gender problems stem from several causes. But a principal explanation is that decision-making regarding public toilet provision has been dominated by men (Greed 1995, Kira 1995). The worlds of plumbing, services engineering and building technology are particularly male dominated, especially at the senior level (Greed, 1995).

## Study Area and Methodology

The study was conducted in a peri-urban farming community of Efutu in the Cape Coast Metropolitan Area in Ghana. The 2000 Population and Housing Census indicated that Efutu had a total population of 2,214 inhabitants: 1,052 males and 1,162 females. There were 349 houses and 427 households with an average household size of 5.2 persons (GSS, 2000). The community has a Senior High School but the predominant economic activity is farming.

Data for the study were gathered in December 2008, using a survey questionnaire, focus group discussions (FGD) and observations. From a household list prepared, two hundred (200) households were randomly selected from a list of households prepared by the researcher during a reconnaissance survey. In each selected household, the head was targeted, but in situations where the head was not available after two or three visits, the spouse or any adult member who gave consent was interviewed. In all, a total of 154 respondents were interviewed, while 46 were either absent during the period of the study or did not complete the entire interview process.

The questionnaire comprised three sections. The first dealt with the community sanitation profile (source of drinking water and type of toilet facility), the second dealt with residents' sanitation preferences (the preferred toilet facility and the location of such a facility) while the final section elicited basic background data on the age, sex, education level, income, household size and religious affiliation of respondents.

Additionally, two focus group discussion (FGD) sessions (comprising a male and a female group) were conducted to complement the findings from the surveys. The purposive sampling method was adopted to choose the discussants for the focus group discussions. This was done to ensure fair

representation of all stakeholders in the discussions. Consent was sought to tape-record the session and later transcribe the recording to enrich the qualitative analysis. To ensure the validity and reliability of the responses from the focus group discussion, the responses provided by the discussants were repeated by the moderator for them to confirm or modify. This ensured that the discussants understood the issues very well and that their responses were not misrepresented by the moderator or the recorder. Secondly, in addition to the recorder, a note taker was present to take notes on the salient points that emanated from the discussions. Since most of the people could not read or write, all the instruments were administered by the researcher in the local language, "Fante". Observation of the existing toilet facilities was done to examine the possibility of converting them into ECOSAN toilets. Items observed included the nature of the toilet pedestals, number of chambers, cleanliness of the toilet as well as the general design of the toilet facility, from the superstructure to the storage of excreta.

## Results

### *Socio-economic profile of respondents*

The study shows little variation in the socio-demographic characteristics of the respondents. Table 1 presents the socio-demographic characteristics of the respondents, which covers sex, age, educational level, marital status and income. Out of the 154 heads of households or their representatives interviewed, 55% were males and 45% were females. One reason why there were more men than women is that they are most often the heads of household and most women expect their husbands or male heads of household to discuss issues relating to the entire household. A little more than a third (37%) have lived in the community for between 10 and 20 years, and 34% even longer (21 years and above). Over 30% of the respondents were aged between 30 and 40 years. The majority of the respondents have had

limited formal education: 62% have had primary school education, 14% have had secondary/vocational or technical school education, and 2% have had post-secondary or tertiary education. The majority of the respondents were Christians (94%) and 78% were married. The income levels of the households were generally found to be low: 38% of the respondents claimed to earn below GH¢50 (US\$ 41.67) per month and 35% earned between GH¢50 (US\$ 41.67) and GH¢100 (US\$ 83.33). The interpretation and use of the income data should be done with a little bit of caution since most respondents were either not willing to mention their income or could not determine the exact income they received monthly. Respondents were mainly farmers (39.6%), traders (27%) and artisans (23%). The household size was quite large; 46% of households contained between 4 and 6 people, confirming the data by the Ghana Statistical Service (2002) that the average household size of the community was five (5).

