

# Annex 8

## Case Studies

Annex 8 summarized eight projects as case studies for highlighting some of the experience reviewed in Sections 5 through 8. One of the projects was carried out with the cooperation of Japanese ODA, one with UNICEF, one with KfW, and five with the participation of the UNDP/World Bank Water Supply and Sanitation Programme. The information provided by these organizations is very much appreciated and acknowledged.

All eight cases deal with low-cost on-site sanitation. It was not deemed necessary to review projects with off-site sanitation; all parties involved are very familiar with such projects. For lack of additional space, only brief summaries are included. For each, additional information is available from the organizations indicated throughout the Annex.

- 8.1 Bangladesh — Changing Sanitary Behaviour
- 8.2 Brazil — Sanitation Programme in Brazil for Poor People (PROSANEAR)
- 8.3 Ethiopia — Study of Water Supply and Sanitation in Eleven Centres
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### 8.1 Bangladesh<sup>13</sup>: Changing Sanitary Behaviour

#### 8.1.1 An Evolving Programme

The UNICEF-assisted School Sanitation Programme was initiated in 1992. At the start, emphasis was placed on the construction of water and sanitation facilities, with the assumption that such facilities would meet the basic requirements of the schools. Today, construction is supplemented by a deliberate focus on behavioural development among school children, so that personal hygiene, sanitation, and safe water use become integral to their life style. Experiential learning is promoted by encouraging active participation in extra-curricular activities, in partnership with teachers, parents and members of the School Management Committee (SMC).

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<sup>13</sup> UNICEF. For the full study, see: School Sanitation Program in Bangladesh. Waterfront, Issue 9, UNICEF, New York, December 1996.

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This evolution mirrors the changing emphasis in the UNICEF-assisted programme on Water and Environmental Sanitation. Bangladesh is already renowned worldwide for having achieved 97% national coverage for access to a safe water supply within 150 m of the household. The last few years have also seen a healthy trend in sanitary latrine coverage (e.g., 48% in 1995 vs. 16% in 1990). However, the challenge remains insofar as the daily deposit of about 20,000 metric tons of fresh human excreta still contributes to a heavy pathogen load on public land and water sources through open defecation or hanging latrines.

Mortality and morbidity due to diarrhoea and parasitic worm infection remains very high in the country and no significant decline in the occurrence of diarrhoeal episodes has been observed in spite of the success in supplying safe water and increasing sanitation coverage. Environmental sanitation and personal hygiene practices (e.g. handwashing before eating and after defecation, cutting nails, use of safe water for drinking and domestic purposes, disposal of children's faeces in sanitary latrines, *etc.*), together with a clean environment, as well as related measures in health and nutrition, are therefore essential for reducing the risks of diarrhoea and parasitic infestations.

The current emphasis in the WES programme is hence on creating a "mindframe" which leads to a clean environment and healthy behaviours, and on bringing about greater convergence with such efforts as oral rehydration therapy, diarrhoeal case management, breastfeeding, immunizations and nutritional supplements. In this respect, a major focus is being placed on the potential of primary school students inculcating behavioural development within themselves and through them to motivate parents and other community members towards desirable behavioural change.

**Table A.1.1 School Sanitation Programme, Bangladesh (1992-1995)**

School Sanitation Programme, Bangladesh (1992-1995)				
Year	Number of schools covered	Number of districts covered	Number of thanas covered	Number of teachers and SMC members trained/oriented
1992	1,089	16	16	16,420
1993	369	11	28	5,840
1994	678	19	43	7,458
1995	438	05	34	2,512
				(Ongoing)
Total	2,575	51	121	32,230

### 8.1.2 Lessons Learned

Several lessons have been learned along the way that have helped in modifying and improving the programme.

1. An assessment done in 1994 shows that the attendance of girls in Classes III through V in the sample schools rose on average by 11%. This was in part due to the social mobilization campaign for compulsory primary education for All. The girl respondents indicated that the privacy provided by separate latrines for girls was an important contributory factor.
2. A comparison of survey results from 1994 and 1995 shows that the quality of construction and the maintenance of water and sanitation facilities improved remarkably during the year. For example, the percentage of running tubewells in the sample schools increased from 68% to 89% and satisfactory discharge of water increased from 55% to 95%. Similarly, the status of clean and flushed pans increased from 36% to 80%. These are attributable to a monitoring system that combined inspection and corrective measures, thus indicating its importance as part of the implementation process.
3. The 1995 survey shows that 95% of the teachers from the sample schools received training and 96% replied that they are now teaching hygiene and sanitation in their classes, following the training. It is encouraging that funds for maintaining WATSAN facilities are available in 44% of the schools in 1995 as compared to 7% in 1994, a sign of increasing initiatives taken by the teachers. Also, soap or ash was kept next to the water supply facilities in 52% of the schools, which helped to encourage handwashing after defecation, another sign of initiatives triggered by teachers' training.
4. In 1995, an action-research study in Moulavibazar was carried out in five schools to engage the School Management Committees (SMCs) in the implementation of the Programme. Performance by SMCs was far superior to that by contractors hired by the Department of Public Health Engineering (DPHE). For example, the time taken by SMCs for completion of construction was 28 days as opposed to 7-10 months by contractors. The quality of materials used and the overall construction by SMCs were cost-effective and met specifications and plan design. Contractors hired by DPHE generally quoted costs that were 80% higher. Most importantly, the initiative by the SMC promoted and ensured participation, empowerment and a sense of ownership among the community while encouraging, at the same time, local capacity building and better management of the WATSAN facilities.
5. An experiment in Social Mobilization in Barisal demonstrated that school children were very effective in prompting their parents to build and use sanitary latrines and keep them clean. The process was helped greatly by the personal interest and political will demonstrated by the Divisional Commissioner and District officials to promote sanitation and hygiene.

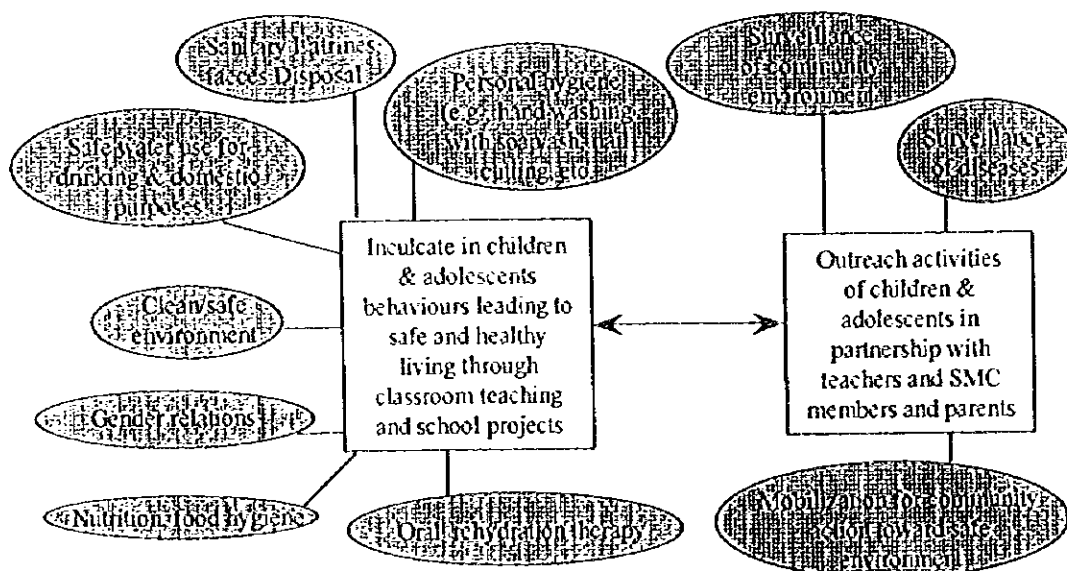
### 8.1.3 The Way Forward

In 1996, several measures have been taken to improve the School Sanitation Programme.

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1. Based on the encouraging results from the experiment in Moulavibazar, the Secretary, Local Government from the Ministry of Local Government, Rural Development & Cooperatives (MLGRD&C) has issued the directive that all activities under the School Sanitation Programme will henceforth be implemented through the SMCs. Multisectoral district and thana committees of concerned government officials have been formed to oversee the programme and provide guidance and technical support. Accordingly, this approach is being applied in 800 schools in six districts.
2. Distribution of deworming tablets and nail clippers is also being introduced in all of the 800 schools. These subprogrammes will act as entry points and educational tools to promote improved sanitation and hygiene among the students as well as their siblings and parents.
3. A module for Safe Learning Environment in Primary Schools is being developed and introduced on an experimental basis in the Noakhali district. Figure A8.1.1 gives a framework for the experiment. As already discussed above, the time has now come to supplement the current School Sanitation Programme and create an enabling environment for the active participation of students in partnership with teachers and members of the School Management Committees. There are two parts to the concept: (i) to inculcate in children those behaviours that would lead to safe and healthy living, through classroom teaching and experiential learning, by engaging in school projects linked to various themes as shown in Figure 8.1.1; and (ii) to reach out to the community by enabling children to function as motivators for change. Both of these would be pursued in the form of extracurricular school projects with the help of teachers, SMC members and parents.

