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On-plot sanitation in low-income urban communities: Guidelines for selection

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Part 1

Section 1A

Background

Section 1B

Guidance points in relation to latrine type

Section 1C

Guidelines for key questions

Section 1D

Cross cutting issues

Section 1E

Conclusions

Section 1A: **Background**

Project details

This document presents the findings from Phase 2 (August 1994-March 1997) of Project R4857 *On-Plot Sanitation in Low Income Urban Communities* carried out by the authors as part of the Technology, Development and Research Programme, Engineering Division, Department For International Development of the British Government. The project concerns the performance of on-plot sanitation systems in India, Ghana and Mozambique.

Purpose

Phase 1 (a comprehensive literature review) found there was little clear evidence of an objective examination of the performance and sustainability of on-plot sanitation in urban areas of less developed countries. The purpose of Phase 2 is to investigate how satisfactory on-plot sanitation is in the urban context, and to develop guidance on its use for policy makers and professional staff of urban governments, development agencies and non-government organisations.

Background

The Phase 1 review recorded an underlying feeling amongst some authorities and sector professionals that whilst on-plot sanitation was appropriate for rural areas, it was generally unsuitable in the urban context, unless viewed as a (preferably short-term) route to ‘better’ forms of sanitation. Given the reality of the situation in which on-plot sanitation is widespread in urban areas, this project seeks to investigate some of the key issues of concern through field investigations in India (Vijayawada), Mozambique (Maputo) and Ghana (Accra, Cape Coast and Tamale).

The most important feature of our investigation is that it focuses on the *perceptions* of the users of on-plot sanitation (see the outline methodology). All too often, assessments and judgements on the effectiveness and appropri-

ateness are made from a technologically biased and purely external perspective. One can observe that many evaluations are done by those who are hardly likely to themselves be regular users of improved pit latrines. We have therefore devoted most attention on an attempt to establish what the concerns of the users of on-plot systems were in urban areas and to reflect these in the guidance offered.

About these Guidelines

The results of our investigations are presented in this document as a series of *guidelines* for selection and use of on-plot sanitation. It *does not intend to give those who use it a formula with which to make decisions* - it is primarily a means for **narrowing** decision making at the local level.

The Phase 1 report identified a number of important issues which have guided this investigation; these are reflected in our findings which are presented in the following way. In **Section B**, we briefly describe the different on-plot technologies, offer guidance on situations in which the particular technologies are appropriate, and present the users' perceptions as a series key findings for:

- Unimproved pit latrines
- Lid-covered pit latrines
- Ventilated improved pit latrines
- Double pit pour-flush latrines
- Pour-flush toilet to septic tank
- Bucket/pan latrines

In **Section C**, we pose five key questions which emerged during the Phase 1 review and postal survey in relation to the use of on-plot sanitation in urban areas. We provide specific guidelines and supporting evidence in relation to each of these key questions, which include:

- What are the reasons for the absence of household sanitation?
- Will users be satisfied with on-plot solutions to sanitation?
- How does plot size constrain the use of on-plot sanitation?
- What operational problems arise with on-plot sanitation?
- Do maintenance problems arise when pits and tanks fill up?

In **Section D**, we abstract four important cross-cutting issues which emerged during the course of the investigation and provide guidelines on each. In fact,

these issues are common to the development of any sanitation programme whether on-plot or off-plot, but we deal with them as best we can from the perspective of on-plot sanitation programmes:

- Role of socio-cultural factors in user choice
- Cost, subsidies and cost recovery
- Institutional considerations
- Promotion of sanitation

Section E presents our conclusions.

The scope and focus of this project is related to *user perceptions* of on-plot technologies. We would like to reinforce the point that factors relating to the development of successful *sanitation programmes*, particularly institutional and promotional issues, need additional detailed investigation. A new DFID project (R6875), now underway, entitled *Practical Development of Strategic Sanitation Approaches* will redress these deficiencies.

Methodology

The research employed several different methodological tools simultaneously, some of which were conducted in-country, others from the United Kingdom. Ghana, Mozambique and India were selected for fieldwork visits on the basis that these countries would afford cross-cultural and technological comparisons. Arrangements were reached with several agencies (NGO's, government departments, municipalities) to collaborate on the research and to provide the necessary in-country inputs of resources to conduct appropriate fieldwork.

Household surveys

House to house surveys formed the basis of the data output. In each country, local field workers, known by the communities in which they worked, were employed to collect data using a locally agreed questionnaire survey sheet. The selection of districts to be surveyed was left to the discretion of collaborating agencies, but general criteria included:

- Districts in which collaborating agencies had a history of community based work
- Districts with mixed physical site conditions
- Districts with mixed density housing

- Districts with varying household plot sizes
- A mixture of formally and informally developed areas
- Areas where pit emptying practices could be found and observed

A total of 1843 completed household surveys were conducted during this stage of the research.

Semi-structured interviews

Semi structured interviews involve a series of open-ended questions that are asked in a largely predetermined order. Each question is followed with additional probes until an answer is explored in some depth. A total of 15 interviews with staff from implementing agencies, multilateral agencies, government ministries and NGO's were used to build up qualitative data relating primarily to programme and some technical related issues.

Quantitative testing

Tests for numbers of flies contained within latrine superstructures were conducted on 73 household latrines and 2 public latrines. Testing involved leaving adhesive 'fly' paper in latrine superstructures for a standard test period to sample for flies. Categories of flies were noted and checked against a guide sheet. Planned tests for odour and wind flow across vent pipes proved inconclusive and were subsequently abandoned.

Postal surveys

Surveys of engineers, administrators, health workers, and government officials were conducted by post. The questionnaire focused on similar issues to the household survey but required the respondent to give an overview for his/her city. 58 completed postal survey questionnaires were used in the research, a response rate of 19%.

Literature review

An on-going literature review covered both general issues and those relating in particular to groundwater pollution.

Section 1B:

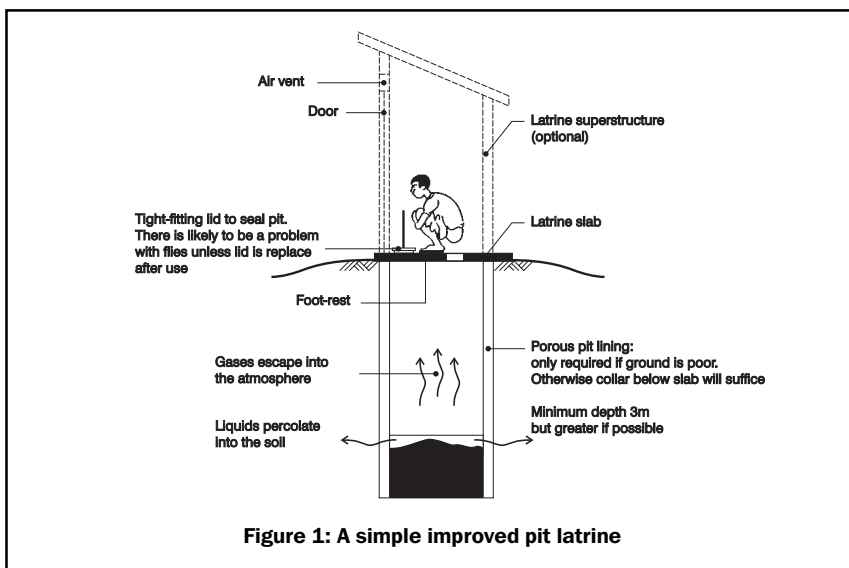
Guidance points in relation to latrine type

Latrine types

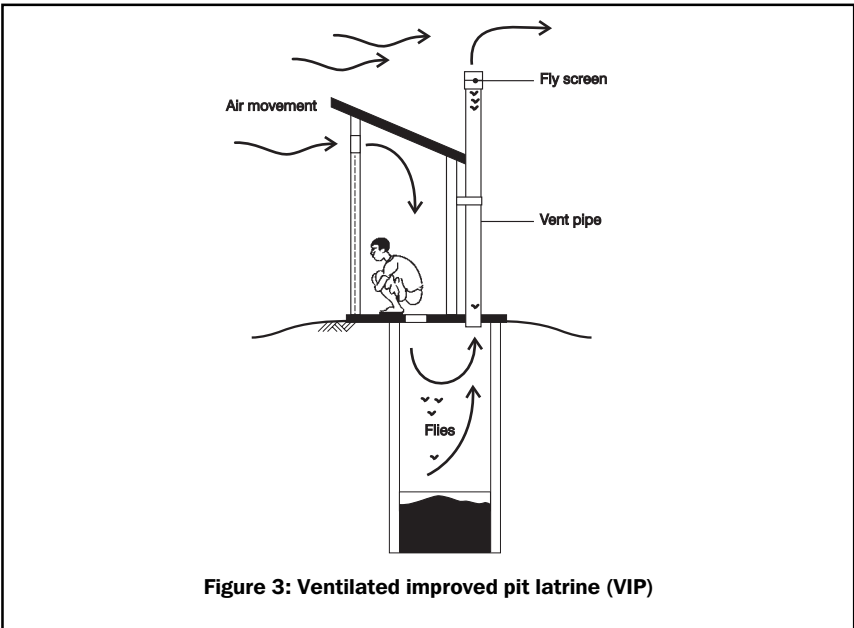
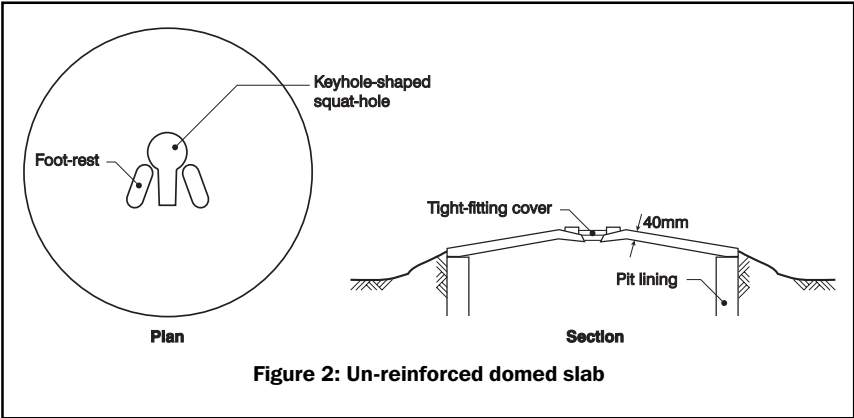
This section briefly reviews some of the most commonly encountered on-plot sanitation systems and presents specific findings in relation to each of them. The systems included are:

- Unimproved pit latrines
- Lid-covered pit latrines
- Ventilated improved pit latrines
- Double pit pour flush latrines
- Pour-flush toilet to septic tank
- Bucket/pan latrines

Detailed descriptions of these have been well documented elsewhere (See for example: Cotton & Franceys (1991), Franceys, Pickford & Reed (1992)).



