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South Asia**

On-site Sanitation

**An International Review
Of World Bank Experience**

Andrew Fang
July 1999

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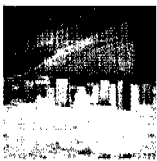
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*A study carried
out by the
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Photography (Front Cover)



Hjalte Tin/Still Pictures

Government-funded latrines in Likalaneng Village, Maseru Province, Lesotho.



Mark Edwards/Still Pictures

Slum in Ghana.



Guy Stubbs

Community contributions for sanitation, Ahmedabad, India.



Paul Harrison/Still Pictures

Sanitary latrine in Western Kenya.

July 1999

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On-site Sanitation: An International Review of World Bank Experience

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The original report on which this paper is based was prepared by Andrew Fang during June-July 1998 working as World Bank summer intern attached to the then Environment Sector Unit of the East Asia and Pacific Islands region of the World Bank (EASEN). The impetus for undertaking this review came from the perception that many Bank-financed projects in Asia included on-site sanitation components, but that no comprehensive review of their success or failure had been done. The original concerns were mostly related to the suitability of the technologies employed and their environmental sustainability. But during the review, institutional and social aspects were found to be of great concern as well.

The work was undertaken under the general guidance of the unit manager, Kristalina Georgieva (EASES), and with encouragement from Robert Goodland (ENV). Hakon Kryvi and Heinz Unger (EASES) provided the terms of reference and then directed and oversaw Mr Fang's work on a day-to-day basis. Many Bank colleagues cooperated by contributing ideas and information. Comments on the draft report were given by Daniel Hoornweg (EASUR), Kirsten Hommann (SASIN), Mary Judd (EASES), and Jennifer Sara (AFTU2). Stephen Latham (School of Public Affairs, University of Maryland) and Kevin Tayler (GHK - Research and Training, UK), carried out detailed reviews of the draft report and provided extensive comments. Kirsten Fehrenkamp (EASES) performed a check on the sources quoted and did some initial editing.

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ABBREVIATIONS AND ACRONYMS

CIDA	Canadian International Development Agency
CBO	Community Based Organizations
CWSSP	Community Water Supply and Sanitation Project
DCC	Dhaka City Corporation
FW4SP	First Water Supply, Sewerage and Sanitation Sector Project
FY	Fiscal Year
IBRD	International Bank for Reconstruction and Development
ICR	Implementation Completion Report
IDA	International Development Association
IDRC	International Development Research Center
IER	Impact Evaluation Report
KfW	Kreditanstalt für Wiederaufbau
NGO	Non-governmental Organization
ODA	Overseas Development Administration
PCR	Project Completion Report
PPAR	Project Performance Audit Report
RWSA	Rural Water and Sanitation Association
SAR	Staff Appraisal Report
SSA	Strategic Sanitation Approach
TOR	Terms of Reference
UN	United Nations
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Program
UNDP/TAG	United Nations Development Program/Technology Advisory Group*
UNDP/WB	United Nations Development Program/World Bank*
US	United States
USIT	Urban Sanitation Improvement Team
VIP	Ventilated Improved Pit

*UNDP/TAG and UNDP/WB were forerunners of the Water and Sanitation Program (WSP).

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FOREWORD

Sanitation has long been neglected in water supply and sanitation projects and programs. While there has been widespread acknowledgement that improved sanitary behavior is necessary to realize the potential health benefits of improvements in water supply, adequate emphasis is yet to be placed on sanitation components of most projects, in terms of funding (relative to investments in water supply), attention to innovations in project design and in supervision. Many sanitation investments fail to result in improved health and environment for target communities, and indeed in the worst cases, a positive deterioration in the living environment can be the end result (a non-functioning latrine, for instance, serving to concentrate potential contamination and infection closer to the house, can be worse than no latrine at all).