Figure A8.1.1 — A Framework for School Sanitation and Safe Learning Environment



A preliminary action-research study has been initiated in the Noakhali district to examine the effects on the behavioural development of school children due to the construction of WATSAN facilities (four schools) and by adding the SLE components (four schools) as opposed to those where no facilities or SLE have been introduced (four schools). Lessons learned from this study will help design an extension of the approach to other primary schools operated by the Government and NGOs.

The new innovations mentioned above are important developments in the continuing effort to orient the School Sanitation Programme towards more effective behavioural development among children. The initiative has already taken root in 2,575 Government primary schools. Estimates show that there are altogether about 57,600 such schools, of which about 45% still lack any WATSAN facilities. The goal ahead is to cover all of these schools and also non-formal primary schools run by NGOs with active School Sanitation and Safe Learning Environment Programmes by the year 2000.

## **8.2 Brazil: Sanitation Programme in Brazil for Poor People (PROSANEAR)<sup>14</sup>**

### **8.2.1 Background**

During 1981-1988, the Ministry of Interior in Brazil financed studies aimed at developing and testing methods for increasing coverage for the poor with improved water supply and sanitation services. The results showed that although access of the poor to improved water supply had greatly improved over the years, sanitation services had been mostly neglected. As a result, there was growing pollution of the slum and squatter areas where most of the poor and migrant populations stayed. Part of the reason was found to be the lack of technologies suitable for low-income communities. Moreover, projects for low-income communities were invariably based on standards developed for middle- and upper-income families, and they were implemented without consultations with the community. The beneficiaries were not involved in the maintenance or financing of the services. These findings led to a followup pilot project known as PROSANEAR, which was financed by the World Bank and the Government of Brazil.

### **8.2.2 The PROSANEAR Programme**

PROSANEAR is the Brazilian acronym for "Sanitation Program in Brazil for Poor People". It is a large-scale project implemented in 126 low-income areas in eight states of Brazil. More than US\$100 million was invested in it, with 50% provided by the World Bank, 25%

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<sup>14</sup> Source: Proceedings of the Urban and Peri-Urban Strategic Sanitation Conference (unpublished), UNDP/World Bank Water Supply Sanitation Programme, March 1996, The World Bank, Washington, 1996.

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by the Government of Brazil through the Employee Indemnity Fund, and 25% by the participating states and/or municipal local governments. The programme was designed to provide water supply to a population of 200,000, and improved sanitation to a population of 700,000. Implementation started in 1992 and ended in June 1996. It is being managed by the *Caixa Economica Federal* (CEF), which is the Brazilian Federal Bank for Urban Development. Key features of the programme were community participation and the use of low-cost engineering techniques to build basic sanitation systems for the poor.

The main characteristics of the programme were:

- Priority was given to outlying urban areas and/or to slums in cities with populations above 50,000;
- Provision of service to urban groups that have traditionally not been served by formal systems; thus, beneficiaries were families whose household incomes were less than three times the minimum wage of US\$100.00 and who lived in areas where about 40% of the population earned less than the minimum salary;
- Involvement of communities in the design and construction of water and sanitation infrastructures; community participation and hygiene education were used to define the rights and responsibilities of local residents as well as those of water companies;
- Emphasis on low-cost technologies;
- Maximum investment cost for water supply was limited to US\$98 per capita;
- Maximum investment cost for sanitation, including treatment, was limited to US\$140 per capita;
- Sewerage projects addressed waste treatment (possible treatment options were discussed with the community, which made investment decisions on the basis of the technical feasibility and available funding available); and
- To upgrade environmental conditions, all water projects had to include community-generated solutions for sanitary sewer systems and, where possible, solid waste collection.

The programme was inherently demand-oriented; it entailed unbundling of service areas and the adoption of institutional arrangements conducive to sustainability, while enhancing the prospects of scaling up. Community members were involved in the planning, construction and management of tertiary sewers through the "condominial" approach. In this, the community decides between three basic options for the route of the system serving their block — the options being back of lot, front of lot and in the street. In all three cases, it is assumed that government should continue to be responsible for facilities serving wider areas. Initiatives have recently been taken to assign responsibilities for operating feeder and disposal facilities to the private sector in some areas.

### 8.2.3 Demand Orientation

PROSANEAR follows a participatory approach involving a dynamic process of interaction with the community. This approach is based on the premise that sustainability of infrastructure in peri-urban areas depends in part on the degree of interaction between the beneficiaries and all the production agents of the project (private companies, public officials, utilities, consultants and construction contractors). For such interaction to be effective, there must be a clear definition of the rights and responsibilities of all the parties and stakeholders involved. Partnerships in the projects have been formed from the bottom up, starting with partnerships between individual communities and public/private water companies and/or with local governments, and progressing to partnerships between state and federal governments, and then, between the federal governments and the World Bank.

The following steps have been followed —

- **Information Dissemination** — This is the first step in the participation process, although elements are present in all stages of the project as well. There is a continuous dissemination of information through which the community learns about the various options that are available, such as service levels and organizational arrangements for operating and maintaining constructed systems. During this period, the project staff also learns about the community characteristics and dynamics. The goal of this step is to deepen community understanding of project details, and further develop participation. In the local context, it often means integrating “popular wisdom” with technical know-how. The project staff and the community engage in an on-going discussion of the local situation (i.e. the realities of the community) and the technically feasible interventions.
- **Proposal and Decision** — At this stage, the project staff and the community discuss and take decisions on those actions possible that are at once technically viable and organizationally best suited to the local conditions.
- **Responsibility** — This is the final stage of the participation process. It is at this point that project staff, and the community commit themselves to specific actions and define their mutual responsibilities. For instance, PROSANEAR requires that 80% of all the groups served by a secondary-level sewer must have signaled their commitment to work at the tertiary level before the secondary-level sewer is built. The PROSANEAR approach involves cost recovery through user charges after facilities have been installed.

The final step (responsibility) is designed to ensure that any future privatization of cities would include the poor areas. The following are typical roles for project staff and communities —

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- Role of the project staff or their agents: to provide sanitation systems that are suited to the community's characteristics and dynamics, to guarantee the operation of the system, and charge fair rates for services.
- Role of the community: to pay agreed rates for the services, operate the systems correctly, and maintain the facilities.

### **8.2.4 Unbundling of Technologies — Diversifying Technology**

Based on the results of the *Proposal and Decision* process, the technological choices are designed and implemented. Normally, the feasible sanitation technologies are diversified down to three levels: (i) household; (ii) neighborhood; and (iii) trunk and treatment.

- **Household Level.** At the household level, sanitation investments are treated as pure private goods.
- **Neighborhood Level.** At the neighborhood level (blocks), sanitation investments begin having the characteristics of both private and public goods. Alternative methods have been developed to keep down costs. Under the condominium system, a network of secondary sewerage is built to the entrance of a block of houses, and the community assumes responsibility for the design, construction, operation and maintenance of the infrastructure within their blocks. The procedure can cut costs by an average of 50%. Three types of routing for the internal systems are most common:
  - Location of sewers in backyards;
  - Location in front of lots; and
  - Location in the street.

Each option carries a different cost to the community, with backyard location being the least-cost option.

- **Trunk and Treatment Level.** At the trunk and treatment level, the "public good" aspect dominates. The most widely used treatment was a decentralized system of small treatment plants.

### **8.2.5 Institutional Arrangements**

PROSANEAR is based on the tenet that water and sanitation management should be participatory, with decisions taken at levels as close as possible to the beneficiaries. It advocates that:

- Decisions on water and sanitation projects should reflect user demands;



- Particulars of projects are defined by a negotiating body which ensures that public/private decisions are participatory in nature and reflect broad agreement by all the social agents involved;
- Decisions and actions that can be effectively taken at levels closer to the users of the system should never be taken at a higher level; and
- Technical solutions must be efficient (which might require the establishment of an appropriate cost-benefit ratio, good allocation of funds, and well-defined partnerships).

### 8.2.6 Sustainability

The basic approach is to move the boundary between private- and public-sector provision from the plot boundary to a point further downstream, generally to the point at which locally managed tertiary sewers meet government-constructed secondary sewers. Further, PROSANEAR has tackled one of the important institutional issues surrounding facilities that have been built wholly or partly with community resources but which are connected to higher level facilities operated by public- or private-sector organizations. What tariff should the users of such facilities pay? The answer is to give discounts on standard tariffs to reflect the private and community resources devoted to the provision of local-level facilities.

The 1978 Brazilian legislation on tariff structure for water and sanitation introduced the concepts concerning the social aspects concerned in public-service provision. The law envisaged that all segments of society, including low-income communities, should benefit from water supply and sanitation service improvements. It allowed state administrations to incorporate specific regional and socioeconomic features into the design of tariff structures.