The principle underlying all types of pit latrines is that excreta and anal cleansing material can be deposited in a hole in the ground. Its basic components are a superstructure to provide user privacy, a hole or seat set into a slab which covers the pit, and a pit beneath the slab into which excreta is deposited.



The addition of a lid which fits tightly into the hole in the slab should help to reduce insect and odour nuisance.

The important feature in the Ventilated Improved Pit Latrine (VIP) is the addition of a vent pipe whose purpose is to reduce the escape of odour and insects through a squat hole by creating a through-flow of air. The vent pipe needs to extend about 300mm above flat or sloping roofs or the apex of conical roofs to benefit from a draught passing across the pipe. Flyproof netting is fixed across the top of the vent.

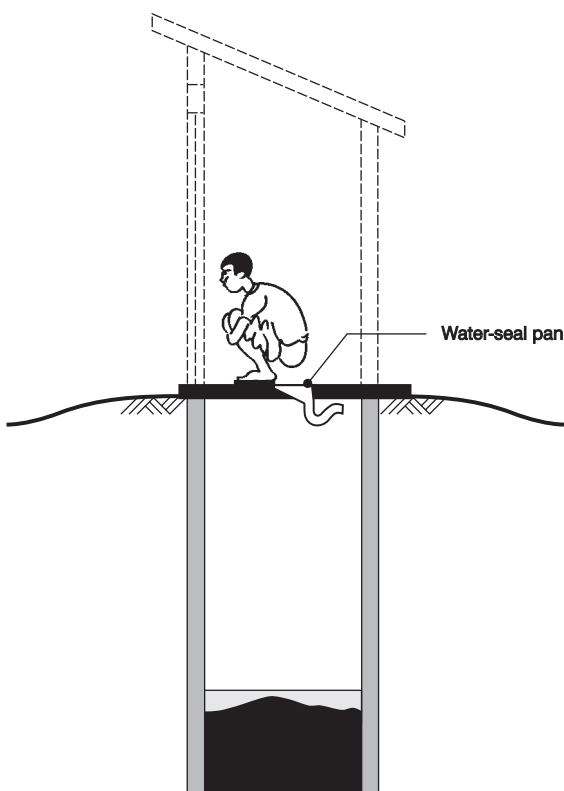
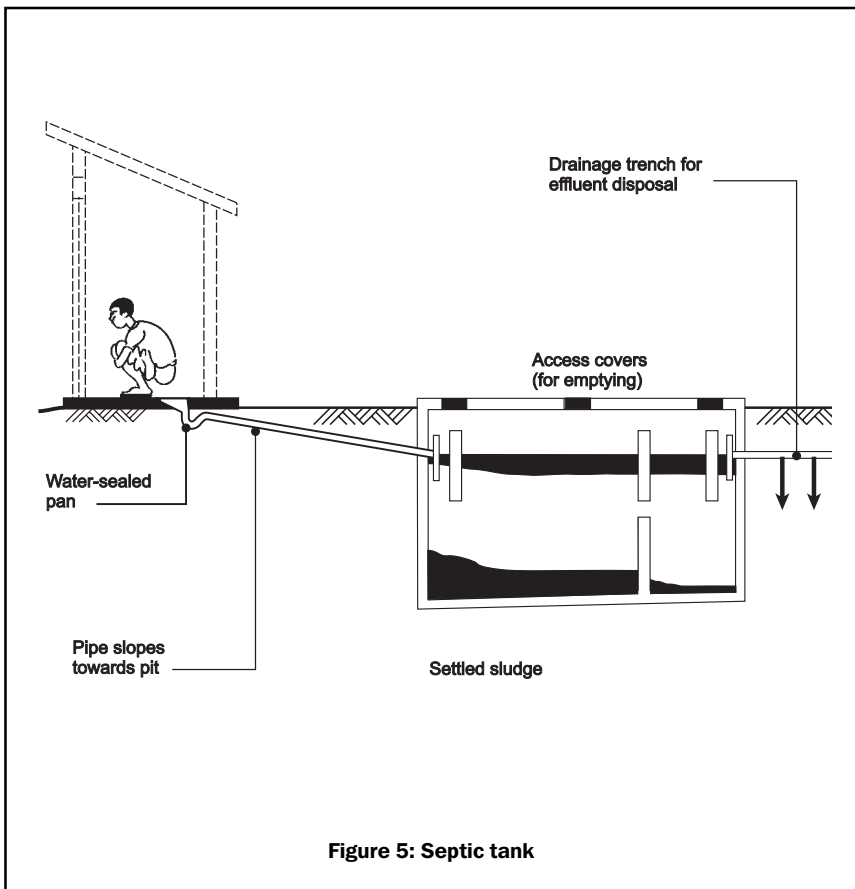


Figure 4: Pour-flush latrine with pit beneath the superstructure

Latrines with water seals are suitable where water is used for anal cleaning. The pour-flush latrine has a bowl inserted into the hole in the slab; when filled with water this creates a seal which isolates the pit from the superstructure and the user, thereby both improving the aesthetics of the latrine and reducing insect and odour nuisance. With a well designed, smooth surface pan only one or two litres of water are required for cleaning. There are several variants of the pour-flush latrine depending on the location and number of pits in relation to the latrine superstructure and pour-flush slab. The pit can either be below the slab, or offset from it and connected via a short length of pipe to a sewer. In the latter case, a further option is to provide two shallow pits which are used/emptied alternately; we refer to this as the double pit pour-flush latrine.



A septic tank is an underground watertight settling chamber into which sewage is delivered through a building sewer connecting a cistern flush toilet to the tank. The sewage receives partial treatment in the tank; effluent infiltrates from the tank into the surrounding ground through soakage pits or trenches.

Bucket or pan latrines involve a container made of (non-corrosive) material which is placed beneath a squatting slab or seat in a chamber, with rear doors which are kept shut except during removal and replacement of the bucket.

Guidance points in latrine selection

It is not possible to prescribe precise routes for selecting a particular type of on-plot latrine, because it is always difficult to allow for local contextual factors which influence the type of latrine householders obtain. For example, an important but unstated assumption of most decision algorithms (particularly those with a technological bent) is that consumers have a completely free choice over the range of options. This is not necessarily the case, for example, where programmes choose to promote or subsidise particular technologies. Another situation which defies the rather technocratic approach of deducing the best type of latrine via a series of checklists is where there exists social pressure to acquire a latrine built to a certain design and specification.

We therefore suggest the following selected *guidance points*, which are based on the findings of our survey of user perceptions of the particular technology. These points will provide the reader with detailed information about specific technology types, and should be used to gain a better indication of the problems which might arise when advocating these types and the conditions in which their use might be appropriate. Alongside these points we present selected illustrative caselets.

Cost to the householder is the overwhelmingly important factor; different types of latrine clearly have different costs, added to which subsidies may be available for certain target groups to use a particular design of latrine. There is also a trade off between capital and operation & maintenance costs in relation to the size of the pit. Deep pits, whilst more expensive to construct, have a longer life-cycle and therefore incur less cost with regard to pit emptying. This applies to all types of pit latrine with the possible exception of double pits systems which are usually constructed because there is an express reason for requiring shallow rather than deep pits.

The simple improved pit latrine is the lowest cost option (see **GP1**).

At marginally increased cost, the hole in the latrine slab can be sealed by a tight fitting lid, which in theory reduces insect and odour nuisance (see **GP2**).

Ventilation of the latrine pit also has been advocated as a means of reducing fly and insect nuisance; this adds to the cost of the latrine, being more expensive than providing a sealed lid (see **GP3**).

If water is used for anal cleansing, it is possible to use a pour-flush latrine. We were only able to investigate the double pit pour-flush latrine, and have no detailed information on either single pit direct or single pit offset latrines which did not exist in substantial numbers in the study areas. The addition of the pour flush bowl and connecting sewer add significantly to the cost (see **GP4**).

If a plot has an individual piped water connection supply, a cistern flush toilet may be used which is connected to a septic tank. This option has the highest construction, operation and maintenance costs of all of the on-plot options studied (see **GP5**).

Finally, we also looked at the cases of households served by bucket latrines. The generally unhygienic and hazardous operation of this system means that in common with other authorities we would not recommend that this system be adopted anywhere. Bucket or pan latrines are amongst the oldest forms of organised sanitation, and are still used extensively throughout the cities and towns of Africa, Asia and Latin America. Although the number of bucket latrines are declining rapidly, this type of system remains attractive because of its low capital cost. The normal format for this system involves a container made of (non-corrosive) material which is placed beneath a squatting slab or seat in a chamber, with rear doors which are kept shut except during removal and replacement of the bucket (see **GP6**).

Unimproved simple pit latrine: selected guidance points (GP1)

Based on 39 cases (2% of full sample): Mozambique 60%, Ghana 40%.

