



Sanitation for the urban poor

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IN DEVELOPING COUNTRIES, the unprecedented growth of urban populations has placed great stress on basic services, a fact that has been recognised by politicians, planners, sector professionals and communities alike as one of the key challenges to future sustainable urban development. Guidelines for the selection of effective, affordable and appropriate technologies that will be accepted and maintained by users is therefore one of the most valuable tools available to municipalities in their attempts to address the disparity between demand for, and supply of, these services.

Poverty and poor environmental quality are inextricably linked in the developing world. The urban poor are denied the options about where and how they live precisely because of their low incomes, typically occupying marginal areas with low commercial or residential value (but with inherent vulnerability to hazard), in districts characterised by high population and housing densities, without access to safe water, sewerage or solid waste collection services.

Incidences of sanitation-related diseases consequently tend to be higher amongst the urban poor inhabiting marginal settlements than elsewhere in urban or rural areas. In Manila, for example, diarrhoea amongst the urban poor was found to be twice that of the rest of the city (Basta, 1977). With between 30 - 60 per cent of developing country populations living in such settlements and with the continued growth of populations in marginal urban locales, it is clear that new approaches and increased emphasis must be given to sanitation provision.

Although factors such as political will and shortage of trained staff affect the improvement of urban sanitation, financial considerations are the major constraint. Typically, the cost of conventional sewerage is excessive, sometimes requiring total annual expenditure in the order of a quarter of average household earnings. Given the economic power of many developing nations, there has been surprisingly high resistance to the adoption of lower cost alternatives. Although sewerage systems offer many advantages, notably convenience for users, and little or no insect and odour nuisance, there are also considerable disadvantages, including its expense and need for a piped water supply. Clearly, given the numbers of the urban poor there is no possibility of providing sewerage to all those inhabitants who are currently without adequate sanitation. Other systems have to be employed, ones which ideally provide the same health benefits as sewerage at a fraction of its cost. They must operate effectively

without the need for piped water and be simple and reliable to operate and maintain. Such systems do exist, and normally involve the use of some form of pit within the household plot.

Project Background

Phase I

WEDC has developed considerable experience in the field of low cost sanitation during its 25 year history. In 1991 it was asked by the Overseas Development Administration to undertake a desk study of the literature relating to on-plot sanitation in low income urban areas of Africa and Asia. *On-plot sanitation* here refers to technologies which are located within the boundaries of the household plot, as distinct from *on-site sanitation* which refers to communal facilities which are self contained within the site.

More than three hundred documents were examined during the review and references relevant to urban sanitation were grouping under three headings dealing respectively with technical, health and social and management issues. Alternative technologies were critically reviewed and attention given to the relative advantages of each system. Although some factors which limited the success of projects and programmes were noted, the literature review failed to provide substantive information which related to the following important issues:

- Clear guidance about the key ingredients for sustainable on-plot sanitation.
- The effect and relevance of local legislation, for example, in relation to plot size and groundwater pollution.
- The effectiveness over time of operation and maintenance for various types of on-plot latrine (as opposed to extensive literature on 'what ought to be done').

Phase II

The findings from Phase I suggested that there were several areas which deserved more detailed investigation, and Phase II (1994-1997) has as its dual focus to identify the technical, social, financial and institutional factors which are necessary for effective on-plot sanitation in urban areas of Africa and Asia; and to produce an acceptable and appropriate methodology for the selection of household sanitation.

The project has focused on seven research sub-themes:

- Reasons for the absence of household toilets.

- Effect of plot size on sanitation technology choice.
- Insect and odour control.
- Pit emptying practices.
- Groundwater pollution.
- Double pit latrines.
- User satisfaction.

The methodology employed to achieve these objectives includes continued literature review, key informant interviews (semi-structured), postal survey and household survey questionnaires and limited fieldwork testing. Fieldwork is planned for, and being carried out, in three countries: Ghana, Mozambique and India.

Phase II is currently at a crucial point. Much data is being collected through household survey and postal survey work, and this is being supplemented with other qualitative and quantitative information. The bulk of the data has NOT been analysed to date, and so the focus of this paper is based on the experiences of the research team during their initial fieldwork visits during 1995 and early 1996.

The sample included in this paper is small in size (n=175) and hence the observations which are drawn from them must be interpreted with caution. However, they do represent points of interest which further fieldwork with larger data sets will help to confirm or refute.