**Table 1: Socio-economic profile of the respondents**

| Variable   | Frequency | Percentage |
|------------|-----------|------------|
| <i>Sex</i> |           |            |
| Male       | 85        | 55.2       |
| Female     | 69        | 44.8       |
| <i>Age</i> |           |            |
| <30        | 42        | 27.3       |
| 30-40      | 48        | 31.2       |
| 40-50      | 45        | 29.3       |
| 51+        | 19        | 12.3       |

| <i><b>Marital Status</b></i>            |            |              |
|---|------------|--------------|
| Never Married                           | 18         | 11.7         |
| Marricd                                 | 120        | 77.9         |
| Widowed                                 | 5          | 3.2          |
| Divorced                                | 4          | 2.6          |
| Separated                               | 7          | 4.5          |
| <i><b>Education</b></i>                 |            |              |
| None                                    | 34         | 22.1         |
| Basic                                   | 96         | 62.3         |
| Sec/Voc/Tech                            | 21         | 13.6         |
| Higher                                  | 3          | 1.9          |
| <i><b>Religious Affiliation</b></i>     |            |              |
| Christianity                            | 144        | 93.5         |
| Islam                                   | 8          | 5.2          |
| Traditional                             | 2          | 1.3          |
| <i><b>Primary occupation</b></i>        |            |              |
| Farming                                 | 61         | 39.6         |
| Trading                                 | 41         | 26.6         |
| Artisan                                 | 36         | 23.4         |
| Other                                   | 16         | 10.3         |
| <i><b>*Household monthly income</b></i> |            |              |
| Below GH¢50                             | 58         | 37.7         |
| GH¢ 50-100                              | 34         | 35.1         |
| GH¢ 101-200                             | 32         | 20.8         |
| Over GH¢200                             | 10         | 6.5          |
| <i><b>Length of stay</b></i>            |            |              |
| Below 10 years                          | 44         | 28.6         |
| 10-20 years                             | 57         | 37.0         |
| 21-30 years                             | 31         | 20.1         |
| Over 31 years                           | 22         | 14.3         |
| <i><b>Household size</b></i>            |            |              |
| 1-3                                     | 44         | 28.6         |
| 4-6                                     | 71         | 46.1         |
| Above 7                                 | 39         | 25.3         |
| <b>Total</b>                            | <b>154</b> | <b>100.0</b> |

\* \$1 = GH¢1.2

Source: Fieldwork, 2008

### ***Water and sanitation profile of the community***

The availability of safe drinking water and hygienic sanitation facilities is a precondition for health and for successfully fighting poverty, hunger, child deaths and gender inequality. It is also central to the human rights and personal dignity of every woman, man and child on earth (Biesinger & Richter, 2007). Access to water in the selected community varied from outdoor water tap to wells, boreholes and rainwater. About 92% of the respondents had access to pipe-borne water (mostly shared pumps) while the rest either relied on boreholes (5%), or hand-dug wells (2%) or both for water. In a focus group discussion, other sources of water and methods of waste water disposal were revealed: *During the rainy season, rain water is also harvested for use within a day or two after the rainfall. Rain water is harvested with barrels, pans and buckets depending on the intensity of the rain. Waste water from the home is generally discharged onto the streets since there is no proper drainage system in the community* (47 year-old woman).

The study also found that the predominant toilet facility used by the residents in the Efutu community was the public toilet (58%), mostly Kumasi Ventilated Improved Pits (KVIPs) followed by household KVIP (Figure 2a & 2b) or household pit latrines (36%), while 3% had no toilets and therefore had to resort to the bush for defecation (Table 2). This finding is in consonance with the Ghana Statistical Service's (2002) findings that most of the people in Ghana use public toilets.

**Table 2: Present toilet facility frequently used by respondents**

| Toilet Facility        | Frequency | Percent |
|------------------------|-----------|---------|
| Public Toilets         | 90        | 58.4    |
| Household KVIP         | 26        | 16.9    |
| Household WC           | 4         | 2.6     |
| Household pit latrines | 29        | 18.8    |
| No toilet (bush)       | 5         | 3.2     |
| Total                  | 154       | 100.0   |

Source: Fieldwork, 2008



**Figure 2a: A public KVIP in Efutu**

Source: Fieldwork, 2008

**Figure 2b: A household KVIP in Efutu**

An interview with the unit committee chairman of the community revealed that the mass use of household KVIP in the community started in 1997 when the Adventist Development and Relief Agency (ADRA), a Religion-based NGO, introduced that facility into the community. At the time of the survey, a household had to pay GH¢10.00 and dig the pit, as its (household) contribution while ADRA provided the building materials and labour. This finding supports Thrift's (2007) assertion that the water and sanitation sector in Ghana is well linked through the Coalition of NGOs in Water and Sanitation (CONIWAS).