- 66% level of overall user satisfaction
- User satisfaction levels most significantly affected by smell and insects
- 80% of users felt the problems they had identified had no or slight impact on its use. Users perceived lower cost (39%) and easier operation and maintenance as ways to alleviate identified problems with their latrine
- Insect and odour nuisance were relatively high. 51% recorded a 'strong' smell from their latrine, 25% recorded 'hundreds' of flies
- Mean construction cost: Ghana (US\$ 26), Mozambique (US\$ 9)
- 24% of all latrines had been in use for more than 5 years
- The majority of pit latrines (84%) had not been emptied. When they had, most were on one occasion only. 58% of all cases recorded re-emptying periods greater than 3 years

Lid-covered latrine: selected guidance points (GP2)

Based on 357 cases (19% of full sample): Mozambique 92%, Ghana 8%.

- Few cases of problems with simple pit latrines recorded, reinforced by a 93% level of overall user satisfaction
- Most significant problems affecting user satisfaction were smell and insects (8% of respondents) and frequent repairs (6%)
- 25% of all simple pit latrines had been in use for more than five years
- Only 6% of pit latrines been emptied, most on one occasion only. Re-emptying periods were greater than three years in most cases; only 1% of the sample regarded pit emptying as an operational problem

NB: In Mozambique the convention for latrine superstructures is a privacy screen with no roof. It was observed that this aided reduction of odour and insect nuisance since there was no containment of foul smells or flies within the superstructure.

Ventilated Improved Pit (VIP) latrines: selected guidance points (GP3)

52 cases (3% of full sample) all drawn from Ghana.

- 83% level of overall user satisfaction expressed
- User satisfaction levels are most significantly affected by smell, insects and emptying problems
- 61% of users believed that the problems they had identified with their latrines had no impact on its use. Users perceived easier operation and maintenance and less regular need for emptying (9%), and lower cost (36%) as ways to alleviate identified problems
- 10% of users recorded high incidences of insect nuisance, and 60% noted slight or strong smells
- Mean construction cost 313,000 cedis (US\$156), mean emptying cost, 30,000 cedis (US\$15)
- 42% of VIP latrines required emptying every six months, with 53% being emptied by vacuum tanker
- 33% of VIP latrines had been in use for more than five years
- 46% of all latrines had not been emptied; 6% of these had been in use for more than 5 years

Pour-flush latrine: selected guidance points (GP4)

394 cases (21% of full sample) all drawn from India.

- 83% level of overall user satisfaction expressed
- User satisfaction levels are most significantly affected by smell, blockage and frequent repairs
- 69% believed that the problems were minor and of little impact; of the remainder, users perceived these problems could be alleviated by easier operation and maintenance and less regular emptying (60%), and lower cost (27%)
- 5% of users recorded moderate incidences of insect nuisance, and 36% noted slight or strong smells
- Mean construction cost Rs2866 (US\$78), mean monthly O&M cost Rs33 (US\$0.9)
- For 59% of all latrines, the period between being emptied exceeded three years. In 27% of cases, this period lasted for five years or more

...GP4 continued

- Pour flush latrines have been constructed on plots as small as 14m²
- 62% of pour flush latrines had been in use for more than five years
- 66% of all latrines had not been emptied; of these, 47% had been in use for between 6-10 years

Case study 1a: Pit emptying of pour-flush latrines

District: *Pakeer gudem*
City: *Vijayawada, India*
Family size: *10; (5 adults - 5 children)*
Income earners: *1*
Occupation: *Mason*

Notes: Resident in this slum for 20 years, the family had constructed a low cost sanitation toilet in 1987/88 (a pour flush twin pit system of 6ft depth in each pit); prior to this the family had used public latrines. The household were given instructions and a demonstration on use of the latrine at the time of construction. In conversation with the family, it was clear that they knew and understood that when 'water did not flow' it was necessary to alternate pit use. The pits had been emptied only once and municipal 'scavengers' had been contacted for this purpose. Emptying took two nights work, cost Rs 400 (US\$ 11) for both pits, and was completed by hand using buckets, hand tools and a handcart. The pit contents were disposed off-site (in a designated place to receive faecal matter). The householders reported that the contents of the first pit was hard and black on sight, indicating it had been rested for its specified 'safe' period.

Case study 1b: Pit emptying of pour-flush latrines

District: *Bhinana Vari Peta*
City: *Vijayawada, India*
Family size: *8; (5 adults -3 children)*
Income earners: *1*
Occupation: *Milk project worker*

Notes: This pour-flush twin pit system had been in use for seven years with eight users, and had been emptied twice (with a three year re-emptying period). Scavengers were employed to empty the pits, at a cost of Rs 800 (US\$22) per pit (this figure was higher than normal due to the difficult local terrain). The hilly nature of the slum meant that a cart and drum could not be positioned next to the plot for emptying, as in the normal manner. Thus, pit contents were diluted with water prior to emptying and removed by hand with buckets. The contents were dumped into lane-side drains which were then flushed with water. These drains were later 'disinfected' by the scavengers (although no details of how this was done were given). The householder did not report any significant problems with the latrine other than with emptying, which the householder felt was expensive and was inconvenient to neighbours.

...GP4 continued

Field insight 1: Experiences with pour-flush double pit latrines

Case: 1
District: Readhe Nagar
City: Vijayawada, India
Family size: 3 adults, 1 child
Income earners: 2 (Rs. 60 per day, per person)
Occupation: Agricultural labourer/coir production worker

Notes: This family was using a pour flush twin pit system which had been incorrectly constructed with a connection between pits, instead of the normal Y-junction. The toilet had been used in this fashion for eight years, and because the pit required such frequent emptying, some members of the family had decided to resort to open defecation in order to reduce maintenance costs. This was considered highly unsatisfactory by the householders because of the lack of privacy afforded.

Case: 2
District: Fraizerpet
City: Vijayawada, India
Family size: 5 adults, 7 children
Income earners: -
Occupation: -

Notes: This family had been using the same latrine for the last 5 years (a pour-flush twin pit). The pits were alternated in 1995, and prior to this it had taken three years for a single pit to fill. In conversation with the householders, it became clear that they were aware of how to alternate the pits (demonstrating how to block the Y-junction, and being able to identify the signs of a full pit), and that the twin pit system was designed to facilitate and improve the pit emptying process.

The household did not report any problems with the operation and maintenance of their latrine. They had applied for a latrine under the programme because it would provide 'comfort and convenience' (the family had resorted to open defecation prior to using this system). No significant odour problem or insect nuisance was reported. Where insects nuisance was noted, the householders believed its source was primarily from lane side drains, not the latrine itself. Plot size estimated at 112m².

Case: 3
District: Ranader Nagar
Family size: 6 adults, 2 children (2 families)
Income earners: 4 (Rs. 100 per week)
Occupation: Metal workers

Notes: Two adults from this family had stopped using the latrine because they preferred open defecation. The pour-flush twin pit system had been in use for 1.5 years without

...GP4 continued

any need for emptying. At the time of the completion of the latrine, no instructions or demonstration had been given to the householders on how to use the latrine or what to do when one pit became full. The family had applied to build a latrine under the existing sanitation programme because of (a) the lack of privacy with open defecation, and (b) the flooding of the Krishna river reduced places for open defecation during the rainy season.

Despite the lack of support, the family reported that they were highly satisfied with the operation and maintenance of their latrine. Mosquitoes were a nuisance at night but the householders felt they were derived from the drain which was present at the back of the plot, not the toilet itself. Plot size 27m².

Case:	4
District:	<i>Ranader Nagar</i>
City:	<i>Vijayawada, India</i>
Family size:	<i>4 adults, 1 child</i>
Income earners:	<i>1 (Rs. 600 pcm)</i>
Occupation:	<i>Labourer</i>

Notes: This family had used their latrine for a total of eighteen months. Some members of the family continued with open defecation outside of the rainy season. When the latrine was first constructed, the users were given a demonstration by the masons as to how to operate and maintain the toilet, including the correct operation of the Y-junction.

The family had experienced problems with blockages (thought to be attributable to the high density plastic pans) though these were infrequent. They had decided to pay a 'scavenger' to clean and maintain the latrine each week (at a cost of Rs 2 per week).

The reason for applying for, and constructing the latrine, was the 'difficulty' of going to the banks of the Krishna to defecate ('difficulty' implying problems of convenience and privacy).

WC to septic tank: selected guidance points (GP5)

159 cases (9% of full sample); 82% from Ghana, 18% from India.

- 90% level of overall user satisfaction expressed
- User satisfaction levels most commonly affected by lack of water and tank emptying
- 86% believed that the problems were minor and of little impact; of the remainder, problems could be alleviated by easier operation and maintenance and less regular emptying (55%), more regular water supply (13%) and lower cost (10%)
- No significant incidences of insect nuisance, and 33% noted slight or strong smells
- Monthly O&M cost (US\$0.3 - US\$5)
- In 34% of cases, the period between emptying the tanks exceeded three years. 23% required emptying every six months
- 58% of all households had used septic tanks for more than three years. 36% of these had used the facility for more than 11 years
- 48% of septic tanks had not been emptied during their lifetime

Bucket/pan latrines: selected guidance points (GP6)

264 cases (14% of full sample) all drawn from Ghana.