Over the past 20 years much progress has been made in developing innovative and appropriate sanitation technologies which can serve the specific needs of low income and informal communities. One major area has been in the development of so called 'on-site' technologies; technologies which enable a household to own a self-contained sanitary latrine which is not dependent on the functioning of an expensive and technically complex sewerage network for safe disposal of human excreta. These latrines have brought relief to homes around the globe and have been widely adopted in major investment programs of both governments and donors. Nonetheless the adoption of new technologies in projects has not, in itself, necessarily improved the effectiveness of investment. To understand why, it is necessary to unravel the complex institutional and financial issues associated with past investments to find out why things went wrong. This is a major task but one which is permanently ongoing, with donors, governments, independent bodies and NGOs providing a range of good quality review material which looks at past project experience.

This study aims to add to this body of work by carrying out a brief review of a specific set of project experiences; those associated with World Bank investment projects around the world. The study has deliberately limited its scope to older, large scale World Bank investment projects utilizing on-site technology. This does not imply a lack of merit in other approaches, merely a need to focus the analysis on a discreet set of experiences (experiences in the use of off-site technology and the significant achievements and lessons from the informal sector are also significant as we move forward to new project approaches). The study looks at the design of projects, both technical and institutional, and evaluates, to the extent possible, the outcomes of investments over the longer term. The value of the approach is that it is possible to draw useful lessons from these projects relating to the long term effectiveness of the investments undertaken.

As all major actors in the sector, including the World Bank, move towards a more open acknowledgement of the institutional and financial challenges inherent in successful sanitation investments, it is hoped that this retrospective study can provide some useful indicators of how to implement more successful projects and programs in the future.

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Photograph: Mark Edwards/Sift Pictures

Ghana: In many slums, the street is the only place available for washing, bathing and defecation.

EXECUTIVE SUMMARY

Over 50 infections can be transferred from a diseased person to a healthy one by various direct or indirect routes involving excreta. The primary objective of sanitation programs is the improvement of public health. This primary health objective can often be fully achieved by on-site sanitation technologies which are much simpler and cheaper than conventional sewerage.

The World Bank has supported low-cost on-site sanitation projects in developing countries for many years. The purpose of this review is to identify successes, issues, and problems of World Bank-supported low-cost on-site sanitation projects and explore technology options of low-cost on-site sanitation. New strategies for sustainable on-site sanitation are also presented in the report. Sanitation projects implemented in East Asia, South Asia and Africa over the past 10-20 years were the focus of the review.

Three major approaches were used in this study:

- ◆ Bank reports, such as Staff Appraisal Reports (SARs), Implementation Completion Reports (ICRs), Project Performance Audit Report (PPARs), and Impact Evaluation Reports (IERs), were consulted to obtain information on the design, preparation, implementation and social and environmental impacts of a specific project;

- ◆ Task managers and mission team members of some projects were identified and interviewed whenever possible; and

- ◆ A literature review of on-site sanitation was conducted to follow the latest developments in technology and management aspects of low-cost on-site sanitation in developing countries.

The review covers on-site sanitation work in 24 water supply and sanitation projects over the past 20 years. Because some projects involved a series of investments that took place within the same target areas and had similar objectives, they were grouped together and analyzed as a single project. This reduced the sample size to 16 projects, with five in East Asia, eight in South Asia, two in Africa, and one in South America.

Many different latrine designs have provided effective low-cost on-site sanitation. Innovative technology is needed for low-cost sanitation in low-income urban areas with high population density. It is difficult to determine and measure groundwater contamination by pit latrines, especially in saturated zones. Although many Bank projects do have some sort of water source monitoring program for bacteria, no efforts have seemingly been made to relate any found problems with the locations of latrine pits and the possibility of groundwater pollution by these pits.

Getting communities involved in the

selection process is the key to finding an economically and culturally acceptable design. However, frequently, the most popular technology was chosen and there was no evidence showing that any modifications were made to accommodate requirements from communities with special economic and cultural backgrounds.

It has commonly been found that project beneficiaries, sometimes even project managers, do not understand the importance of sanitation in fully realizing the health benefits that water supply programs are intended to bring. Sanitation rarely receives adequate political support, and low public awareness often results in difficulties for sanitation programs. Rarely does a Bank report give the reasons for the failure or success of the sanitation part of a project. Other information related to sanitation, such as latrine design, cost sharing and recovery, and facility operation and maintenance, are usually absent in Bank reports as well. The Bank needs to focus more on all aspects of sanitation programs if they are included in projects, that is, to give it a higher profile, more attention, and more preparation and supervision resources.