### *Sanitation preference among the residents*

According to Drangert (2004), norms and perceptions about excreta are also related to technical devices and management. Thus, even though only 58% of the respondents presently use public KVIP toilets and household KVIPs, 65% of the respondents mentioned the household water closet (WC) as their most preferred toilet facility (Table 3).

**Table 3: Most preferred facility and the criteria for choosing it**

| Criteria for choosing most preferred facility | Most preferred toilet facility (%) |              |                        |       |  | N   |
|---|------------------------------------|--------------|------------------------|-------|--|-----|
|   | Household KVIP                     | Household WC | Household pit latrines | Total |  |     |
| Absence of bad smell                          | 0.0                                | 100.0        | 0.0                    | 100.0 |  | 8   |
| Low cost                                      | 10.0                               | 0.0          | 90.0                   | 100.0 |  | 20  |
| Privacy/Security                              | 53.8                               | 38.5         | 7.7                    | 100.0 |  | 13  |
| Convenience/Comfort                           | 20.5                               | 79.5         | 0.0                    | 100.0 |  | 78  |
| Healthiness/Cleanliness                       | 10.0                               | 85.0         | 5.0                    | 100.0 |  | 20  |
| Sheer habit                                   | 40.0                               | 20.0         | 40.0                   | 100.0 |  | 5   |
| Other   | 20.0                               | 70.0         | 10.0                   | 100.0 |  | 10  |
| Total   | 20.1                               | 64.9         | 14.9                   | 100.0 |  | 154 |
| N   | 31                                 | 100          | 23                     | 154   |  |     |

Source: Fieldwork, 2008

Several reasons were advanced for choosing the WC: all the respondents (100%) indicated that it has no bad smell, 80% said it is cleaner while 39% cited security. This reflects some of the positive features of the WC, which include the fact that it is easy to clean, is odourless, is indoors, and has less

health risk than the others. This result is also consistent with Holden *et al's* (2003) findings that the absence of smell, together with the least handling of excreta, the security of an indoor toilet, privacy and comfort are the factors which influence people's preference for a sanitation technology. However, their assertion that health is rarely a motivating factor in choosing a toilet was at variance with what was found in the present study, as about 85.0% of those who prefer the WC said they did so because it is healthier and cleaner. Though most people preferred the WC, the cost of installation put them off, as indicated by a 32-year old man in a focus group discussion:

*I once visited my brother in the city and used the WC. In fact, it was very clean and comfortable. There and then I wished I could have one for myself. But when I asked about how much it costs to build one in my house, I said to myself I can never afford it. Even if my brother wants to build it for me now, I will ask him to give me the money so that I can use it for other things. You know that the soul is willing but the body is weak.*

Observation made on the few WC toilets in the community revealed that they are not connected to a sewerage system that can treat the waste water before disposal. Rather, every toilet is connected to a septic tank that is emptied when full. The faecal sludge from the tanks is dumped directly into the environment without any form of treatment, which poses serious environmental and health hazards.

Warner (n.d) opines that gender plays a very influential role in shaping people's preference for sanitation systems. However, a chi-square statistic showed that at a 0.05 significant level, there was no significant difference ( $p=0.915$ ) in respondents' preference for a toilet facility with regard to gender. This might be due to the fact that males and females generally have

had shared toilet facilities (albeit in different chambers) in the community for a long time.