- Only 33% overall user satisfaction expressed
- User satisfaction is most affected by the frequency and cost of emptying, associated smells and insect nuisance
- Of those who expressed problems, 84% believed that they had a significant impact; of the remainder, users felt problems could be alleviated by easier operation and maintenance and not requiring regular emptying (49%), simpler toilet design (26%) and lower cost (9%)
- 13% of users recorded high incidences of (flying) 'insect' nuisance and 60% presence of cockroaches. 90% noted slight or strong smells
- Mean construction cost (US\$24), monthly O&M cost 5346 cedis (US\$3)
- 25% of bucket/pan latrines have been in use for between 21-30 years

Case study 2: Bucket/pan latrine use

District:	<i>Nima</i>
City:	<i>Accra, Ghana</i>
Family size:	<i>30; (20 adults - 10 children)</i>
Income earners:	<i>15</i>
Occupation:	<i>Petty traders / drivers</i>
Consumer items:	<i>Television; radio</i>
Plot size:	<i>1120m²</i>

Notes: The motivating factors for these compound housing families to build a household toilet was primarily social: comfort & convenience and privacy. The decision to build a bucket/pan latrine instead of other toilet types was a function of the bucket/pan's low cost. The latrine had been constructed with the house in 1960 and was paid for at the time through the landlady's own financial resources. Amongst the range of problems identified about the latrine, 'smell' and 'emptying' were most significant. Emptying was undertaken every three days by a private contractor at a price of 800 cedis (US\$ 0.4) per visit. The householders believed that the bucket's contents were disposed of hygienically off-site. Emptying was very irregular and this had led some of the household to resort to open defecation. In general, the household were 'satisfied' with their bucket latrine, but felt that the problem with flies, insects and emptying was significant enough to have a 'strong impact' and made its use 'a constant problem'. Easier operation and maintenance was seen as the key to relieving these difficulties.

Section 1C:

Guidelines for key questions

In this section we present five key questions which are central to the adoption of on-plot sanitation in urban areas and provide specific guidelines and supporting evidence in relation to each. For each key question, readers are referred to *Part 2: Supporting evidence* for a detailed explanation of these points.

Key Question 1

What are the reasons for the absence of household sanitation?

Guidelines

- Poverty and indebtedness are the primary reasons for lack of household latrines. When money is available, it may be prioritised for other essential items
- Householders decide to invest in domestic sanitation for socio-cultural rather than health reasons

Background

- Poverty, and/or the inability to save funds to invest in longer term sanitation facilities are key factors for absence of sanitation on-plot.
- Significant family indebtedness, often due to payment of medical fees through illness, constrain ability to save or invest in sanitation.
- In cases where plot size was mentioned as the key factor explaining absence, these cases were spread across a range of plot size categories, rather than being exclusively linked to the smallest size group.
- Plot sizes amongst households without sanitation are not on average smaller than those households where latrines are present.
- The relationship between cost, technology choice and income level is a complex one, which defies simple categorisation. There is some evidence to suggest grouping of unskilled employment with those households without sanitation, although this does not remain true for lower cost

latrine types. Similarly, skilled sources of employment are not the sole source of employment with higher cost latrine types. Choices about sanitary technology are based on a variety of factors, of which cost is just one (important) consideration.

Case study 3: Absence of household latrine: 1

District: *Ranigarathotha*
City: *Vijayawada, India*
Family size: *8; (4 adults - 4 children)*
Income earners: *1*
Occupation: *Ice cream vendor (Rs. 70 per day) during summer;
vegetable vendor during winter*

Notes: Before moving to Ranigarathotha, this family had lived elsewhere in Vijayawada and had used a pour-flush twin pit latrine. Financial problems led them to sell their old plot in order to move to this district. On the current plot, they had used a pour-flush twin pit latrine between 1990-95, but due to the need to pay their daughter's medical fees when she fell ill, the family was forced to subdivide the plot and sell half to their neighbours. The sold portion contained the household latrine. All family members have subsequently resorted to open defecation, on grounds 200 metres from the house. This proved very inconvenient for the female head of household because of the lack of privacy from open defecation. The family wanted to build a new toilet under the slum improvement scheme next to their current bathroom; they felt that there was sufficient space on their plot to do so, and were confident that by saving they would be able to afford the repayment costs involved in construction. Plot size approximately 54m².

District: *Bhinana Vari Peta*
Family size: *2 adults; 4 children*
Income earners: *2 (Husband - Rs. 20-25 per day; son - not stated)*
Occupation: *Rickshaw puller (husband); agricultural labourer (son)*

Notes: The family moved to this district so that they could be closer to the fields they worked and in order to buy their own land. The family had resorted to open defecation both at their previous and current plots. Since moving to

the hill slum nine years ago, defecation has involved walking approximately 1km to relieve themselves on open ground, a trip which involved ascending and descending steep stairways on each occasion. During conversation with the family, the main factor accounting for the absence of a household latrine was ‘lack of money’ (the family were indebted to the sum of Rs. 5000-6000 from medical fees incurred during a child’s illness). Additionally, they lacked legal title to the land which had previously been a constraint, but this had recently been granted by the Municipality. Major expenditure items included subsistence spending on food and goods to sustain their livelihood(s), and their current loan liabilities.

Case study 4: Absence of household latrine: 2

District: *Readhe Nagar*
City: *Vijayawada, India*
Family size: *1*
Income earners: *1 (Rs. 20- per day; 600-700 pcm)*
Occupation: *Coir production worker*

Notes: The household consisted of a single woman who had moved to Vijayawada from elsewhere in Tamil Nadu twenty years previously. During the first 12 years at this site, there had been no household sanitation provision available. When a facility was built, it soon collapsed and since that time, the woman had resorted to open defecation. The householder had not used the toilet when it had been built on the plot because of operational problems (‘the water did not flow’). She was not aware that there was a current low cost sanitation scheme at work in the slum, and expressed a desire to build a latrine if the government was prepared to help finance it. She reported that it was inconvenient to continue to defecate in the open because of the increased number of plots in the slum and the reduced number of (nearby) locations for open defecation (privacy problem). The majority of her income was spent on repaying the loan which was taken on buying the house; on the upkeep of livelihood as a coir production worker and on the flooring for the house (flagstones). The householder was currently unable to afford a share in the cost of a low cost toilet.

Key Question 2

Will users be satisfied with on-plot solutions to sanitation?

Guidelines

- Users express a high degree of satisfaction with on-plot sanitation
- In this survey, 83% to 90% were 'satisfied' or 'very satisfied'

Background

- For all latrine types other than bucket/pan latrine, users expressed high degrees of satisfaction with their latrine (in excess of 80% recording 'satisfied' or 'very satisfied'). Interestingly, simple improved pit latrines (assumed to be the most problematic of on-plot systems) recorded slightly higher levels of user satisfaction than VIPs or pour-flush latrines.
- Many users do not perceive there to be any problems with their latrines (accounting for 54% of the total sample). Where problems are recorded, the most common relate to the emptying of pits/tanks. However, in absolute terms, this figure is low (12% of total sample).
- Other problems, such as smell, insects and operational problems relating to the emptying of pits and tanks have the most impact on satisfaction levels and the ability for the householder to use the latrine. However, these figures still only account for 6% of the total sample.

Key Question 3

How does plot size constrain the use of on-plot sanitation?

Guideline

- Small plot size is not a constraint to the use of on-plot sanitation

Background

- Operational sanitation facilities were found to be commonplace on the smallest of plot sizes: 14m².

- Levels of user satisfaction were not significantly affected by the incidence of small plot size.
- There is little indication that plot size determines technology choice. No definitive grouping or concentration of technology types was observed by recorded size categories.
- There is little indication that plot size is associated with particular operational problems. Where the most common latrine problems were noted, they were spread across all size categories.
- The absence of household sanitation is not exclusive to the smallest plot sizes.

Key Question 4

What operational problems arise with on-plot sanitation?

Problem 1: Odour and insect nuisance

Guideline

- This problem is not extensive; very few users perceive odour and insect nuisance to be a common problem with their latrine

Background

- Only 11% of the total sample mention either odour (7%) or insects (4%) as a nuisance problem (although nuisance of this kind does have a significant impact on satisfaction levels).
- VIP latrines record higher than anticipated levels of odour and insect nuisance. There is little conclusive evidence to suggest a link between odour and insect nuisance and: height of vent pipe above roof line, presence of fly screens, vent pipe colour and diameter of pipe.
- Quantitative test results for insect nuisance indicate low absolute numbers of insects observed across a range of latrine types.
- Anecdotal evidence raises doubts about domestic latrines as the primary source of insect nuisance on the household plot.
- Bucket/pan latrines register the highest nuisance levels of all latrine types.

Case study 5: Source of insect nuisance on-plot

District: *Mearuthi Nagar Canal Huttings*
City: *Vijayawada, India*
Family size: *2 adults, 3 children*
Income earners: *1 (Rs. 4000 pcm)*
Occupation: *Clerk, Medical college*

Notes: This household had been using a pour-flush latrine with a sewer connection since 1994. The latrine was built entirely from family resources, and the household expressed a high degree of satisfaction with their facility. The household head reported that the family felt that the main source of insect nuisance was that arising from the drains which ran adjacent to the household plot, not from latrine superstructure itself.

Problem 2: Incorrect operation of double pit latrines

Guideline

- Mechanisms needs to be in place for ensuring that correct operation is explained at both the planning and post-construction stages

Background

- Insufficient user support and education activities were made available to users.
- Construction related problems were infrequently noted by users. Of greater concern were correct operation and maintenance of twin and double pit latrines.

Problem 3: Groundwater pollution

Guidelines

- Pollution of groundwater constitutes a potential environmental hazard but not necessarily a health risk
- A minimum distance of 15 metres, other than in fractured formations, between a pit and a downstream water point is sufficient to remove contaminants

Background

- Determining the movement of viruses and bacteria in soils is extremely difficult, and involves a complex interaction of soil profile and hydraulic conductivity parameters, temperature, soil pH, and moisture retention capacity. The clay content of the unsaturated zone is amongst the single most important indicator of the likely mobility of contaminants and its subsequent impact on groundwater pollution.
- Larger sized contaminants (helminths and protozoa) are normally effectively removed by physical filtration; bacteria are normally filtered by clayey soils. Of most concern are waterborne viruses which are too small for even fine grained clays to filter.
- Viruses *normally* die-off within three metres of the pollution source, irrespective of soil type. Bacterial contamination is *normally* removed given sufficient depth of unsaturated soil (at least 2 metres) between the pollution source and water point.
- Health risks associated with environmental pollution of groundwater must be set against the much greater hazard of widespread open defecation and contamination of the neighbourhood environment with excreta.
- If a health risk is demonstrable, investigate alternative water supplies through extending reticulation systems as this is likely to be cheaper than centralised sewerage with treatment.