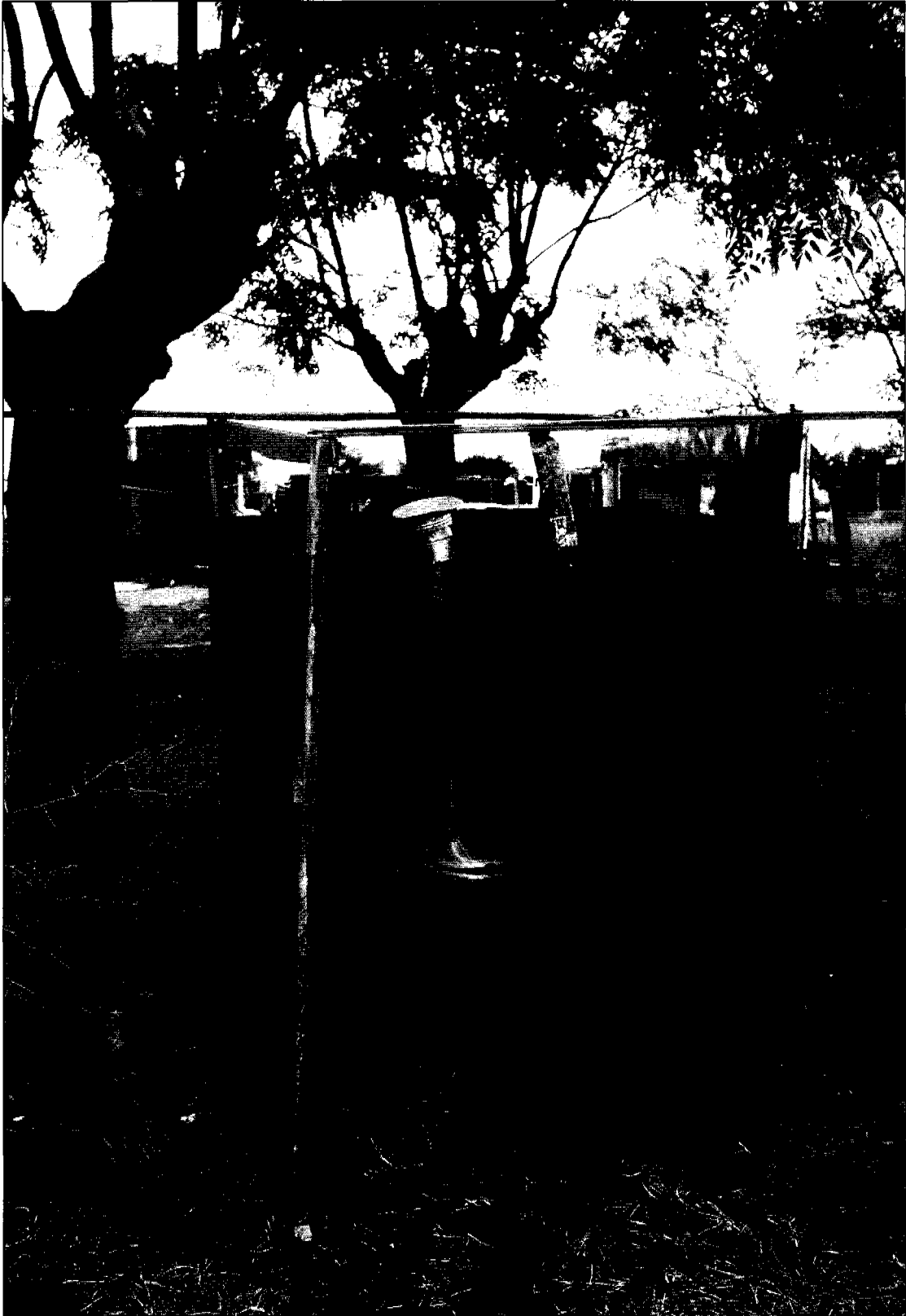
Most latrine users considered latrines to be some kind of a status symbol. The motivating factors for many households to build a latrine are not hygienic but primarily social: comfort, convenience and privacy. This is true even

where households have been exposed to health education. When promoting and marketing sanitation, therefore, project implementers should focus on the social benefits that a latrine can bring as well as the hygiene benefits.