PROSANEAR operates on the premise that community members will be responsible for the operation and maintenance of the local feeder facilities which directly affect them. The incentive is provided by the fact that people have committed their own resources to the provision of facilities and will be adversely affected if the facilities cease to operate. There is a need for systematic study of the sustainability of the informal local-management systems for the sewers built with the assistance of the OPP. The indications are that such sewers are rather better managed than those which are the direct responsibility of government departments.

A system of cross subsidies was introduced under which tariffs were determined according to category and levels of consumption. The users with low levels of consumption (assumed to be poorest) were cross subsidized by those with higher levels of consumption (assumed to be richest). So far, this law has not been changed. With this law, the sustainability of each area of the project depends on the sustainability of all the city (cities) included in the cross subsidization process. In the next PROSANEAR it will be necessary to propose a change in this law.

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### **8.2.7 Expanding the Programme**

PROSANEAR has been a resounding success. Water-supply coverage has been four times the original target of 200,000 people, and coverage for sanitation has been almost 30% higher than the initial target of 700,000 people. With the success of the programme, a decision has been taken to prepare a follow-up PROSANEAR, similar to the first, but incorporating lessons learned in the pilot project. It is envisaged to cost about US\$400 million.

## **8.3 Ethiopia: Study of Water Supply and Sanitation in Eleven Centres<sup>15</sup>**

### **8.3.1 Overview**

In 1994, only 26% of the total population and 18% of the rural population in Ethiopia were estimated to have access to potable water. Consequently, the majority of the population was and is exposed to contaminated drinking water and, thus, to waterborne diseases. It is also estimated that less than 12% of the total population use latrines. An estimated 1% only of the rural population have access to adequate refuse disposal.

In light of this situation, the Government has given priority to water supply and sanitation in 11 centres from among 230 rural centers listed in the National Development Plan, and commissioned a study carried out by JICA. According to the Scope of Work agreed upon by the Ethiopian Government and the Government of Japan, the average 1995 population of the 11 centers is 15,664, and the average annual population growth rate between 1984 and 1993/1994 is calculated to be 5.9%.

The major objectives of the study are: (i) to conduct a feasibility study of the water supply system in order to improve the living conditions of the population in the study area by enhancing the water-supply services in terms of quantity and accessibility, (ii) to formulate a plan for sanitary education and the diffusion of sanitary facilities in order to raise people's awareness of hygiene and improve the safety of the water supply, and (iii) to transfer technologies to the Ethiopian counterpart personnel with the view of strengthening management.

The study has been conducted during the two fiscal years 1994/95 through 1995/96, and divided into two phases. Phase I was conducted between December 1994 and March 1995, while Phase II started the following May and was completed in February 1996. During Phase I, a detailed survey was carried out for four centers, and for the remaining centers in Phase II. The Study's mandate included surveys of meteo-hydrology, geo-electric prospects, water quality, water use, sanitary and health conditions, initial environmental examination

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<sup>15</sup> Compiled from information made available by JICA.

(IEE) and an environmental impact assessment (EIA), and consideration of the people's sanitary education and practice, their awareness, social background and relevant socio-economic factors. The mandate also included construction of experimental toilets and pumping tests and related investigations.

Costs of introducing sanitation to all 11 centers (by target year 2010) have been estimated to be 23,246 thousand Birr (about 348.7 million Japanese Yen in 1996)(1 US dollar = 6.3 birr in November 1995). Implementation through Japanese Grant Aid cooperation is under preparation.

### 8.3.2 Some Sallent Project Features

Based on previous experience and lessons learned, the following are of particular interest:

#### *Health and Sanitary Awareness*

**Sanitary Behaviour.** Sanitary behaviour has been scored by a household survey. The scores have a strong negative relationship with reported incidence of diarrhoea (correlation coefficient (CC):0.7) and a less strong positive relationship (0.4) with the awareness of diarrhoeal disease control. This implies: (i) the better the sanitary behaviour the lower the risk that a household will encounter diarrhoea; and (ii) knowledge about diarrhoeal disease control is not a major determining factor affecting sanitary behaviour at the level of the household.

**Children's Awareness.** Boys and girls (under the age of 15 years) are much less likely to be aware of ORS, suggesting gaps in health education which need to be filled during the implementation phase.

**Role of Women.** Gender segregated data shows that men and women have similar levels of knowledge about diarrhoeal disease control but women are more aware of ORS. Although women generally have the role of teachers and caretakers of sanitary behaviour, men and women share control over the resources that are needed to pay for sanitary facilities. Sanitary education needs to be targeted at both men and women.

#### *Construction of Experimental Toilets*

Among the various types of toilets, community toilets were selected for testing in two communities out of the whole study area. Communities using the toilets have been organized through promoters of community participation. Responsibility for administration, operation, maintenance and safeguarding of the toilets has been vested in the communities with, among other things, video promoting their effective use.

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The community was readily organized for using the toilets and little help was needed from the promoter. The community elected several representatives, i.e. one coordinator, one accountant and an assistant (female).

Operation and maintenance were to cover the payment of water consumed. In one community, the toilet required a guard because it was located near a market. The guard was appointed from among the members of the community, and also assigned to cleaning the toilet. The community re-allocated the costs of operation and maintenance to household members, with fifty cents to three birr each, according to their income. The costs of emptying the toilet every two years could be met from the surplus of the monthly payments and interest.

In one center, people wanted separate community toilets for women and men. In the other center, toilets for each household were preferred. Each group operates and maintains one toilet, the work being done by a person chosen from the group and supervised by a committee set up by the group.

### ***Experimental Emptying of Toilets***

The salient lessons learned by experimental emptying highlight the need for prior preparation of dumping sites and accessibility to the latrines. The study team planned 100 disposal trips for the two experimental centres. However, only 60 trips were made, for the following reasons:

- Accessibility to the latrines was difficult after rainfall because of poor drainage;
- Difficulty of access and narrow openings of some latrines; and
- Improper dumping area in the case of one centre (due to disputes between the people and the municipality).

### ***Experimental Sanitary Education***

**Film Show.** The showing of a film was readily planned and carried out. Advertisements were made by megaphone around the centre with the help of the municipality. Police presence for crowd control was organized. Production of films during the experimental stage of the project is highly effective and will stimulate people's interest. 16 mm Film was used for large audiences, and video for smaller groups with a maximum of 40 to 50 people.

**Street Theater.** A street theater took five days to organize. Its effect is probably greater than that of showing a film; this medium is justified if it is part of a more intensive programme. 28 Students were chosen by the Headmaster of a High School to perform in the dramas. A four-hour training session on street theater was organized. Students were divided into four groups, each dealing with one subject, i.e. personal hygiene, domestic hygiene,

environmental hygiene, and safe excreta disposal. For the next three consecutive days, two-hour practices were held, including one dress rehearsal the day before the performance in the street. During the practice sessions, the students were advised by those in their own group and other groups, and by the Study Team. In this manner, the students researched the topics for the dramas, wrote the sketches and performed them — all by themselves. Four dramas were performed in the street outside a house near to the experimental toilet site. They were effective in popularizing sanitary education.

### 8.4 Ghana: The Kumasi Strategic Sanitation Project<sup>16</sup>

#### 8.4.1 Background

Kumasi is the capital city of the Ashanti Region of Ghana. With a current population of one million and an area of 150 km<sup>2</sup>, it is the second largest city in Ghana. Its location in the centers of both Ashanti and Ghana has made it a nexus from which road, rail and air transportation systems radiate to other parts of the country and to the region. Kumasi is a major center for a wide range of services and activities: cultural, political, and educational affairs, administrative and banking services, and a wide range of industrial, manufacturing, and commercial activities. Its central market is the second largest in West Africa. These features probably account for the current level of permanent and transient populations, resulting in congestion and overstressed physical infrastructure.

Over the years, the local authority currently known as the Kumasi Metropolitan Assembly (KMA) has introduced measures to respond to the shortage of urban infrastructure in the city. In the case of sanitation, the KMA opted for a master sewerage plan. So in 1954, Kumasi became the first city in Ghana to prepare such a plan. The plan has been updated at intervals of about ten years — in the 1960s and in the 1970s — but its high cost has proved prohibitive and has discouraged the city authorities from implementing it. Meanwhile, most of the poor have had no access to satisfactory sanitation services, and the city was choking under the weight of its own sewage — only about 10% of the excreta produced in the city was being properly collected for safe disposal; the rest was being dumped within the city environment — in streams and on open land.

In the end, the city became convinced of the futility of relying on the master plan approach. Accordingly, on the initiative of the UNDP, it decided to try an alternative approach, the strategic sanitation approach, which was in its early stages of development at the World Bank.

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<sup>16</sup> Source: Proceedings of the Urban and Peri-Urban Strategic Sanitation Conference (unpublished), UNDP/World Bank Water Supply Sanitation Programme, March 1996, The World Bank, Washington, 1996.

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### **8.4.2 The Kumasi Sanitation Project**

The Kumasi Sanitation Project (KSP) was a pilot project designed to test the efficacy of the strategic sanitation approach in satisfying the immediate wants of the people of Kumasi for improved sanitation services. It was funded by the UNDP and executed by the UNDP/World Bank Program. It was under this project, which started in 1989, that the Kumasi Strategic Sanitation Plan (KSSP) was prepared and implemented. The population of Kumasi at that time was 600,000.