Key Question 5

Do maintenance problems arise when pits and tanks fill up?

Guidelines

- Advise householders that the filling/emptying cycle is likely to be between 3 to 6 years and that they need to make their own arrangements for desludging
- Emptying cost is strongly location specific; investigate likely emptying costs with local contractors during programme planning

Background

- Manual methods of emptying tend to dominate, and are especially commonplace for simple pit and pour-flush latrines. As expected, mechanical emptying tends to be associated with VIP and septic tank latrines.

- The responsibility for emptying latrines is normally either that of the users, or contractors. Contractors are of particular importance in the emptying of bucket/pan and pour flush latrines.
- For those latrines which had been emptied, most had been used for 6, 7, or 8 years. Typically, these latrines had been emptied either once or twice.
- Rates for re-filling of previously emptied latrines indicate that the majority fill over 3-6 years.
- Where users expressed a problem with emptying, the three most important issues were frequency, cost and hygiene.
- In the majority of cases, the final disposal site for collected excreta was either unknown or indiscriminate dumping.

Field Insight 2: Emptying pour-flush latrines by scavengers

District: *Scavengers' Colony*
City: *Vijayawada, India*
Occupation: *Pit emptiers*

Notes: 'Scavengers' (the local terms applied to individuals emptying pits) are generally self employed, although some do work as Municipal road sweepers. While some empty pits on a full time basis, others work as scavengers only part time. In order to qualify as a scavenger, an individual must apply for and be granted a collectors certificate by the Municipality and work in the same community for a minimum of six months. Indian scheduled caste status tends to constrain scavengers' ability to work in other forms of employment.

Scavengers hear about full pits which need emptying either by householders coming directly to the scavengers' communities or through their work as road sweepers. The average workload for a scavenger is one house every 10-15 days. It normally takes 3-4 hours to empty both pits, using buckets, water drums and transport using a rickshaw. On arriving at the household, the procedure is to open the slab cover, empty with buckets into drums and dispose of the contents away from the site. In hill terrain slums, scavengers were placing the pit contents in lane drains and flushing the contents to the ground level with water. Generally, pit contents are disposed of in major outfall pipes or on surrounding fields.

When asked about the condition of the excreta removed from pits, the scavengers did not have a common experience with regard to the texture and colour of pit contents. Some found that the faeces in both pits were fresh and soft (indicating incorrect operation), whilst others found the contents to be hard and innocuous (indicating adequate resting period). Costs for emptying were set at Rs 50 for each pit ring of each pit emptied (6 rings to a pit) though it was claimed that in hill slums charges for pit emptying could rise to as much as Rs 2000.

The overheads involved in emptying included rent for rickshaw and drums, but this tended to vary from case to case depending on the distance travelled to the plot. For a fee of Rs 300, overheads may account for between Rs 50-100. The remainder was split between the scavengers (normally three persons for each pit emptying).

Section 1D:

Cross-cutting issues

In this section, four important cross-cutting issues which emerged during the course of the investigation have been abstracted and guidelines on each are provided. In fact, these issues are common to the development of any sanitation programme whether on-plot or off-plot, but we deal with them as best we can from the perspective of on-plot sanitation programmes:

- Role of socio-cultural factors in user choice
- Costs, subsidies and cost recovery
- Institutional issues
- Promotion of sanitation

Socio-cultural issues

Guidelines

- In planning sanitation interventions, programme staff need to be sensitive to the social and cultural context in which decisions about sanitation facilities are made, if there is to be widespread adoption of the programme
- There is a potentially wide differential in understanding of key concepts about hygiene, health and sanitation between users and programme implementers. Interventions should seek to look at their activities from the user's perspectives, knowledge and understanding
- Communities are rarely uniform. Different groups have specific needs with regard to sanitation
- Different groups exercise different levels of authority over the community and act as a constraint or aid to promotion and change
- Individual users decide whether to accept or reject new sanitation facilities. Sanitation interventions depend on the consent of the individual - they need to be convinced of the need for the improvement and that any benefits will outweigh any costs

Background

Sanitation programmes involve much more than simply designing a particular engineering solution to fit a particular problem. As important as an

appropriate technological option is an understanding of the social context and the complex relationship of beliefs, traditions and social structures which are common to a given community. By ensuring that any engineering intervention is acceptable to its intended user group(s), the chances of implementing a programme that is sustainable over the longer term are significantly increased. It is therefore necessary to understand at the design and planning stage of a sanitation intervention what the critical factors are which determine how a community operates.

Cultural beliefs

Attitudes and behaviours which are derived from a combination of tradition, religion, and moral standards can have a powerful influence on the use and acceptability of on-plot sanitation systems. Understanding what these influences are will help to inform the process of selecting technology and improve the acceptability of sanitation improvements. For example, culture may determine the technical parameters which are set for a given technology: the type of anal cleansing material used (typically determined by custom or tradition rather than notions of hygiene and health) will have implications for the technical design of a sanitation system.

Culturally derived ideas of what constitutes improper or taboo practices affects the use of sanitary facilities by particular social groups. In peri-urban Mozambique, it was reported that mother and sons-in-law should not use the same latrine (based around maintaining respect) and women were frequently forbidden from using a latrine during menstruation because the men of the household feared 'catching diseases'. Likewise, the need for privacy during defecation (particularly for women) is a critical factor affecting both the use of a latrine and the design of the superstructure.

Communities typically have well developed ideas about what constitutes hygiene, disease and sanitation. Concepts of dirty and clean will vary markedly between traditional and Western notions, and between programme promoters and users. Careful appreciation of these concepts are key elements in designing promotion campaigns in which users are encouraged to accept an intervention because of new standards of cleanliness. Judgements between those beliefs which are beneficial to improved sanitation, and those which are not needs to be made. An example of the effect of such concepts is that in many societies it is commonly and wrongly held that children's excreta is less harmful than that of adults. A study of nearly 8,000 individuals in India (GOI, 1990) showed that the general understanding was that

unweaned infants' excreta was 'absolutely harmless' because it came from mother's milk.

Case study 6: Influence of belief systems on siting of household latrines

A slum area in Vijayawada, Andhra Pradesh, India had been upgraded but the community were not using the new toilets provided on their plot. This was not immediately apparent, but when a local woman resident was asked by a speaker of the local language if there had been any problems with the recent development, she explained that most of the households had not been using the toilets provided. She explained that the toilets were located in the north-east corner of the plot, and according to the Hindi belief system Vastu, this is an inauspicious place to locate a toilet. The north-east corner is preferential for items such as a water source, the prayer room and the main door. Toilets should be located at the south of the plot. As a result, many residents did not use the toilets provided, and had resorted to open defecation in fields adjacent to the slum.

Social structure

Communities are rarely homogenous, but are formed from a diverse number of ethnic, political, age and gender groups. Each of these groups will have specific roles and patterns of behaviour within a community which will affect their needs vis-à-vis sanitation. Consider for example the different needs that women and men have with regard to sanitation: with the former a high premium is placed on the need for privacy during defecation, and the inaccessibility of public latrines after dark are key concerns which are gender specific.

Key change agents

Communities often develop informal and indigenous organisational forms which have evolved over time to assist in the functioning and operation of a society (for example, chiefs, elders). These different groups exercise different levels of authority and power within a community and have the potential to influence community decision-making and the process of change in both a positive and negative manner. Identification of *who* the key change agents

are is a critical element for effective sanitation promotion and implementation. In the Kumasi Sanitation Project (KSP), Ghana, the role of area chiefs in the sanitation programme was of key importance. These chiefs acted as the main link between the metropolitan assembly and the community, and their overall task was to keep the community informed, develop a dialogue with the people and encourage participation in sanitation related activities.

“I have asked the communities to make an effort to construct latrines in their homes. I have also talked to them about the dangers of cholera, dysentery and other diseases that they will suffer if the sanitary conditions in the community is not improved. The people accepted the challenge; it was rather progressive. Initially, five people volunteered to have improved latrines constructed in their homes, then it increased to ten and so on. I have myself constructed a latrine in my house to serve as an example”

– Chief of Moshe Zongo, Kumasi, Ghana (UNDP-World Bank Water and Sanitation Programme: RWSG-WA, 1994)

Furthermore, understanding *why* certain groups are open or resistant to change helps to determine how promotional activities should be conducted and what strategy for implementation should be adopted. Change agents may be resistant to an intervention for various reasons, including factors such as resentment towards outsiders and experts and the fear of loss of authority over the community through community development programmes. An NGO working in Accra, Ghana on the implementation of a ventilated improved latrine programme in low income urban districts noted a series of problems with community ‘assemblymen’ (the representatives of the municipal assembly at the local level). Assemblymen had responsibility for promoting and developing sanitation programmes at the local level (in consultation with the community) and in this case were a focus of the repayment process. Semi-structured interviews showed that in some cases:

- Assemblymen would agree to policy decisions during sanitary committee meetings when implementing agencies were present, but the moment the NGO withdrew from the district, the assemblyman would change procedure and practices to suit their own agenda
- Money was collected from the community for repayment purposes (via the assemblymen) but not paid back into the revolving fund scheme

Costs, subsidies and cost recovery

Guidelines

- The views of sector professionals about the affordability to the user of a particular latrine type may be at variance to the householder's idea of what is and is not affordable
- Systems providing credit for financing sanitation generally involve a high management burden for programme staff
- Forms of social contracting such as peer pressure, peer guarantees and tribal court systems are effective methods of cost recovery compliance
- Schemes which accommodate periods of household financial stress have greater potential for sustainability
- Cost recovery schemes which redirect revenue back to the community for other development interventions could improve repayment schedules
- In rented accommodation, or other areas where there is insecurity of tenure, improvements to sanitation facilities may simply lead to higher rents, forcing the poorest to move out

Background

Although different sanitation interventions may exhibit a range of social, cultural, institutional, technical and health related features which make them more or less desirable for implementation, the choice of one option over another is frequently based on the cost of the technology and its affordability to potential beneficiaries. It should not be assumed that because a sanitation technology is marketed as being 'low(er)-cost', that low income urban households perceive it to be so, or can actually afford it. If they cannot pay, then the options are typically to either provide a subsidy, or to arrange for a loan.