Most of the projects reviewed in this study employed a cost-sharing scheme of grant and loan or grant and user contribution. The success of loan programs depended heavily on the willingness of the households to apply for credit. A low sense of ownership, high subsidies, and the perception of being mere recipients of assistance rendered cost recovery difficult in some of the projects.

Many of the projects reviewed in this study failed to result in sustained improvements through sanitation. This is often the result of a low sense of ownership by the users, or a low level of users' awareness of operation and maintenance procedures.

Many strategies have been developed by the Bank and other development organizations to develop sustainable sanitation programs. The principles implied in these strategies include developing demand-driven programs, focusing on promotion, expanding community participation, user-oriented financial management, and making proper institutional arrangements. Engaging NGOs to undertake some of the work can also enhance efficiency and effectiveness of sanitation projects.



Photograph: Mark Edwards/Still Pictures

Argentina: A locally designed sanitary latrine in Buenos Aires.

INTRODUCTION

Background

A convenient supply of safe water and the sanitary disposal of human wastes are essential ingredients of a healthy, productive life. Over 50 infections can be transferred from a diseased person to a healthy one by various direct or indirect routes involving excreta. Coupled with malnutrition, these excreta-related diseases take a dreadful toll in developing countries, particularly on the poor who suffer the most from absence of access to safe water and sanitation. UN statistics indicate that, in 1990, approximately 380 million people were still without adequate sanitation in urban areas worldwide (United Nations, 1990). One of the fundamental problems in improving the situation in developing countries is the high cost of conventional sanitation services. In industrialized countries, the standard solution for the sanitary disposal of human excreta is waterborne sewerage. In addition to its technical complexity, this solution is beyond the bounds of affordability for many low-income communities in developing countries.

The primary objective of sanitation programs in developing countries must be the improvement of public health. This primary health objective can often be fully achieved by on-site sanitation technologies which are much simpler and cheaper than conventional sewerage.

Objectives

The purpose of this review is to identify lessons from World Bank-supported low-cost on-site sanitation projects. East Asia, South Asia and Africa were the focus of the review.

The objectives of the study were to:

- ◆ examine low-cost on-site sanitation technologies, their advantages and disadvantages; and
- ◆ review Bank-supported on-site sanitation projects to identify the problems and issues related to technology selection, project implementation, and the sustainability of improvements.

Study Methodology

Three major approaches were used. First, Bank reports, such as SARs (Staff Appraisal Reports), ICRs (Implementation Completion Reports), PPARs (Project Performance Audit Reports), and IERs (Impact Evaluation Reports), were consulted. Second, task managers and mission team members of some projects were identified and interviewed whenever possible, generating valuable first hand information of individual projects. Unfortunately, because of the time constraints and the departure of staff involved in projects completed many years ago, only a few projects could be analyzed with the help of interviews.

Third, a selective literature review of on-site

sanitation was also conducted. The purpose of the literature review was to follow the latest developments in technology and the management aspects of low-cost on-site sanitation in developing countries.

Projects Reviewed

The review covers on-site sanitation work in 24 water supply and sanitation projects over the past 20 years. The projects studied are listed in Attachment 1. These projects were reviewed to learn overall lessons of experience, not to critique them individually. Because some projects involved a series of investments that took place within the same target areas and had similar objectives, they were grouped

together and analyzed as a single project. This reduced the sample size to 16 projects, with five in East Asia, eight in South Asia, two in Africa, and one in South America. In addition, information from a project in Burkina Faso was provided by one of the mission leaders. This project is included in the discussion because it offers a good example of a successful demand-driven on-site sanitation project.