Observations from Ghana

In Ghana, fieldwork has centred on three cities: Accra, Cape Coast and Tamale. In particular, it is hoped that sampling and field work testing will provide detailed information about the operation and management of VIP latrines in high density urban areas. Preliminary sampling was conducted in a total of 48 households, in which VIP and bucket latrines were the most common toilet types. Results indicated:

- The majority of households with VIP latrines (60 per cent) had 'no' problems to report with the functioning of their toilet. Where complaints were recorded they included: problems with emptying (20 per cent); odour (13 per cent); and insects (6 per cent). Fieldwork observations by the surveyors indicated that where insect and odour nuisance was present it was not significant (ie, recorded as 'none' or 'slight').
- In those districts without household toilets, plot size was mentioned once; cost was recorded as the principal reason why households did not have a toilet.
- During a series of quantitative tests on insect nuisance in toilet superstructures it was noticeable that absolute numbers were low. A relatively high incidence of small, 'midge-like' flies were noted, in contrast to larger 'household' varieties. A trend between higher insect nuisance in traditional latrine types as compared against VIP latrines was observed. Incidence of cockroach nuisance was recorded through face to face

discussions with householders, but this has not been verified through testing to date.

Observations from Mozambique

In Mozambique, a thin, circular, unreinforced dome shaped slab with a removable lid cast in the squat has been developed and promoted. Odour and insects cannot escape from the pit when the lid is placed over the hole. Latrines are generally constructed without superstructures, except for a privacy screen made from local materials. Between 1979-June 1995, 144,149 such latrines had been built and installed, benefiting an estimated 864,894 people nationally. The programme is targeted at households with minimum monthly salaries of approximately 150,000 MT (US\$ 15) (1995 figures), and the cost to a household for a 'basic' slab was US\$ 1.

Fieldwork involved a sample of 74 households taken from several districts in the cities of Maputo and Quelimane. The sample covered districts with varying groundwater levels, soil conditions, housing density, and income groupings. Results indicated that:

- 73 per cent of households reported that they had 'no' complaints with their latrines. Problems which were noted were pit collapse (11 per cent); insect nuisance (5 per cent); odour nuisance (3 per cent) and short pit filling time (3 per cent).
- Plot size did not appear to be a major constraining factor to the installation of latrines in the peri-urban districts visited. In the vast majority of cases, there was space on plot to dig new pits when (and if) current pits became full. Access to plots was more of a constraining factor than the plot size itself.
- Slabs were frequently re-used within the same plot. Slab reuse was recorded as follows: reused once (51 per cent); twice (22 per cent); 3 times (9 per cent); 4 times (3 per cent), >4 times (2 per cent); Not known (12 per cent).
- Lids appeared to effectively control odour and insect nuisance, relative to traditional latrines. Insects were present in 17 per cent of slab latrines compared to 53 per cent of traditional latrines; and 'no odour' was recorded in 56 per cent of slab latrines compared to 33 per cent of traditional latrines. Odour was not mentioned in significant numbers by householders as constituting a nuisance.
- Transport costs from production units to household plots could significantly increase the purchase cost of the slab latrine (on average by 60 per cent). Latrine superstructure costs varied significantly, but in all cases were between 2-3 times the cost of the slab;
- The project as a whole is heavily dependent on a substantial subsidy by donors (59.9 per cent) and government (29.5 per cent) with user contribution accounting for 10.5 per cent of total costs.

Observations from India

Two cities, Patna and Vijayawada were selected as suitable locations in which to examine pour-flush pit latrines. A sample of 53 households indicated the following:

- Of 52 pour flush latrines, 31 households (60 per cent) did not have any complaints to make about the operation of their toilet. Where complaints were made 3 households noted blockages (5 per cent); 2 noted emptying problems (4 per cent).
- Just under two-thirds (63 per cent) of all pour-flush latrines sampled had been built and installed before 1990. Of these three-quarters had not been emptied during their lifetime (a fact verified by the surveyors who observed pit covers being removed, clearly for the first time). Average number of users per household in the sample taken = 9.
- It was noticeable that in several cases, householders felt confident enough with the performance of their toilet using a single pit to modify the double pit system. Modifications typically involved removing the rings from one pit and using them to deepen the other.
- Sludge accumulation rates appeared to be minimal (no measurements to date), under a variety of soil and groundwater conditions, given the duration of use and number of users involved.
- Repayment rates appeared to account for approximately 3 per cent of monthly household income. In the cases observed, repayment was typically spread over a period of 40 months. No figures relating to payment default are as yet available.

Summary: key points

The preliminary sample (n=175) was designed to pre-test the content and format of the household survey questionnaire. The data which has been collected however, does provide some broad points of interest which it is anticipated the full sample will investigate in greater detail.

Some of the general points to note include:

- **Plot size:** 'lack of space' does not figure prominently in questionnaire responses as a factor restricting the choice or operation of latrine type.
- **Absence of household latrines:** the incidence of which appeared to depend crucially on the cost of the prevailing technology being used.
- **Double pit latrines:** Few complaints were recorded in questionnaire responses about the functioning of double pit latrines. In India, problems associated with blockage of the Y-junction and / or incorrect operation of double pit systems were infrequently found.
- **Emptying practices:** typically contracted out by the householder to either the municipality or to an individual within the community. Little information is available about what happens to pit contents once it has been removed from the plot, and few householders considered this to be a problem.
- **Insect and odour nuisance:** this element was not perceived *by users* to be a key problem, a point which was reinforced through surveyors observations during sampling.

References

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