The recent shift in development thinking away from supply-led financing strategies to those that are demand-based implies that if the financial element of a sanitation programme is to be sustainable, considerable information about the financial context in which communities operate will be required. This includes information relating to the availability of credit facilities, the willingness of the communities to pay for sanitation, government attitudes towards cost recovery, the role of the private sector and so on. Some of these aspects are considered below.

Costs

A feature of on-plot sanitation systems is that the majority of the costs are for local material or labour. Equipment and supplies imported from abroad may have a range of prices, from low 'official' rates to ten or twenty times as much on the open market. Similarly, official conversion rates between local and 'hard' currency may be unrealistic. The effect is that attempts to give an international cost to different types of sanitation are of very limited value. Subsequent costs in this section are only for in-country comparison and analysis.

The single most useful figure for comparing sanitation costs is the total annual cost per household (TACH). This includes capital (or investment) costs and recurrent costs adjusted to reflect real opportunity costs and averaged over time. Examples of calculating and using TACH and other methods of cost comparison for sanitation can be found in Franceys, Pickford and Reed (1992), and in the Annex.

Beyond methods of comparing costs, user perceptions of the relative affordability of a sanitation option are critical for programme sustainability. If costs are perceived to be too high by users, then householders will be unwilling to invest in sanitation. It is important to note that there can be large differentials between what professionals and beneficiaries accept as a 'low(er)' cost technology.

In Mozambique, the national low cost sanitation programme has introduced unreinforced domed concrete slabs, which are targeted at the poorest sections of peri-urban communities, who typically earn less than 217,000 Meticals (MT), (US\$22) per month. The total cost of producing a simple slab in 1995 was 105,200 MT (US\$10.99), and with subsidies from government and donor agencies, user contributions were reduced to 11,100 MT (US\$1.16). Additional costs were borne by the users through transportation of slabs from production units, and from the construction of the latrine superstructure.

Household surveys asked users to describe the total cost of their latrine as 'low', 'medium', or 'high'. The table below indicates results for those latrines built most recently in 1995 or 1996.

The key point is that despite the subsidy provided, this relatively simple technology type was still perceived by large sections of users to be of 'medium' cost. This reinforces the difficulties of providing comparable

Table 1: User perceptions of simple pit latrine costs for facilities built in 1995 and 1996, Mozambique

	<i>User perception of total cost of latrine (% of cases)</i>		
Year	Low	Medium	High
1996	18	22	9
1995	16	28	8

sanitation costings - in many other parts of the globe, the total cost figure used here might be considered very low, but it is the local context and the particular demands that householders have on their income which complicates such comparisons.

Case study 7: Impact of ‘high cost’ KVIP’s in Ghana

The high cost to the user of KVIP’s in Ghana (where they were first introduced) has seriously impeded the implementation of urban sanitation programmes (Brown,1985). Although both the government and the Ghana Water and Sewerage Corporation have adopted the KVIP as the ‘approved’ type of on-plot sanitation there has been a comparatively low rate of construction because of high costs. In Kumasi, conversion costs from a bucket latrine to KVIP were 60 per cent of the cost of a new KVIP.

Affordability and types of financial assistance

There is a degree of consensus in existing literature that suggests a range of 1.5-3 per cent of total household income represents an ‘affordable’ level of financing for household sanitation facilities. Amongst the poorest sections of the community, this figure may fall to 1-1.5 per cent of total income.

Where the cost of a technology type exceeds this general range, then financial assistance of one form or another for construction of the facility will probably be necessary. All costs involved in operation and maintenance and future upgrading of the facility should be the responsibility of the user so as to ensure sustainability.

There are a variety of approaches to financial assistance which may be considered.

Subsidies and grants

If a sanitation intervention is to target the poorest urban communities, then some form of subsidy and/or grant has to be provided (Roy, 1984). The use of subsidies can lead to numerous problems, many of which have been well documented. Typically, these might include:

- Money is not directed at sanitation provision
- Subsidies may lead to the adoption of a technology type which is financially unaffordable which will ultimately bring problems with the future operation and maintenance of the facility
- Subsidies can bring with it unfortunate or undesirable perceptions or associations which can taint a technology type
- Means testing for subsidies may lead to richer members of a community misrepresenting their status in order to benefit from what is available
- Subsidies reduce the profit potential for private sector contractors to become involved in latrine construction
- Different subsidy levels are provided by different agencies and donor organisations

If subsidies are to be introduced then certain key elements need to be designed into the scheme (EHP, 1997).

- Conduct willingness to pay surveys prior to designing the programme. Different sections of the community will be prepared to pay differential rates for adequate sanitation
- Consider the full real cost of assisting the whole target population. Can this be met within the existing programme budget?
- Allow potential for upgrading to take place by providing subsidy for only the most basic facility
- Fund only the interventions which are likely to have the greatest health impact

Even with the poorest households, a nominal loan component is seen as an invaluable way in which to maintain household commitment to the programme and to ensure longer term operation and maintenance of the facility.

Loans

Loan schemes, whereby money is made available from the government or a donor agency at normal or subsidised interest rates and repaid over time, is an important financing measure and offers opportunities for involving the poorest sections of a community in a way that community self-financing may not. However, ensuring regular repayment of the loan is difficult, and numerous examples of failed credit schemes have been documented in the sector. EHP (1997) have identified some commonalities about the situations in which these schemes have failed:

- Financial environments in which inflation has been, or is, high
- Where it is not common to borrow money for capital goods
- Where unplanned demands on household finances mean that regular repayment is unlikely

Revolving funds are a specific type of loan scheme in which a limited fund of money is available for a particular programme, and it is incumbent on the beneficiary household(s) to repay their loan in order that other community members can access this fund. Peer pressure, peer guarantees or examples of social, rather than legal contracts for repayment, are increasingly important and effective methods of cost recovery. A good example of this form of social contracting is Operation Hunger's sanitation initiative in Kwa-Jobe, KwaZulu/Natal, South Africa. In this scheme, residents agreed to pay 44 per cent of the capital costs of household VIP latrines (roughly US\$78) over a six month repayment period. The mechanism agreed on to ensure cost recovery was an existing tribal court system to 'discipline' those who failed to maintain repayment. Additionally, a staggered delivery system was used whereby funds and materials were only released for new applications once the sanitation committee could demonstrate reconciled accounts and that previous recipients had fully complied with the repayment schedule.

Lessons learnt for effective cost recovery include:

- Use of social rather than legal sanctions
- There is a need for transparency in loan repayment arrangements. Householders must be able to have access to and understand the status of a revolving fund. In Kumasi, Ghana, householders had no access to the repayment schedules used in the household sanitation component, and were suspicious of over-billing

- Repayments schedules need to recognise and accommodate periods of financial stress for householders
- Loans for latrines should have shorter repayment periods than for housing, since the perceived benefits of latrines are limited and may not sustain payments over a longer period
- Some form of commitment from the beneficiary (either in the form of a deposit or labour during construction) is desirable. If a programme does not capture participation from the community in this form, then low returns on loan schemes are probable
- Interviewing potential beneficiaries before granting loans may help to reduce defaulting. In Ouagadougou, Burkina Faso, beneficiaries under the Strategic Sanitation Plan were filtered according to their ability to make substantial savings

Case study 8: Experiences of cost recovery and one NGO's response

An Accra based NGO working in low income high density urban communities comment on their experiences of cost recovery with a domestic KVIP programme.

“Well, I think that considering the amount of income people earn and the amount you are expecting them to pay at the end of the month, you realise that somebody who is supposed to pay about 157,000 cedis (US\$165) to cover the cost of a VIP latrine will be paying a monthly [repayment] fee of 6,000 cedis (US\$6). Maybe his total income is about 40,000 cedis (per month) (US\$42) - but from this they have to pay rent, have to pay for the family, for electricity, for water, so even 6,000 cedis was too much. A few times we would have to come in and get the money from the people, and...I have personally said on a few occasions to people who cannot pay the 6,000 cedis - ‘What can you afford at the end of the month?’, which means that the 24 months repayment becomes 36 months or something. So I personally tell them to pay less...far, far less - about 20 per cent less. I think we should have flexible repayment rates. Considering the areas in which we are working...if you are telling them to repay the money and the rate of repayment at the end of the month is far above what they can pay, that will be a nonsense. So the payments should be less, or there is a need for some flexibility”.

Community self-financing

With this approach, no external funding is made available for sanitation improvements, instead the programme responds to expressed user demand and their willingness to pay. In areas with large proportions of rented accommodation, or in areas which do not have security of tenure, the potential for self-financing may be severely limited, since few tenants are willing to invest in improvements which ultimately benefit their landlord. Additionally, better facilities within rented accommodation may simply give way to higher rents, forcing the poorest to move away.

Institutional issues

Guidelines

- Maintain clear lines of responsibility between participating agencies in sanitation projects
- Effective co-ordination of different agencies may produce better conceived and more acceptable sanitation options for communities

It should be noted that factors relating to the development of successful sanitation programmes, particularly institutional and promotional issues, need additional detailed investigation. A new DFID project (R6875), now underway, entitled Practical Development of Strategic Sanitation Approaches will redress these deficiencies.

Background

Any sanitation intervention takes place against a background of complex relationships between different stakeholders, including the household, community, and government. The nature of these relationships inevitably affects the way in which a programme is planned, implemented and managed. Institutions or organisations which play a key part in this relationship include those bodies outside the local community which are responsible for initiating, promoting, supervising and supporting a sanitation intervention.