#### *Preferred location of toilet facilities*

When asked to indicate where they wanted their toilet facility to be located, 78% of the respondents wanted their toilet facility to be sited in the house while 22% wanted it outside the house. Out of those who wanted it inside the house, 55% cited convenience/comfort, followed by security/privacy (20%) and easy access (15%) as the main reasons for their preference. However, almost all those who wanted their facility outside the house (97%) indicated that they wanted to avoid the bad smell emitted by the toilet facility (see Table 4). This was corroborated in the FGD as a 45-year old man indicated:

*The toilet facility does not produce odour at the initial stage but when it is about to get full, the smell is so bad that you cannot enjoy fresh air in the evenings. Even the public toilet that is not very close to my house produces bad smells, how much more a toilet in my house. For this reason, I will always make sure that my toilet facility is cited away from my house.*

From the observations made on the different models of the KVIPs used in the community, it became evident that apart from the public KVIP latrine that had several holes but one big chamber, the household KVIPs were of two kinds: single-chamber and double-chamber. The main idea behind the design of double-chamber latrines is that household members will use one chamber at a time so that when the first is full, they will switch to the second one. This is to allow enough time for the complete decomposition of the faecal sludge in the first chamber which would otherwise pose a threat to health and to the environment. However, the observation revealed that in most cases both

chambers were used simultaneously, which might be due to the large number of people using the toilet. Therefore, it does not take a long time to become full, hence there is not enough time for the contents to decompose sufficiently before they are emptied. This would result in unsanitary faecal sludge, which, when dumped into the environment directly, can cause serious health and environmental hazards.

**Table 4: Location of preferred toilet facility and reasons**

| Reasons for the location of preferred facility | Location of preferred toilet facility (%) |                 |       |     |
|--|---|-----------------|-------|-----|
|  | In house                                  | Away from house | Total | N   |
| Avoid bad smell                                | 0.0                                       | 97.1            | 21.4  | 33  |
| Easy access                                    | 15.0                                      | 0.0             | 11.7  | 18  |
| Privacy/Security                               | 20.0                                      | 0.0             | 15.6  | 24  |
| Convenient/Comfortable                         | 55.0                                      | 0.0             | 42.9  | 66  |
| Healthy/Cleaner                                | 10.0                                      | 0.0             | 7.8   | 12  |
| Other  | 0.0                                       | 2.9             | 0.6   | 1   |
| Total  | 77.9                                      | 22.1            | 100.0 | 154 |
| N  | 120                                       | 34              | 154   |     |

Source: Fieldwork, 2008

To ascertain whether significant differences existed between respondents' socio-economic characteristics and the location of their preferred toilet facility, a one-way analysis of variance (ANOVA) and t-test were employed at 0.05 significant level. The *t*-test statistic was applied on variables that have only two categories while the one-way ANOVA was employed on variables with three or more categories. The existence of significant difference was determined by comparing the *p*-values with the level of significant set (0.05). The results indicated significant differences in the location of a preferred

facility and educational attainment ( $p=0.027$ ). More of those with higher formal education (secondary or higher) wanted their facility within their houses than those with lower formal education (basic or no formal education). In addition, the test showed a significant difference between household size and the preferred location of a toilet facility ( $p=0.003$ ). Thus, members of larger households (4-6 people) were more likely to prefer a toilet facility located outside their house than those with smaller households (1-3). This may be due to the fact that those in larger households expect their facility to get full faster, and hence want to avoid the bad odour associated with it. However, no significant difference was observed with regard to location of preferred toilet facility and income ( $p=0.216$ ), major occupation ( $p=0.568$ ), marital status ( $p=0.671$ ), age ( $p=0.469$ ) and sex ( $p=0.632$ ).

## Discussion

This study explored preferences for sanitation options and the motivation for those preferences, using permanent residents of Efutu as a case study.

According to Kendie (2002), many conceptualisations of the term *sanitation* refer to it as simply the safe means of waste disposal. He defined sanitation to encompass all those inter-related activities which in the long run ensure a sustained health of the family. Adequate sanitation is therefore seen as involving those facilities whose effective presence and use reduce the chances of human contact with potentially contaminated wastes (Kendie, 2002). The study's finding that most of the residents presently use the public toilet is not unexpected. According to Ayee & Cook (2003), public toilets have become an important feature in Ghanaian urban life for two main reasons. First, they have become the main facility for people in low income, densely populated or informal settlement areas. Second, and more important, the toilets serve the interest of public health.