None of the 24 projects was a stand-alone on-site sanitation investment. Without exception, sanitation was just one component within a larger water supply or sewerage project. Often, sanitation was allocated only a small portion of the project resources and staff time.



Photograph: Mark Edwards/Still Pictures

India: A toilet pan factory.

FINDINGS

Low-cost On-site Sanitation Technology

On-site sanitation usually involves the use of some form of pit. In pit latrines excreta and anal cleansing materials are deposited in a hole in the ground where they undergo complex chemical and biological reactions and decompose, producing innocuous humus-like solids, water and gases. Water and gases dissipate into the ground or air, leaving a solid residue in the pit. According to the sociological and cultural preferences of users, various types of superstructures – ranging from a privacy screen with no roof, to high quality enclosures – can be added above the pit.

Much work has been done on the technical aspects of pit latrines (Cotton and others, 1995; Franceys and others, 1992; Mara, 1982). Technical options, their advantages and disadvantages, and their application criteria are well documented. The following paragraphs give a brief description of various on-site sanitation systems. Attachment 2 gives a summary of cost, water requirements (if any), and the advantages and disadvantages of each system.

Simple pit latrine

A simple pit latrine consists of a slab over a pit, which may be 2 meters or more in depth. The pit walls and floors are permeable and

allow liquids to soak away. A squat hole in the slab or a seat is provided so that the excreta falls directly into the pit. Insects (flies and mosquitoes) and odor nuisance are major disadvantages of this type of latrine. The addition of a lid that fits tightly into the hole in the slab has been reported to help reduce fly numbers significantly. In places where the 'open-air' approach is acceptable or even preferred, the odor problem can be reduced by building a latrine without any superstructure, except for a privacy screen. This design can also reduce costs. A floating layer of polystyrene beads, through which female mosquitoes cannot lay eggs and larvae cannot breathe, can be used to control mosquitoes. The beads have been found to remain in place for as long as four years (Cotton and others, 1995).

Ventilated improved pit (VIP) latrine

Insect and odor nuisance may be further reduced if the pit is ventilated by a pipe extending above the latrine roof, with fly-proof netting across the top. Such latrines are known as Ventilated Improved Pit (VIP) latrines. Field work in Botswana and Zimbabwe indicates that the incidence of wind blowing across the top of the vent and into the latrine shelter is the most important factor in reducing insect and odor nuisance. An earlier notion suggested that the

pipe should be on the sunny side of the building and should be painted black (Cotton and others, 1995). In urban areas, where other buildings allow neither wind nor sunshine to reach the vent pipe, the effectiveness of ventilation pipes becomes questionable.

Pour-flush pit latrine

The pour-flush latrine incorporates a toilet bowl in the slab. The toilet bowl has a trap that provides a water seal. The toilet is cleared of faeces by pouring in small quantities of water (1-2 liters) to wash the solids into the pit and replenish the water seal. A water seal prevents flies, mosquitoes and odor from reaching the latrine from the pit. The pit may be offset from the latrine by providing a short length of pipe or covered channel from the bowl to the pit. It can be upgraded by connection to a sewer when sewerage becomes available. The major disadvantage is the requirement of a reliable water supply, which makes it unsuitable in dry areas. It is also unsuitable where solid anal cleaning material is used.

Combination of VIP and pour-flush pit latrine

It seems that some Bank-supported projects applied a design that is a sort of hybrid of the VIP and the pour-flush latrine. For instance, in the India Uttar Pradesh Urban Development Project (World Bank, 1987), the SAR report refers its latrine design as "ventilated improved pit latrine with pour flush". However, no technical details were given in the report. The SAR report also mentioned that the UNDP/TAG had conducted feasibility studies in the 26 towns where the low-cost sanitation programs were carried out. Further study on this design may be conducted by consulting corresponding UNDP/TAG documents (see the SAR report-Credit/Loan No.: 1780-IN (IDA)/2797-IN (IBRD)).