Institutional responsibility

Many institutions have a stake in sanitation in the urban context, from central government ministries, through local authorities, and non-governmental

organisations. The provision of services to urban communities involves many providers working on connected tasks. In such an operating environment, problems such as poor co-ordination of programme activities, duplication of efforts, and institutional conflicts can arise, all of which weaken the attainment of the projects goals. A key factor in achieving and sustaining programme success is the creation of a clear institutional structure with a lead agency to take overall control of the intervention, to establish clear areas of responsibility, goals and objectives, and a time frame and schedule to achieve these goals. Designated officers and advisory committees working within the lead agency can make the task of executing the programme or project easier.

Case study 9: Institutional responsibilities under the SSP, Kumasi, Ghana

In Kumasi, Ghana, the Strategic Sanitation Plan (SSP) brought about significant changes to the existing institutional arrangements in order to introduce greater transparency and clarity to infrastructure provision in the city. Prior to the SSP, the management of sanitation services and the institutional roles of the Kumasi Metropolitan Authority were fragmentary and unclear. The Medical Officer of Health, Mechanical Engineer's Department and the Metropolitan Engineer's Department were jointly responsible for planning, development, operation and maintenance of household sanitation, public latrines and solid waste collection and disposal. The division of responsibilities between the three were fraught with duplications and inefficiencies. Following implementation of the Plan, the KMA were stripped of responsibility for direct delivery of waste management services, and instead wide partnerships between the communities and private sector were encouraged. An independent waste management department (WMD) was created to oversee this transition and to plan and supervise waste collection and disposal undertaken by different participating agencies. The department was headed by a Director of Waste Management who was directly accountable to the metropolitan chief executive via the director of administration. Furthermore, clear division of responsibilities was brought about through the creation of four sections within the WMD: contract management, administration, pollution control and planning.

Institutional co-ordination and cooperation

Identifying a lead agency does not mean that an intersectoral approach cannot be pursued. Other organisations have specialist skills and knowledge which would prove invaluable in deciding which technology to apply and how to implement such a programme. Discussions with key informants during this research indicated that cross sectoral co-ordination and cooperation was frequently lacking or poorly developed in programmes. To achieve a greater degree of dialogue between key sector agencies, a series of components to reinforce partnership arrangements were identified:

- Specialised teams or working groups to deliberate on specific issues of relevance (i.e., sanitary codes and regulations)
- Steering committees comprising representatives from the range of cross sectoral institutions working on a particular intervention (see case study 10 below)
- Regular meetings and reports circulated to all partners
- A formalised contractual arrangement outlining the responsibilities of all partners

However, establishing *effective* dialogue and cooperation between sector agencies remain the critical issue. The points listed above will only work if all participating agencies are committed to working together.

Case study 10: Urban Sanitation Improvement Team, Ghana

In Accra, Ghana, the Waste Management Department for the city wanted to introduce a programme of construction of domestic KVIP latrines in low-income districts. At the executive level, an Urban Sanitation Improvement Team was established with the intention of bringing together representatives from the planning department, the Ministry of Health, the Ministry of Public Works as well as the Waste Management Department to co-ordinate activities and inputs from the respective agencies.

The key lessons which had been learnt from the creation of such specialised teams was that they need to be given a clear remit, their role in existing organisational structures needs to be clarified and their staff should be given designated duties, rather than incorporating team activities within existing workloads.

Such specialised teams frequently offer opportunities to overcome the bureaucratic procedures and delays which can beset the institutional aspects of sanitation interventions.

Lead agencies must decide how most effectively to use the experience of multilateral and NGO support for sanitation programmes, and to try and incorporate their efforts appropriately into the overall scheme. Tendencies for NGO's to promote one-off projects which fulfil their own objectives can be damaging to the overall programme goals. In Mozambique, the National Low Cost Sanitation Programme had found that the reputation of their programme had to some extent suffered through poorly developed and ill-advised NGO sanitation interventions which failed soon after implementation. The Programme has begun the process of lobbying central government to issue guidelines to NGO's which will allow wider monitoring of their work programmes.

Institutional - householder roles: catalysts

When a project is implemented, it is valuable for the implementing agency to have contacts with the community, as a means for stimulating participation, assessing need and co-ordinating implementation. For example, in Mozambique, local community members, or animators, are used by the national programme to promote the programme in the local area, help assess the individual needs of those without sanitation, to monitor and evaluate the performance of the system and to reinforce hygiene behaviour practices.

Particular elements of the community may be more effective in communicating messages than others. For instance, women have a special role in running the home, collecting water and managing the sanitation system, thus, female animators, or talking to female heads of households about sanitation are important elements.

Field insight 3: Institutional framework to National Low Cost Sanitation Programme (PNSBC), Mozambique

Operational organisation

This is structured around a single central management unit located in the capital, Maputo, and a series of improved latrine projects (PLM's) at the provincial level.

Responsibilities

The Programme is managed nationally by a central management unit (CMU) which has responsibility for overall policy, planning, co-ordination, training, resource mobilisation, procurement and financial management. The CMU maintains supervisory visits to each of the provincial units as a means of ensuring quality control in the programme: each unit is expected to be visited at least once every two months. There are currently 8 Improved Latrine Projects (PLM's) at provincial level. Each unit has responsibility for planning, budgeting and projecting annual production targets.

Institutional framework

The PNSBC emerged out of the initiatives of the National Directorate of Housing and National Directorate for Preventative Medicine in the 1970's. It was subsequently absorbed into the Institute of Physical Planning (INPF) which was a suitable institutional location at the time given the complementary roles with urban and rural contexts. Since the dismantling of the INPF and the creation of the Institute of Rural Development, there have been concerns about the logic of the institutional framework.

The water supply and sanitation sector as a whole in Mozambique has suffered from institutional confusion and tensions in the recent past, which are in part attributed to:

1. Political instability and blight before major elections
2. Reluctance to give a commitment to new structures in the sector, and a legacy of poor inter-agency co-ordination leading to a policy vacuum in the sector
3. No consensus about institutional divisions of responsibilities in the sector and no clearly defined responsibilities for leadership and co-ordination;
4. Uncertainty caused by relocating PNSBC from its current home in INDER, and fear of disrupting the established pace of implementation have limited decision making about PNSBC's future institutional location

Location of PNSBC within INDER has weakened links with the urban sector and led to problems regarding acceptance of institutional responsibilities - informal links with only the water and health sectors has made it difficult to develop long term plans and commitments to establish sustainable co-ordination mechanisms.

Co-ordination

Intersectoral co-ordination is largely informal, and the lack of integrated, formalised and consistent co-ordination places serious constraints on the programme, namely:

- it may lead to duplication of activities and/or contradictory activities
- it places extensive demands on the community in terms of participation

Clearly a need for some restructuring of the sector institutionally is required. Particular significance has been placed on the creation of the Basic Services Section in the Department of Water and Sanitation within the National Directorate for Water. A Co-ordination and Planning Nucleus has been created within DNA/DAS to permit better intersectoral co-ordination and planning for specific low cost sanitation activities with the participation of key agencies (health, physical planning, social action co-ordination, low cost sanitation etc.). Its objectives are to promote and co-ordinate activities for provision of adequate and affordable water and sanitation facilities for low income groups.

Recent developments have placed emphasis on the need to decentralise the operations of the PNSBC. This will involve delegating powers to local municipalities to manage the provincial units, and through greater integration of the private sector in the construction of latrine parts.

Sanitation promotion issues

Guidelines

- Promotion must be matched to the customs, attitudes and knowledge of user communities
- Selection of appropriate communication channels is critical in reaching target audiences and reinforcing core messages. Messages should build on ideas and concepts which are already present in the community. Findings from this research suggest that convenience would be a key issue to target during promotion campaigns for on-plot sanitation
- Community based and managed promotion activities are more effective than externally based interventions
- Interpersonal communication through household visits has proven to be very effective in awareness raising

Background

The development of a sustainable sanitation intervention involves several phases of development, including: surveying, demonstration, consolidation and mobilisation.

This section will focus particularly on the mobilisation phase, on issues relating to effective communication of key messages during the development of a sanitation intervention.

Common aspects of effective sanitation promotion

During the mobilisation phase, promotional activities should be designed and implemented in order to stimulate demand for sanitation facilities, to convince householders that they need to improve their existing facilities, and to demonstrate clearly that they have the skills and means with which to upgrade.

Common elements in effective sanitation promotion initiatives are:

- *Identification of the key target groups to be reached*
For promotional campaigns to be effectively targeted and adapted, it is necessary to develop an understanding of which groups in a community can benefit most from improved sanitation. Women for instance, have most to do with the operation and maintenance of sanitation, or feel the impact of the lack of sanitation most acutely (i.e., privacy).
- *Identification of the core messages to be communicated*
This needs to be at the heart of any promotional campaign, and should emphasise the interdisciplinary nature of sanitation, stressing not only technology related issues, but socio-cultural and hygiene concerns. Core messages would typically include a health and hygiene behaviour component, information on the technological options available and why the programme is of importance. The way in which core messages are communicated can affect the responsiveness of the community. Excreta disposal is a highly sensitive issue in many cultures, and one in which it is difficult to change behaviour. Communication strategies which are aware of these concerns and adapt to them will reduce the potential for confrontation from the community. Additionally, any communication strategy needs to have a mechanism by which it is possible to judge if core messages have been correctly understood by target groups.

- *Awareness of the prevailing socio-cultural framework*

This is critical to understanding why individuals decide to invest in sanitation and how they might respond to a sanitation programmes. The results from this research indicate that the motivation to build facilities on-plot is largely socio-cultural (i.e., status, privacy, or comfort and convenience), rather than from notions of improved health. This does not negate the need for health and hygiene promotion, but demonstrates the importance of designing a promotion campaign which taps into this socio-cultural framework.