Moreover, the high proportion of the respondents using household KVIP latrines also confirms the assertion of **Danso et al (2003)** that in low-income areas, the use of the Kumasi Ventilated Improved Pit (KVIP) latrines, other public pit latrines and free range (i.e. open defecation) is most common, while in the middle and high-income areas water closets are dominant. It must be emphasised here that the KVIP was first developed as a technology for public toilets, but has become the preferred technology for household sanitation as well (Thrift, 2007). The KVIP toilets and household pit latrines represent the drop and store toilet models which are comparatively inexpensive, but involve the risk of groundwater contamination and keep nutrients out of the agro-ecological cycle (Welderer, 2001; GTZ, 2003; Dellstrom & Rosenquist, 2005).

The residents' preference for WC (flush toilet) is due to the fact that people's preferences are always influenced by those of a reference group in the society within which they live. In Ghana, for example, one aspiration of the people is to have a better sanitation system, particularly that which is mostly used by people of a higher economic and social status. For instance, there is a general perception that whatever is used by wealthy people is of high quality and for that matter people associate quality with price. Therefore, the preference for water closet (flush) toilets that are mostly used by people of higher economic status confirms the general perception relating quality to price. This goes further to reinforce the fact that the preference for any toilet facility is more economic than environmental. In other words, people associate the toilet with wealth or economic status. Whatever environmental benefit comes out of this preference is considered a positive spin-off. Consequently, the goals of ecological sanitation should be pursued within people's socio-economic and environmental conditions. This will help influence their acceptance of whatever sanitation options are considered to be economically and environmentally sustainable.

The location of KVIP latrines within the house, which was preferred by a high proportion of the respondents due to comfort and security, has serious implications for the health of the people if the facility is not properly used and managed. Many writers have reiterated the fact that KVIP latrines have often been misused, leading to inconvenience and unsanitary conditions (Thrift, 2007; Vodounhessi 2006; Saywell & Hunt 1999). For toilets with double chambers, it has been reported and confirmed by this study that many people use both holes at the same time, resulting in two full pits, both of which pose health hazards and require emptying at the same time. In addition, there is the use of too much water for cleaning the toilet, which prevents adequate decomposition, attracts flies and creates unsanitary faecal sludge (Vodounhessi 2006; Saywell and Hunt 1999).

### **Conclusions and recommendation**

A sanitation system is more than just the toilet. It has to do with management issues, disposal and potential reuse of treated urine and faeces, greywater discharges, comfort, affordability, health aspects, etc. The study found that most of the respondents preferred the water closet to other sanitation facilities available to them. However, the majority of the respondents presently use the public and household KVIP latrines because they cannot afford the cost of constructing water closet toilet facilities. Though KVIPS present cost-effective sanitation facilities, the observed misuse of these facilities raises a number of concerns, particularly those relating to faecal contamination and the danger of unsanitary faecal sludge which can cause a lot of health problems. This therefore calls for education on the proper use of the facility as well as the health and environmental hazards associated with misuse.

There is an urgent need for the construction of simple, low cost, affordable toilets that are easy to build and maintain and are relatively free of odours and flies. Observation of the existing toilet facilities in the community revealed that a successful introduction and implementation of ECOSAN can be achieved since little alteration of the existing facility is required. There is also the need for the government, through the District Assemblies and NGOs, to support individual members of the community to own the ECOSAN type of toilet facilities that are much more suitable for local conditions, and that save water while reducing pollution in the environment, thereby contributing to the achievement of the UN Millennium Development Goal (MDG) Goal 7 which is on Environmental Sustainability. To achieve this, more open discussions around alternative sanitation options need to be undertaken in the community so that people can relate their cultural knowledge and perceptions to scientific knowledge on sanitation, health, hygiene and waste recycling. Thus, with careful discussions with the community leaders and members, alternative ecological sanitation systems could have a good chance of successful implementation. This is in view of the fact that sanitation programmes critically depend, for their success, on effective public awareness and mobilization through information, education and communication.

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