The key elements of the plan were demand orientation, widening and unbundling of technological options, and institutional reform. These features of the plan enhanced the prospects of sustainability of investments made under it, and paved the way for scaling up the plan.

### **8.4.3 Diversifying Technology**

Based on the results of demand studies, the range of technically feasible sanitation technologies was identified and unbundled into three levels:

- In-house sanitation infrastructure;
- Feeder sanitation infrastructure; and
- Trunk sanitation infrastructure.

#### ***In-house Sanitation Infrastructure***

In-house sanitation infrastructure is defined as facilities located at the household level or at sources of waste generation. They are systems that are decentralized to the household or waste source level. Two types were used, the conventional water closet and the Kumasi Ventilated Improved Pit Latrine (KVIP). The first could be connected to a septic tank system or to a public sewer system. The second is a VIP latrine in which there is access to two possible adjacent pits from one toilet room. Only one of the two pits is put into use initially. When full, it is blocked off from service to allow its contents to undergo decomposition. Meanwhile, the second pit is put into use. By the time it also becomes full, the decomposition process in the first pit would be complete, and its contents would have been converted into an innocuous humus which could be safely removed for use as a soil conditioner.

### **Feeder Sanitation Infrastructure**

Feeder sanitation infrastructure is defined as sanitation infrastructure installed for collective use by a part of the city population. This user population may be a neighborhood community, a group of neighborhoods, or an identifiable transient population that passes through such public places as markets, recreational areas, and transportation yards. They are systems that are decentralized to neighborhoods or to larger specific parts of city populations. In the KSSP, two types of feeder sanitation infrastructure were considered: public latrines and simplified sewerage.

Kumasi already had 290 public latrines. Prior to the KSSP, they were operated and maintained by the Metropolitan Assembly (KMA), but conditions in many became so deplorable that responsibility for their operation and maintenance was assumed by members of local political organizations known as "Committees for the Defense of the Revolution" (CDRs). The performance of the latrines improved under the CDRs, who introduced charges for their use. The cost to the KMA for the operation and maintenance of these latrines still exceeded the revenues reported to the Assembly by 800,000 cedis a month. However, the survey of demand for public sanitation facilities conducted under the KSSP showed that private operation of the public latrines would be profitable. Accordingly, the management of 12 of the most frequently used public latrines was given on a trial basis to five private contractors who signed three-year management contracts. Ownership of the public latrines still remained with the KMA. As part of their contracts, the private operators were to pay monthly fees to the Assembly for renting the public latrines for their businesses. The privatization was a resounding success.

The KMA was making 750,000 cedis a month from the private operators, compared with the former 800,000 cedis a month net cost to the Assembly for the same public latrines; the private operators were happy with the profitability of the new business — so much so that some rehabilitated their latrines at their own cost — and the users were happier with the cleaner, more convenient public latrines, as evidenced by their willingness to pay more for them.

The second type of feeder sanitation infrastructure used in the KSSP was a system of simplified sewerage, 8 km in length, serving 320 housing units over an area of 4 ha. The sewers were laid in alleys between rows of houses; and the sewage is being treated in waste stabilization ponds installed under the project. In line with experience with privatization of public latrines, the operation and maintenance of the simplified sewerage systems and the treatment plant have been privatized.

### **8.4.3 Demand Orientation**

The starting point for the plan preparation was two surveys aimed at estimating, respectively, demand for improved in-house sanitation facilities, and demand for public sanitation facilities. The demand for improved household sanitation facilities was assessed through a large household survey. During the household survey, information was collected on:

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- Demographic characteristics of respondents;
- Existing water and sanitation situation, including the types of facilities used, monthly expenditures, degree of satisfaction with existing sanitation facilities, and perceptions of privacy, convenience and cleanliness;
- Household willingness to pay for improved sanitation facilities; and
- Socio-economic characteristics of the household, including such items as education, income, ownership of assets, weekly expenditures, occupation, religion, and housing characteristics.

A two-stage, stratified sampling procedure was used to select a random sample of 1663 households for this survey. The results formed the basis for technology choice and the formulation of cost-recovery policy for the in-house sanitation facilities.

The demand for public latrines was determined by posting observers at selected public latrines for one week, starting each day from about 4:00 A.M. and ending at about 10:00 P.M. The observers recorded the number of people who used the public toilets, and based on that estimated the daily revenues for use of each such facility. This study led to the conclusion that privatization of such public latrines was financially feasible.

### **8.4.4 Institutional Requirements**

A key institutional feature of the Kumasi Strategi Sanitation Plan is its emphasis on privatization of service delivery. Under the Plan, a Waste Management Department has been created within the Kumasi Metropolitan Assembly for the management of both sanitation and solid waste. However, the focus of this department is on policy formulation, overall strategic planning, contract management, formulation and enforcement of standards and regulations, *etc.* The actual supply of services and the operation and maintenance of installed facilities is left to the private sector. Under the KSSP, the following are all undertaken by the private sector:

- Operation and maintenance of public latrines;
- Installation of in-house sanitation infrastructure;
- Installation of simplified sewerage and waste stabilization ponds;
- Operation and maintenance of all feeder sanitation infrastructure; and
- Septic tank emptying services.

So far, the involvement of the private sector has been limited to feeder sanitation infrastructure; the Waste Management Department handles trunk infrastructure, which is



limited to the operation of the facilities for the disposal of septage. The Department charges private contractors for the use of the septage disposal facilities.

### 8.4.5 Sustainability

For investments to be sustainable, it is not enough for the choice of investments to be driven by demand. It is equally important that the subsequent operation and maintenance and the overall supply of services should be responsive to the wants of users. The Kumasi experience has shown that involvement of the private sector in a competitive way in operation and maintenance of installed facilities can provide powerful incentives conducive to the sustainability of investments.

The KSSP has produced out of Kumasi a number of skilled contractors that no one knew existed. Thus, the right incentive brings out desired skills. Private entrepreneurs will hire people with requisite skills if the incentives are right. The use of such incentives can reduce reliance on capacity building at start-up of projects. The Project has also demonstrated that appropriate involvement of the private sector can enhance the quality of service. For example, the privatization of the management of public latrines has resulted in highly improved services. In addition, the licensing of private contractors for septic tank emptying has increased availability of septic-tank-emptying trucks in the city and has reduced the response time for septic-tank emptying.

### 8.4.6 Expanding the Programme

The Kumasi experience shows that the role of private operators can be integrated into the overall management structure for sanitation facilities. It suggests that the presence of an incentive system with clear performance-related rewards and sanctions is a prerequisite for the success of such an approach. This is easiest to achieve for franchised operations in which the contractor has to make only a limited financial commitment but holds the contract for a limited period, so that failure to perform can be dealt with by termination of the contract and awarding it to another contractor.

Kumasi further provides an example of the involvement of the private sector in the provision of feeder infrastructure. The first step was to implement a pilot project, involving the franchising of the operation and maintenance of 12 public latrines. This initiative has been successful and is being used as a model for the extension of the approach to other public latrines in the city, and to the operation and maintenance of a simplified sewerage system and treatment plant serving a total of 320 houses.

In light of the above, the success of the KSSP has led to the decision to expand the plan to cover the rest of the city. Thus, more KVIPs are to be constructed at household level, and private management is to be extended to cover all 290 public latrines. It also planned to provide simplified sewerage for other parts of the city in response to demand. Potential

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demand for this type of service is estimated to be 3700 connections, necessitating 150 km of sewers, compared to 320 connections and 8 km installed under the KSSP. The approach has formed the basis for the preparation of a World Bank-funded project covering the ten Regional capital cities in Ghana.

### **8.5 India: Urban Low-cost Sanitation Component<sup>17</sup>**

#### **8.5.1 Overview**

This project is part of a nation-wide effort to replace traditional dry (bucket) latrines by sanitary and low-cost pour-flush latrines. The bucket latrines are emptied manually by scavengers. An estimated number of more than 300 000 scavengers, both men and women, are employed either municipally or privately; they are economically weak, educationally backward and socially marginalized. A programme has been launched with multiple objectives, i.e. (i) to liberate the scavengers and retrain them for other work, (ii) to replace existing bucket latrines by pour-flush latrines, and (iii) to construct the same type of facilities for houses without latrine.

This physical improvement programme is coordinated by the Ministry of Urban Development and implemented by the Housing Urban Development Cooperation (HUDCO). HUDCO has been handling governmental programmes since the mid-1980s. It channels credits to municipalities, depending on the levels of income of the beneficiaries. The urban low-cost sanitation project described thereafter is a component of a project in Maharashtra State (other States may be added) with three components, i.e. (i) new housing, (ii) slum rehabilitation, and (iii) sanitation. It is now in its fifth stage, involving a "loan" from KfW to HUDCO in the amount of 700 million IRs (including 67.5 for cost increases during implementation) of which 100 million (3.5 million DM) are earmarked for sanitation. The latter amount of 100 million will fund 50% of the cost of the latrine programme, for which the remainder will be contributed, mainly by HUDCO from governmental sources (45%) and the rest by a contribution from the beneficiaries (5%). The "loan" is made from Grant Aid sources. HUDCO is the "borrower" and operates it as a revolving fund. It relends money to local municipalities. The individual beneficiaries take credits for the construction of the latrines; credits are recovered over a seven-year period. The management scheme is exhibited in Table A8.5.1.