- *Consideration of sanitation as a consumer good*

Sanitation facilities require marketing as with any other consumer product. The concept of 'social marketing' offers a comprehensive approach to integrating improvements in water supply and sanitation with the behaviour changes necessary to make these technologies effective in improving public health. In essence, the concept borrows heavily from commercial marketing techniques and applies them to social problems. In relation to sanitation, the social marketing approach implies several key concepts, including: consumer orientation; setting of objectives; the marketing mix (product, place, price and promotion); marketing of environmental influences and exchange theory. A full review of social marketing can be found in Berry, A. (1993).

- *Communication methods*

A mixture of techniques and methods which are adaptable, use existing channels of communication, using simple language and expressions, and which attracts the community's attention are preferable. Findings from Mozambique indicate that those persons charged with communication (animators) were critical factors in the success or otherwise of sanitation promotion campaigns. Common examples of communication methods range from conventional public face-to-face meetings to more innovative campaigns incorporating traditional arts media.

This research has focused on several examples of promotional programmes, and three case studies, with selected comments drawn from semi-structured interviews are reproduced below, illustrating examples of differing approaches and some of the constraints experienced.

Case study 11: Domestic Sanitation Programme, Kumasi, Ghana

Under the Strategic Sanitation Plan for Kumasi, three pilot projects were established, one each covering public latrines in the central business district; simplified sewerage in a high density tenement area and domestic sanitation programme in three residential districts.

Sanitation committees

Committees were established in these districts to promote the programme and to stimulate demand and interest amongst the local population. The role of the committee was four fold: to explain to householders the disadvantages of poor sanitation and the relative benefits of constructing VIP latrines; to administer loan agreements with beneficiaries; to collect monthly loan repayments from householders and to provide feedback to the SSP project team on activities. The committee reserved 2 per cent of the revenue collected to cover their operational costs.

Committees were chosen by consensus and not by election. Membership was determined by several factors, most important of which was a willingness to serve the wider community, and being recognised as a respected community member.

Animation tools

A variety of graphical and audio-visual aids were employed, in addition to demonstration latrines and opening ceremonies for new latrines. Women in particular were used as catalysts for promotion:

“To facilitate hygiene education, a group composed of 20 very influential women in the area was formed in 1991. It is always difficult to get women involved, especially amongst the Muslims; but in showing films and having theatre performances, we had a good chance of attracting them”.

Jemima Denis-Antwi, Head of Health Education Division (MoH), Kumasi, Ghana. (UNDP-World Bank Water and Sanitation Programme: RWSG-WA, 1994)

Constraints

In Kumasi, one of the main limitations with the use of sanitation committees was that members were frequently too preoccupied with other community based tasks to maintain the levels of commitment that were required for the committee. Additionally, committee members roles as financial mediators created tension within the community and complicated the tasks of the member in other community based activities.

Case study 12: Programme promotion in Maputo, Mozambique

The National Low Cost Sanitation Programme in Mozambique is a peri-urban programme designed to improve the sanitary conditions of low income urban communities through the promotion of an unreinforced domed slab which covers either a lined or unlined pit.

Animators roles

The programme relies on the activities of sanitary educators, or ‘animators’ to promote the programme at the community level. Animators are typically drawn from the communities in which they work; are men and women with basic training in health and hygiene behaviour and conduct a variety of outreach activities. Jose Naene, animator for Jorge Dimitrov district in Maputo explains the role of the animator:

“[To] identify the need of the family; the conditions of the family; bring ‘propaganda’ about the programme; explain how improved latrines work; explain the advantages of improved latrines, the price (that it is cheap); that with these latrines you avoid lots of accidents; that small children can use the latrine; and that the latrines help to avoid disease. The main point is to speak to people and try to convince them [about the improved latrine] and to convince them to dig a pit on their plot for rubbish, how to use water from the well, and to use only necessary fuel.

...when the animators are organising meetings door to door, people ask us to come more often, people agree that the things that we talk about are important and the perception of the latrines is very positive in the community. It does not matter if a family is rich or poor, they all like the latrines. Sometimes perception can depend on the type of soil...there are cases where

a householder should buy a complete latrine but only buys a slab and there are problems. People like the fact that they can upgrade their latrine when they have money”.

Animation activities

In addition to the presence of community based animators, the programme uses a variety of promotional ideas to communicate its messages. These include use of indigenous media (such as employing dance/drama troupes to visit a district) in conjunction with more traditional communication channels (lectures, activists at church and voluntary level, poster campaigns, and radio/television broadcasts). One innovative promotional idea was the distribution of T-shirts, caps and other promotional clothing to publicise the programme. Given the high demand that exists for affordable clothing in Mozambique, this method was an effective way of communicating the programmes’ central message (through slogans on the front and rear of the T-shirt).

Constraints

There appeared to be considerable variation in the initiative that individual animators took towards their tasks. It was clear that in some cases, animators had identified key methods by which further promotional activities could be fostered (for example, in some low income districts enterprising householders would ferment and sell locally produced beer, using their plot as a meeting place for the community. The animator in this district had identified this informal ‘bar’ as a key place in which to promote the improved latrine, allowing people to use and benefit from it at first hand.

Case study 13: Strategic Sanitation Plan, Ouagadougou, Burkina Faso

The SSP-O was designed to promote on-site sanitation in Ouagadougou by stimulating demand for upgraded sanitation facilities in two sectors of the city. The project relied on a mixture of animation and social marketing tools.

Workplan

A detailed schedule of activities was devised for the programme, broken into four phases, of which the most relevant in promotional terms were phases 1

and 2:1 - Getting to know the area, 2 - Information campaign. Phase 1 consisted of activities designed to identify key target audiences, leaders and influential persons who would participate in and help advance the programme, whilst Phase 2 focused on presentation of key advocacy messages through public meetings, poster displays and demonstration models.

Animation tools

These relied heavily on a combination of modern communication channels and more indigenous forms of dissemination (ceremonies, district meetings). Radio and television broadcasts were used following survey work to identify *when* most householders listened to broadcast media, *how* many listen, and what *style* of promotional campaign proved most effective. Broadcasts were short in length, avoided a moralistic tone and were timed for peak listening hours.

More unconventional forms of promotion were also adopted. This included dancing troupes performing in dedicated public spaces or the compounds of traditional leaders, competitive football matches organised under the framework of a 'Sanitation Cup' and guided tours to households with latrines built under the programme. This last element proved particularly effective. About 100 tours were organised, allowing those who were interested in the programme, but hesitant, to see at first hand the technology being used. Explanations of the different stages of construction and practical information relating to cost, maintenance and performance could also be given by the host household. Direct interaction in this way had a powerful effect on the attitudes of potential beneficiaries, building trust and confidence in the technology, and acting as a strong stimulus for initiating construction. Following these visits, no visiting householder decided not to build their own household latrine.

Sustaining promotion

The above case studies highlight different approaches to promotion, with slightly different emphasis between each programme. A critical issue is how to maintain enthusiasm for promotion after the initial campaign has run its course. Potential responses to this problem include:

- Developing school sanitation programmes where children learn about environmental sanitation, new technologies, the benefits of improved sanitation, etc. Emmanuel Bawa, WES Officer, UNICEF, Accra, Ghana

explains his agency's approach to sustaining promotional activities, *"...we tried to focus on schools because our strategy is that you can start this whole awareness campaign with schoolchildren, once they get used to using these facilities at least when they go back to their homes they will be able to say, 'look we have this in school, why can't we have it in the house?'"*.

- The private sector can be used to promote sanitation through the training of local artisans or members of the community to construct local latrines. These artisans can then market their skills in the community and have a financial incentive to widely promote the sanitation programme;
- Develop and introduce new ways of reinforcing core messages. Updating promotional literature, or adapting indigenous media to topical issues will sustain interest in a given message;
- Sanitation promotion campaigns may act as a catalyst for wider community based social development programmes, where local community associations take a more prominent role in environmental activities linked to environmental sanitation;
- Measures such as opening local development offices serve as a focal point between participating groups in the community.

Part 1E:

Conclusions

The following key points emerge from the project's findings concerning on-plot sanitation in low income urban areas.

General

- On-plot sanitation systems are appropriate for low income urban areas. Our findings indicate that a variety of systems are found to be working well on small plot sizes, with limited odour/insect nuisance, without significant operational problems and to the satisfaction of the end user
- There exists a significant gulf between the perceptions of professionals and those of the community when regarding the appropriateness of on-plot sanitation in the urban context. The findings show that professionals' understanding of key issues such as insect/odour nuisance, or the operational problems associated with on-plot systems must be advised by the opinions and perceptions of those who actually use the system.

Specific

- Poverty and indebtedness are key reasons for the absence of household latrine, either constraining the ability of households to save towards the cost of a latrine, or leading to prioritisation of available income to items other than sanitation
- High degrees of user satisfaction were expressed for all latrine types (except bucket/pan latrines); simple pit latrines recorded higher levels of satisfaction than latrines assumed to be of higher technical specification. Satisfaction levels are most significantly affected by smell, insects and emptying problems, although the actual proportion of households recording these points as problems was low
- Small plot size is not a recognisable constraint to the use of household latrines: user satisfaction levels are not significantly affected by plot size, there is little evidence of a link between plot size and technology choice, and few operational problems are directly linked to size of plot

- Odour and insect nuisance is not noted as a significant problem by users, a finding which is reinforced by the low incidence of insects recorded through quantitative testing on different latrine types. The study found that VIP latrines, designed specifically to limit the incidence of insect and odours, actually recorded higher levels of insect/odour related problems amongst users. There is some suggestion that the site of rubbish dumps on the plot may be a more likely source of insect nuisance than the latrine
- The pollution of groundwater from on-plot sanitation is a potential hazard, but not necessarily a risk. Health risks associated with environmental pollution of groundwater must be set against the much greater hazard of widespread open defecation and contamination of the neighbourhood environment with excreta
- Advise householders on the anticipated pit filling/emptying cycle for their latrine type, and that arrangements for emptying are their own responsibility

Details of all these concluding points can be found in the appropriate section of the report.