The average cost of a unit is IRs 3,000. Assuming an average number of ten users for each unit, the project will serve 700,000 people and is expected to liberate perhaps 5,000 scavengers. According to a survey carried out, it may be assumed that 90% of the scavengers will find new employment, especially as municipal workers.

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<sup>17</sup> Compiled from information made available by KfW

### 8.5.2 The Salient Project Features

Based on previous experience and lessons learned, the following are of particular interest:

- **Site selection and needs assessment:** The nodal State agency identifies the towns most urgently in need in consultation with the local bodies. Factors taken into account include the percentages of dry latrines, households without latrine and the numbers of scavengers. HUDOC's Regional Office "sanctions" the selected towns. Among other things, the Sanction Note spells out details regarding loans and subsidies.
- **Area-wide coverage:** No isolated latrines are supported. The emphasis is on area-wide coverage. In other words, the project aims at a critical mass and at completely eliminating all scavenging in an area.
- **Education and information of the beneficiaries and municipal personnel:** This is an essential pre-condition and must be assured by HUDOC through the local bodies and the involved NGOs. If required, relevant activities are supported in the context of the project. Subjects to be covered include the construction, use and maintenance of latrines, and the sensitisation regarding loan repayment and the actual level of the costs to the beneficiaries.
- **Information and retraining of scavengers.**
- **Technology:** The double-pit pour-flush latrine with open-jointed brick-work lining has been adopted.
- **Implementation through NGOs:** The implementation of the project is vested in qualified NGOs, which are selected and supervised by the regional office of HUDOC. With general concurrence, Sulabh International, an NGO with many years of successful professional experience and with international recognition in this field, has been chosen. The local bodies guarantee for the work of the NGO over a period of five years. In general, all construction is carried out by contractors. The participation of the beneficiaries is basically financial.
- **Maintenance:** Maintenance requirements are an essential part of the education and information of both the beneficiaries and the municipal personnel, and is the responsibility of the implementing NGO. The local bodies are responsible for organizing a service for desludging and for the safe deposition of the sludge, but for larger schemes or communities, private-sector desludging is encouraged. Desludging must be paid for by the beneficiaries.
- **Cost recovery:** Full recovery of the loan within seven years is mandatory, but in real life it may fall below 50%. On a monthly basis, this will amount to 30 to 35 IRs, as compared with the 15 to 40 IRs per month paid today to scavengers for the cleaning of dry latrines. The loan and subsidy division for the low-cost programme is

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summarized in Table A8.5.2, based on maximum construction costs per unit of IRs 2,500 in 1993 (Source: HUDOC, 1993).

- HUDOC, as the borrower, selects the implementing organization and certifies that the above features of the project are fulfilled, especially that:
  - ▶ site supervision personnel are adequately trained to adjust the standard design to local conditions and to ensure that on-site water resources are not endangered;
  - ▶ income groups have been correctly determined for the purpose of fixing grant percentages;
  - ▶ municipalities are capable of covering maintenance;
  - ▶ scavengers have been given other jobs or are participants in training programmes.

HUDOC also monitors payments made and confirms that funds were deployed correctly.

**Table A8.5.1 Involved Agencies and their Responsibilities**

<b>Involved Agencies and their Responsibilities</b>			
	<i>Planning</i>	<i>Implementation</i>	<i>Operation &amp; Maintenance</i>
<b>Ministry of Urban Development</b>	<ul style="list-style-type: none"> <li>- Determination of number of towns to be reached by sanitation programmes</li> <li>- Allocation of funds to different states for sanitation programmes</li> <li>- Determination of funds covered by grants and funds available for loans</li> </ul>	<ul style="list-style-type: none"> <li>- Loans channeled through the Town and Country Planning organization and/or HUDCO</li> <li>- Subsidy channeled through State Government agency</li> </ul>	

<b>Involved Agencies and their Responsibilities</b>			
	<i>Planning</i>	<i>Implementation</i>	<i>Operation &amp; Maintenance</i>
(continued from Table A8.5.1)  <b>Ministry of Welfare</b>	<ul style="list-style-type: none"> <li>- Determination of policy for:               <ul style="list-style-type: none"> <li>o conversion of dry latrines</li> <li>o construction of new latrines</li> <li>o liberation of scavengers</li> <li>o financing at State level</li> </ul> </li> <li>- Determination of overall and town targets for sanitation programme</li> <li>- Preparation of guidelines for implementation</li> </ul>	<ul style="list-style-type: none"> <li>- Loans channeled through HUDCO and/or State Government agency</li> <li>- Implementation through State or selected NGO</li> <li>- Subsidy channeled through State Government agency</li> </ul>	
<b>HUDCO</b>	<ul style="list-style-type: none"> <li>- Preparation of guidelines for financing of :               <ul style="list-style-type: none"> <li>o conversion of dry latrines</li> <li>o construction of new latrines</li> <li>o construction of public latrines</li> </ul> </li> <li>- Assess loan applications from authorized institutions</li> <li>- Formulate loan agreements</li> </ul>	<ul style="list-style-type: none"> <li>- Release of funds for implementation</li> <li>- Monitoring of progress, and release of loan instalments if progress is according to agreement</li> </ul>	<ul style="list-style-type: none"> <li>- Ensure repayment of loan by Directorate of Municipal Administration or Municipalities</li> </ul>
<b>Directorate of Municipal Administration</b>	<ul style="list-style-type: none"> <li>- Identification of towns for sanitation programmes</li> <li>- Determination of allocation of funds (loans &amp; grants)</li> <li>- Directives for loan recovery</li> <li>- Planning for implementation at municipal level</li> </ul>	<ul style="list-style-type: none"> <li>- Supervision of implementation through municipal authority or private organization</li> <li>- Monitoring of proper utilization of funds</li> </ul>	<ul style="list-style-type: none"> <li>- Release of funds for maintenance</li> <li>- Ensure repayment of loan by municipality</li> </ul>

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<b>Involved Agencies and their Responsibilities</b>			
	<i>Planning</i>	<i>Implementation</i>	<i>Operation &amp; Maintenance</i>
(continued from Table A8.5.1)  State Water & Sewage Board	<ul style="list-style-type: none"> <li>- Project planning</li> <li>- Preparation of engineering details</li> <li>- Preparation of budget</li> </ul>	<ul style="list-style-type: none"> <li>- Responsibility for project implementation</li> <li>- Selection and supervision of contractors</li> <li>- Technical guidance</li> </ul>	<ul style="list-style-type: none"> <li>- After implementation, handing of responsibility for operation and maintenance to municipal authorities</li> <li>- Ensure repayment of loan by municipality</li> </ul>
Municipal Authority	<ul style="list-style-type: none"> <li>- Planning of projects at local level</li> <li>- Training of staff</li> <li>- Selection of beneficiaries</li> <li>- Planning for motivation and education of beneficiaries</li> <li>- Preparation of loan agreement with beneficiaries</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation of work</li> <li>- Selection of contractors</li> <li>- Supervision of contractors</li> <li>- Motivation and education of beneficiaries</li> <li>- Site selection of public latrines</li> <li>- Monitoring of Implementation</li> </ul>	<ul style="list-style-type: none"> <li>- Provision of services for operation and maintenance of public latrines</li> <li>- Provision of services for private latrines if requested</li> <li>- Provision of pit emptying services</li> <li>- Recovery and repayment of loans</li> </ul>
Nongovernmental Organizations	<ul style="list-style-type: none"> <li>- Assist municipal authorities or state level organizations in project planning</li> <li>- Planning for motivation and education</li> <li>- Planning for training of local municipal staff and contractors</li> </ul>	<ul style="list-style-type: none"> <li>- Construction of latrines</li> <li>- Technical guidance</li> <li>- Selection of contractors</li> <li>- Motivation and education of beneficiaries</li> <li>- Training of local municipal staff and contractors</li> </ul>	<ul style="list-style-type: none"> <li>- Provision of services for operation and maintenance</li> <li>- (Usually) handing over of responsibilities to municipal authority</li> </ul>

Table A8.5.2 Financial Information

Financial Information								
Beneficiary category	UP TO PLINTH				SUPERSTRUCTURE			
	EWS	LIG	MIG	HIG	EWS	LIG	MIG	HIG
Loan	50%	60%	75%	75%	90%	85%	75%	60%
Central subsidy	45%	25%	nil	nil	nil	nil	nil	nil
contribution beneficiary	5%	15%	25%	25%	10%	15%	25%	40%
interest rate per annum (%)	10.5	10.5	10.5	10.5	9.5	12.5	15.0	17.0
loan period (year)	7	7	7	7	15	15	15	15

Legend: EWS — Economically Weaker Section  
 LIG — Low Income Group  
 MIG — Middle Income Group  
 HIG — High Income Group

## 8.6 Lesotho: Rural Sanitation — from Pilot Project to National Programme<sup>18</sup>

### 8.6.1 Overview

The rural sanitation programme in Lesotho exhibits a process of sector development, from the implementation of a small-scale pilot project to the establishment of a nation-wide improvement programme. It began in 1983 with financial assistance from UNDP and UNICEF, and laid the groundwork for a large-scale, integrated national programme. It places a high level of responsibility on users to pay for improved on-site sanitation as a decisive factor in making rural sanitation feasible and sustainable. The programme uses the VIP latrine at a total cost of US\$ 75 to \$150 per unit. Sustainability has been enhanced through the successful transfer of construction and maintenance skills to members of the rural communities.

In Lesotho, very little Government or donor money is spent for rural sanitation.. A privately supplied and privately financed market for latrines has been created, and latrines would

<sup>18</sup> Compiled from: UNDP/World Bank/PROWESS Water and Sanitation Discussion Paper Series No. 3, World Bank, Washington D.C. 1990.

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continue to be built even if all government support were to come to a halt. The purchase of a latrine under an unsubsidized programme shows that a high priority has been given to sanitation, which suggests that improvements have been made in hygiene attitudes and behaviors.

The emphasis on cost recovery from users has also been welcomed by donors. With a reasonably well-defined and tested strategy, and a cost-recovery policy in place, the programme was more attractive to donors when support was sought for national expansion.

The programme's requirement for relatively high levels of cost recovery also raised the issue of affordability. Some percentage of the population in rural Lesotho will not be able to afford improved sanitation at current costs. However, subsidies have been avoided for two reasons: first, current costs of construction are already high without subsidies being provided, and second, introduction of a subsidy might undermine the self-help philosophy of the programme and misallocate resources to those who can afford to pay the full cost of their own latrine. Several strategies to increase affordability without subsidy were tried, including a credit union scheme for financing latrine construction. Success has been mixed and further efforts are needed to enable the programme to reach more of the very poorest population.

Relatively high levels of cost recovery can only be achieved when sanitation demand is high. Demand is largely a function of an appreciation of the advantages of improved sanitation, particularly the potential health benefits. Therefore, in the programme, extensive interaction with community members was required to convey the advantages of improved sanitation, and to instruct users on the hygiene behavior needed to maximize associated health benefits. Increased demands for latrines and a reduced incidence rate of diarrhoea among young children were seen where participatory methods were used systematically.

### **8.6.2 Some Salient Features of the Programme**

- Due to severe budgetary constraints, the Government stipulated that beneficiaries would be required to make a significant contribution to overall costs through direct payment of construction expenses. Construction was to be handled by the private sector with Government playing a largely facilitative role through organizing and training, the promotion of community involvement and health and hygiene education. Latrine builders were to be recruited from the local population and would receive training from project assistants. On-site production of concrete components by the local builders was found to be the most cost-effective method. Householders were given responsibility for procuring materials and employing the local builder.
- As latrine construction proceeded, studies were conducted of prevailing attitudes and levels of knowledge among the district's rural population, with an emphasis on sanitation-related diseases.
- After three years of pilot operation, with 400 latrines built, the decision was made to expand the project and to replicate it on a national scale. As the Government of



Lesotho endorsed a National Rural Sanitation Programme, the focus on district-level activities was retained and donor funding proceeded on a district-by-district basis. At the national level, coordination is the responsibility of a national team made up of a national coordinator, a chief technical officer, a health-education and training officer, an officer for monitoring, and two national teams for training, one made up of four technical assistants and the other of two health assistants. Actual field implementation is the responsibility of district sanitation teams, with a district coordinator and four health assistants provided by the Ministry of Health, and four technical assistants provided by the Ministry of Interior. The rural health-care system of the Ministry of Health was already reasonably well developed and focused on village-level concerns, making use of over 4,000 volunteer village-based health workers.

- Overall community approval and commitment to sanitation has been found to be extremely important. Over the years, a five-stage pattern of promoting community commitment has emerged, to be used when the district programme expands into a new community:
  - ▶ An orientation and participatory training workshop for district extension workers is organized.
  - ▶ This is followed by entry into villages with information provided and opinions solicited. Extension workers form learning groups and conduct house-to-house visits.
  - ▶ Local latrines builders are trained.
  - ▶ The technical and health assistants stay on for a couple of months, if possible, to supervise construction and to consolidate changes in health and hygiene behavior.
  - ▶ Monitoring and evaluation of activities. Monitoring covers, inter alia, rates and standards of construction, prices, credit flows, and the degree of activity of the local latrine builders.
- Latrine-building loans are provided entirely in kind, in the form of materials or payment notes which the latrine builders cash at the credit union office when work is completed. The borrower signs a legal bond that states the cash value of the loan and the repayment schedule. Credit union management at the local level is variable, of course, and may need strengthening. Cost recovery is managed by the Ministries of Health and Interior. Funds are deposited at rural clinics where they are collected by the district's sanitation coordinator and finally placed in a Ministry of the Interior account, to be used for centralized purchase of material for additional latrines.
- Affordability of the latrines was investigated in 1985 by USAID's Water and Sanitation for Health Project. An estimated 45% of the rural population could afford VIP latrines without any external financial assistance, 30% were estimated to be in

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need of some extension credit, and 25% could not afford to participate without partial or full subsidy.

- Hundreds of latrine builders have been trained at the village level by the technical assistants from the Ministry of Interior. Courses are normally of two weeks duration and involve 20 to 30 participants. Of those trained, 15% take up latrine building as a full-time career, 45% part-time and 40% drop out. Builders come from a wide variety of backgrounds and are between 17 and 70 years old; a significant number are women.
- As the national programme expanded, efforts were made to increase the effectiveness of educational activities through the use of more effective methods, with an emphasis on female audiences. At the national level, training focused on the district sanitation coordinators in participatory approaches. District sanitation coordinators, in turn, taught these methods to extension workers, who could then use the teaching techniques to raise awareness and promote changes in sanitation and hygiene behavior among villagers.
- The final link between the programme's health education activities and the village is the village health worker. These are volunteers, generally women, who are selected by their communities to act as liaisons with the formal health system. Their responsibilities include first aid, baby weighing, immunization, health counseling and referrals. The sanitation programme has gradually increased their role in health and hygiene education, and included latrine construction training courses. The village health workers also assist in teaching sanitation in schools.

## **8.7 Lesotho: Low-cost Urban Sanitation — Overview and Funding<sup>19</sup>**

### **8.7.1 Summary**

The low-cost sanitation programme in Lesotho is a remarkable learning experience. It started with pilot projects for both urban and rural sanitation in 1980 and 1983 respectively, and has since evolved into a national programme with few expatriate personnel and modest reliance on governmental or external funding (see also Annex 8.6).

Initially, in the 1930s, bucket latrine systems were introduced, with the aim of preventing pollution of ground water from the pit latrines. At that time, water was still drawn from shallow wells which were subject to contamination. During the 1970s, water supply shifted to piped systems and boreholes, and the introduction of the VIP latrine in the context of a

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<sup>19</sup> Compiled from: Isabel Blackett, UNDP/World Bank Water and Sanitation Discussion Paper No. 10, World Bank, Washington, 1994.

site-and-services scheme as part of a housing development in Maseru provided a new type of experience. During the 1980s, urban sanitation was becoming a new priority as the government responded to the challenge of the International Water Supply and Sanitation Decade. It was then that the pilot operation was initiated as part of an urban development project funded by the International Development Association (IDA) and an urban Sanitation and Health Improvement Team was established to plan and manage the project. The Team was renamed Urban Sanitation Improvement Team (USIT) in 1991.

While the Team implemented the pilot project, the Ministry of Water, Energy and Mining (MoWEM) negotiated a loan for sanitation projects in 13 district towns with the Kreditanstalt für Wiederaufbau (KfW). Originally foreseen as a sewerage project, the feasibility report revealed that a significant component of on-site sanitation was required to achieve the objective of improving overall sanitation in these 13 towns, which are now an example for an integrated approach to sanitation in towns. It combines both off-site and on-site technologies and involves two ministries. Since 1984, responsibility for the on-site component has been vested in the USIT as the most appropriate body to handle this particular aspect of the overall programme for the district towns.

Thus, three ministries share responsibility for water supply and sanitation in Lesotho, i.e. the Ministry of Interior through the USIT and its Village Water Supply Section, the Ministry of Health through the National Sanitation Programme (see Annex 8.6), and the Water and Sewerage Authority of the MoWEM. When USIT started, it was a small government department. Ultimately, there were three sections: the community section, the technical section and a small administration. For some years, expatriate experts assisted the team. When the 13 towns project started, new team members came from within and not outside of existing government structures, and most of the best arrived directly from schools, college or university, or from another department which had a similar teamwork philosophy. Many of the best were women. In 1990, the government provided US\$72,000 for salaries as counterpart to an ODA budget of US\$75,000. Since 1990, more staff has been added by the government. The budget covers wages, office and transport; the ODA funding covers promotion, training, new vehicles, capital equipment, and evaluation and monitoring for the work in Maseru and the headquarters team. The total running costs for the 13 towns project (KfW-funded) is about US\$80,000.

As regards technology, the VIP latrine is the mainstay of the low-cost urban sanitation approach. The programme relied on local builders who were trained by the team. Great care was taken to consult with the users as to their needs and preferences. Initially, four types of VIP designs were being promoted by different agencies. The resulting confusion led to the agreement that a national design standard was needed, which was established after considerable debate. The standard stipulates that the latrines can be built as a ringbeam VIP, a fully-lined VIP, a VIDP (Ventilated Improved Double Pit latrine) or VIP bucket conversion.

For a family of six, the VIP will require emptying or relocation after a period of about six to eight years. An emptying service is operated in most urban areas and the most popular model is the fully-lined VIP. In rural areas, pits are abandoned and the superstructure is

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relocated; this has favoured the wide use of ringbeam VIPs, or double-pit latrines. In Maseru, emptying is operated by the USIT. As different types of equipment were used and tested, concern focused on the safe and economic disposal of the sludge. Initially, the sludge was disposed of at nightsoil farms. Clearly, this imperfect method required change. In Maseru, lagooning was adopted on land near the city's sewage treatment plant. More trials will be needed for other areas.

### **8.7.2 Lessons Learned**

Four widely applicable lessons emerged from Lesotho's urban (and rural — see Annex 8.6) sanitation experience:

- **The right design:** The technology must be adequate, affordable for most people and acceptable to the users. It should be standardized for economy and simplicity. In Lesotho, the VIP was the most appropriate solution. In other situations, different types of latrines may be required.
- **No subsidies:** Whenever possible, the users should finance their latrines themselves, or through a credit mechanism. The users should directly employ private sector local builders who are trained in latrine construction. If subsidies are required, the real costs should be determined first, and the implications and likely problems be foreseen cautiously.
- **Promotion:** To attract the users, the issues of health and status should be addressed through various media. Promotional materials need not be professionally produced, but must be thoroughly tested.
- **Institutional arrangements:** Programmes should work through governmental structures, if possible. Collaboration with related programmes should be encouraged. Running costs of programmes should be kept appropriate to government budgets so that the local government can afford to take over costs once donor funding is phased out. Staff must be carefully selected and team spirit is essential. Few expatriates should be engaged, and only those who can demonstrate a long-term commitment to the programme, but staff should be localized over time.

### **8.7.3 Funding**

The Water and Sanitation Discussion Paper No. 10 states:

Experience indicates that once subsidies are offered, it is often very difficult to discontinue them and persuade people to finance the entire cost of the latrine by themselves. Sufficient funds to subsidize latrines for an entire nation are unlikely to become available. But even if they were, would subsidies be the best policy? USIT evaluated this subject closely and

concluded that subsidies, grants or free latrines were generally inappropriate for domestic sanitation in Lesotho because:

- A significant percentage of urban people were buying fairly large household consumer items that they desired, with the assistance of credit;
- In several countries, while creating short-term benefits, subsidies have also created serious problems that affect the long-term sustainability of what might otherwise have been an effective program;
- They intrinsically contradict the policy of sustainability;
- Users have less than full responsibility for their sanitation, and, therefore, proper cleaning, upkeep and maintenance is less likely;
- They place a permanent drain on government or donor resources;
- They are very difficult to target and rarely assist those who have genuine need of help; and
- If USIT offered subsidies, it would contradict the policy of the Rural Sanitation Program (serving people with generally lower incomes).

On the other hand, if a low-cost sanitation program is to be feasible, extended payment arrangements are needed. USIT was aware that to achieve substantial sanitation improvements, some people would have to spread their costs over a year or two. A revolving fund in the form of a loan scheme was designed which had the following advantages:

- Financing was available for sanitation improvements on a long-term basis;
- There is no limit to the number of people who could be assisted, and testing for eligibility would be unnecessary;
- Repayment with interest means that full responsibility for sanitation remains with the householder, thereby increasing the probability of proper cleaning, upkeep and use;
- Donor or government seed money is given a long-term value; and
- Sustainability of the system is more likely.

Many large household items that people owned were comparable in cost to a VIP latrine. Some of the large consumer items were purchased through commercial credit schemes. Many people also built houses through credit schemes. Although the cost of a latrine appears to be an additional burden to the cost of building a house, it actually constitutes a very small amount in comparison to the total cost.

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After two years of discussions, a loan scheme was set up in conjunction with the parastatal Lesotho Bank. It was a key point that the government should not be seen as the lender. In other credit schemes, poor repayment rates have been partly attributed to the borrowers' awareness of the government's inefficiency at collecting debts and prosecuting defaulters. Therefore, promotion of the scheme advertises USIT as giving the technical advice and assistance, but the actual loan comes from Lesotho Bank.

Lesotho Bank bought the idea of managing the scheme, as it helped them to increase their range of services and further utilize their newly acquired computer system. They have since started similar credit schemes in conjunction with low-cost housing projects and for extension of urban infrastructure services. For the scheme to be successful, it had to be as simple as possible to manage, acceptable to the accountant general and legally sound so that defaulters could be prosecuted. Satisfactory levels of loan repayment are attributed to several factors:

- The loan application is submitted to a Loan Approval Committee of two USIT officers and three or four local people such as the town clerk, chief, hospital matron or military officer. The Committee must interview the client before the loan can be approved. The Committee is also responsible, along with USIT, for following up on late repayments.
- A substantial deposit (30-40% of total cost) is required. This involves not only money but organization, time and effort, and helps to ensure the client is serious about wanting the latrine.
- Lesotho Bank is regarded as an efficient institution that would certainly try to reclaim debts if they were owed.
- Reminders are given or sent out automatically after 30, 60 and 90 days when a repayment has been missed. The 90-day reminder is copied and circulated to the local chief (or town clerk) who will also follow up the debt.
- USIT strongly encourages people to visit the office to discuss repayment problems. Community staff follow up on clients who are defaulting on their loans.
- No repayments are expected during December and January when everyone has the costs of Christmas as well as the school fees to pay. The loan is actually to be repaid in 20 installments over 24 months.

Figure 8.7.1 is an example of a flyer used to provide information to potential borrowers as to how to apply for a sanitation loan.

Figure 8.7.1 — Information Flyer

### HOW TO GET CREDIT FOR YOUR VIP

If you do not have the funds to build a VIP now, then you can apply to USIT for a loan from Lesotho Bank. This is what you have to do:

1. Go to your nearest USIT office and ask for a full explanation of the Loan Scheme and the various options available.
2. With USIT assistance, complete the Loan Application Form. You can choose to repay your loan over any period of up to 20 months. Interest will be charged at the normal Lesotho Bank rates on the loan. In exceptional circumstances, repayment of the loan could be negotiated for a longer period.
3. You will then be called for an interview by the Loan Approval Committee (LAC). They need to check that you are over 18, that you can produce a site ownership certificate and that you are likely to meet your monthly repayments. Before you can receive the loan, you will have to collect 120 blocks and sand for the substructure. You must also dig your own pit.
4. When you have collected the materials, you will have to sign an "Acknowledgment of Debt" agreement and commit your collateral against the loan amount. You should then pay the M 10.00 registration fee. This fee covers the cost of paperwork, flyscreen, roof screws and a few small items. You will then be given a "loan number".
5. USIT will help you find a trained builder and give you a purchase order for the remaining materials and the builder's fee.
6. After you collect the materials yourself from the suppliers, the builder can start building. A USIT Technical Officer will check that it is built correctly. When it is finished, you will have to sign a completion certificate — stating that you are satisfied with the VIP — before the builder is paid.
7. When the invoices have all been paid, USIT will set up the loan with Lesotho Bank. You will be given a Loan Repayment Card to take with you to the Bank. The repayment should be made on or before the first day of every month.
8. If you have any financial problems and cannot make a repayment, talk to USIT community staff about it and USIT will try to help you. Remember, if you repay in less than 20 months, you will pay less money in interest.

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Invariably, the bad debtors have been the wealthier people who think no one will follow up on the debt. Most poorer people are concerned about falling into debt and thus repay regularly. Many people have repaid more quickly than their chosen loan period, to reduce their interest payments. No one has been prosecuted yet, but legal proceedings have started against a few clients. The default rate has risen slowly since the scheme started. This is mainly due to understaffing in the USIT Community Section, which makes it difficult to follow up on everyone who is behind on payments.

### **8.8 Pakistan: The North-East Upgrading Project<sup>20</sup>**

#### **8.8.1 Background**

Lahore is the second city of Pakistan and has a population of around four million. A planning study of the city was carried out with World Bank funding in 1979/80, and this was followed in 1983/84 by a more detailed study of the northern part of the city, which contains a high proportion of informal development, including many industries. In the course of this study, an area in the north-east of the city was identified as a potential upgrading area. This area later became the location of the North-East Lahore Upgrading Project, which like the original planning study was funded by the World Bank. The total area covered by the project was about 400 hectares, of which about 270 hectares was already built up in 1986 when project preparation work began. Most of the area had developed informally over the previous 20 years, although there were some older settlements. It was mostly residential in nature, although there was also a considerable amount of industry and commerce.

Prior to the start of the project, there were virtually no sewers in the area, and those WCs that existed discharged their effluent into open drains via household septic tanks. Falls were very limited, but with a slight overall fall from east to west. At the time of the project, most of the undeveloped land lay along the western fringe of the area and the relatively low level of this land tended to hold back development.

#### **8.8.2 The North-East Lahore Upgrading Project**

The project was designed and implemented in stages, starting with trial schemes in two lanes, which were carried out in early 1987. A pilot scheme for a seven-hectare area followed in 1988, and implementation of the main project began in 1989. The challenge was to develop proposals for sewerage and drainage which would:

- Form part of an integrated approach to upgrading;

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<sup>20</sup> Source: Proceedings of the Urban and Peri-Urban Strategic Sanitation Conference (unpublished), UNDP/World Bank Water Supply Sanitation Programme, March 1996, The World Bank, Washington, 1996.



- Use design standards and details which were both affordable and appropriate to the conditions found in the area; and
- Deal with the technical problems created by the limited falls.

Given the fact that all sewage would have to be pumped, it was decided at an early stage that efforts would be made to keep stormwater out of foul sewers as far as was reasonably possible. In practice, a fully separate scheme is impossible in such an area, but minor streets were designed with levels which allowed stormwater to run off on the surface into covered rectangular storm drains in the main streets.

The design of collector sewers and storm drains was carried out in a conventional way, although it is worth noting that the storm drains were designed for a return period of less than one year. The procedures for planning and designing tertiary sewers are of more interest. Basic design guidelines were developed, relating the allowable minimum slope to the number of houses served by a sewer. The aim was that these slopes would provide a minimum velocity of about 0.75 m/sec. for peak dry-weather flows. However, some relaxation of this criterion was inevitable near the head of the sewer. The minimum-slope guidelines were then used to design local sewer networks which were plotted on 1:500 plans of the area. At each manhole or chamber, the existing ground level and the proposed invert and cover levels were indicated, and the drawings also showed the distance between manholes to the nearest 0.5 m and the sewer slope. Cover levels were used to determine street levels and thus ensure that a slope was always available for stormwater run-off.

Sewer pipes were spun concrete, locally manufactured with spigot and socket joints. The minimum depth to invert allowed in lanes too narrow to allow vehicular access was 500 mm, with rather greater depths required in wider streets and lanes. Standard details were developed for a range of standard chambers and manholes and each standard design was designated by a letter (Type A, Type B, *etc.*). The required type could then be indicated on the sewer plans at each manhole or chamber location. Chambers on tertiary sewers were spaced at intervals varying from about 17 m to a maximum of 35 m, but generally falling in the range 20-25 m.

### 8.8.3 Diversifying Services and Technology

The project unit within the Metropolitan Planning Wing of Lahore Development Authority (LDA) was responsible for the provision of tertiary and some secondary sewers within the project area, leaving the remaining secondary sewers and trunk facilities to be provided by the Water and Sanitation Agency (WASA). No explicit effort was made within the project to deal with household-level facilities. In retrospect, it is arguable that more could have been done to diversify technologies, with World Bank funding and LDA efforts being concentrated on secondary facilities, leaving local government and community-led initiatives to provide sewers at the local level. This might provide a response to the shortage of technical resources — already identified as a problem. The role of government engineers and

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private consultants should be to develop the overall framework and provide the primary and secondary infrastructure, leaving local professionals and tradesmen to design and implement the tertiary-level facilities, which, individually, require a lower level of technical input.

### **8.8.3 Demand Orientation**

The North-East Lahore project was essentially top-down, with little community involvement in planning, design and implementation. Despite this, it is fair to say that there was a clear demand for improved sanitation. Surveys showed a significant increase in the number of households with flush sanitation, from around 36% in 1986 to around 84% in 1990. The latter figure was found both in areas that had already been upgraded and in those awaiting action.

Subsequent experience suggests that demand from householders is not, in itself, enough to guarantee the success of a scheme. There has also to be a willingness to take on the responsibilities associated with improved sanitation. In the case of North-East Lahore, this meant that WASA was required to take responsibility for operating and maintaining services while residents were expected to make regular payments for the services provided. Difficulties and delays were experienced in achieving these conditions because, for various reasons, there had been insufficient dialogue with the two groups at the planning stage of the project. The experience suggests that demand from households is a necessary but not sufficient condition for long-term improvements in sanitation. It is also important to ensure that all concerned have been involved in the planning process and have considered their likely responsibilities.

### **8.8.4 Institutional Requirements**

Following on from the last point, it is clear that the institutional arrangements for North-East Lahore left something to be desired. The main problems arose from the separation of responsibilities for planning and design from those for operation and maintenance. This is a common structural feature of integrated projects implemented through some form of project management unit and will often lead to problems unless specific efforts are made to ensure that all concerned understand and can undertake their responsibilities. There were also problems in providing the required technical and managerial knowledge and skills from within government, and these problems are discussed below in the section on replicability.

### **8.8.5 Sustainability**

The institutional problems raise doubts about the sustainability of the project. It was clear from the time that facilities were ready for handing over that WASA had not budgeted for the operation and maintenance of the system. Another important determinant of sustainability is the financial viability of a system. The project proposals assumed that cost recovery for

upgrading would be achieved partly through the imposition of user tariffs and partly by raising property taxes. It is doubtful whether either was achieved to the level envisaged by project planners, and this points to the need to consider such matters as integral to the project design, and to obtain the agreement and commitment of all concerned parties at the beginning of a project.

### 8.8.6 Expanding the Project — Replicability

The project was relatively large, serving a total population of over 100,000. However, it could have only a limited impact on conditions in the city as a whole. In 1991, it was estimated that all the World Bank funded upgrading projects in the Punjab Province of Pakistan would only deal with about 17% of the annual growth in unserved areas in the Province. One measure of a project's success must therefore be the extent to which it has been replicated. In this respect, an important feature of the approach was that it required a high attention to detail and a fair degree of skill on the part of the designer. This was particularly true in relation to the decision to separate storm flows and to allow them to run off by gravity. Attention had to be paid to various details, for instance to the arrangements needed to carry foul connections under main storm drains. More importantly, the whole system of foul sewers had to be carefully engineered, with attention paid to relative levels, the depth and type of each manhole and the slope of each sewer leg. The approach was therefore dependent on:

- The availability of good survey drawings, providing accurate information on levels;
- Careful, at times painstaking design, by a skilled designer; and
- The availability on site of trained engineers and technicians and conventional surveying equipment.

In North-East Lahore, the first requirement was met, since the whole area had been surveyed by a survey contractor, and plans had been prepared at a scale of 1:500. The survey was based on a triangulated grid fixed by a theodolite traverse, and details were filled in using plane table methods. Levels were tied into the national datum. The cost of producing these drawings was around Rs 2,300 (US\$80) per hectare in 1987. The standard of the surveys was good, but experience elsewhere in Pakistan suggests that it is difficult to ensure this quality of survey as a matter of course. There must be some doubt about overall capacity to produce surveys and drawings at the rate required to make a significant impact on conditions in informal areas.

A more important constraint on the replicability of the approach is the shortage of engineers with the skills and attitudes required to produce detailed designs to the required standard. Most of the design for the seven-hectare pilot project and the first two full-size contracts (covering areas of about 30 hectares and 25 hectares, respectively) was carried out by expatriate consultant engineers. Although there were some problems with these designs, they worked well on the whole. Later designs were carried out by local consultants working

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under an expatriate project manager. The indications are that some aspects of these designs, particularly those which dealt with stormwater, were not considered in as much detail as had been the case for the early contracts. Observation of the standard procedures adopted for many locally funded schemes in Pakistan suggests that it is perhaps unrealistic to assume that the resources are available to ensure the requisite attention to detail required for this approach.

The availability of the skills and equipment required to set out sewers in accordance with the levels shown on drawings is also in doubt. For the project itself, a reasonably good team of site engineers was assembled, although there was a lack of management skills. However, it is doubtful whether the attitudes and skills necessary to replicate the project widely are generally available within the government sector.

The conclusion must be that considerable investment would be required — for introducing new skills into both the government and private consulting sectors — before the North-East Lahore approach could be adopted as standard throughout Pakistan.

Another point relating to replicability is the form of the project in relation to typical government initiatives in the field of sewerage provision. The key point here is the difference between the relatively large, carefully engineered contracts let in North-East Lahore project, and the small-scale and relatively *ad hoc* approach taken to the provision of local sewers by municipal authorities and local residents. It is difficult to see how the former could influence the latter, and equally hard to see how the North-East Lahore approach could be generally adopted by local government.

# Notes

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