Compost latrine

In this latrine, excreta fall into a watertight tank to which ash or biodegradable organic matter is added. If the moisture content and chemical balance are controlled, the mixture will decompose to form a good soil conditioner in about four months. Pathogens are killed in the dry alkaline compost, which can be removed for application as a fertilizer. Compost latrines allow a natural resource to be recycled. Most compost latrines are not easy to operate. They require a considerable amount of conscientious user care and maintenance in that the correct amount of ash or biodegradable organic matter must be added at the correct time to control the moisture content and the carbon to nitrogen ratio. Even if such material is available throughout the year – and it is unlikely to be so in dense urban areas – it is doubtful that the users will be sufficiently motivated to produce a good quality humus which they may not have a use for or be able to sell (Mara, 1982). In addition, the lack of an adequate composting period can result in high levels of worm infection (Cotton and others, 1995). As a result, compost latrine use is restricted to those nations where the practice is customary and the discipline of operation is observed by well educated users. Nonetheless, Kalbermatten (1976) reported compost latrines had widespread application and acceptance in Vietnam. The reader is referred to the literature for further information.

Septic tank

A septic tank is an underground watertight settling chamber into which raw sewage is delivered through a pipe from plumbing fixtures inside the house or another building. The sewage is partially treated in the tank by separation of solids to form sludge and scum.

Septic tanks are expensive, require piped water, and need to be emptied regularly. Effluent from the tank infiltrates into the ground through drains or a soakpit. Some design modifications can make it possible to use septic tanks at higher housing densities, provided that soil is suitable for on-site disposal. Mara (1982) suggested a modified design with three compartments. The first compartment receives only the cistern-flush toilet wastewater which after settlement passes to the second compartment for further settlement and then into a third compartment that also receives directly all the household sullage. The net result of having three compartments and initially separating the toilet wastewater and the sullage is that the effluent can be expected to have a long-term infiltration rate, some two-three times greater than the effluent of a conventionally designed septic tank with one or two compartments, so that the drain field can be two-three times smaller.

Aqua-privy

An aqua-privy has a watertight tank immediately under the latrine floor. Excreta drop directly into the tank through a pipe. The bottom of the pipe is submerged in the liquid in the tank, forming a water seal. Effluent is discharged to a soakpit. Aqua privies have a reputation for poor operation and are seldom constructed now, except as communal latrines. The need for large quantities of water for cleaning the drop pipe and maintaining a water seal has been given as a major disadvantage of aqua-privies.

Overhung latrine and bucket latrine

Overhung latrines are built over water into which faeces fall. Only when the water has sufficient flow to carry excreta away and is not used by people downstream is the health

hazard low enough for the latrines to be considered as satisfactory. Bucket latrines have a bucket or another container for the retention of faeces, which is periodically removed for treatment or disposal. Excreta removed in this way are sometimes termed nightsoil. Poor operation or inconsistent and infrequent collection make bucket latrines malodorous and they can induce an insect problem. Nightsoil collection everywhere results in health hazards to collectors. Millions of bucket latrines still exist in developing countries as they provide reasonable privacy and convenience to the users. However, they can never be promoted as a sanitary option because of the associated health risks.

Vaults and cesspits

In some areas, watertight tanks called vaults are built under or close to latrines to store excreta until they are removed by hand or vacuum tanker. Similarly, household sewage may be stored in larger tanks called cesspits, which are usually emptied by vacuum tankers. They have high construction and collection cost.

Pit Size, Single And Double Pits

Experience in East Africa (Cotton and others, 1995) suggests that if soakage pits are deeper than 4 meters, they never fill up. Pit latrines may have double pits with each pit being used alternately. When one pit is full, it is 'rested' for two years while the other one is in operation. This is long enough for all pathogens, including roundworm, to die. At the end of this period, the accumulated solids can be safely removed. While the possibility of using the decomposed contents as a fertilizer or soil conditioner is frequently stated, it is not always an option for households in urban areas. In fact, disposal of the contents often presents

problems. In addition, some households fail to use twin pits properly. Frequently, both pits are used together and fresh solids are removed from both pits simultaneously with all the attendant health hazards. The routine of alternating pits may be neither acceptable nor convenient to users in some areas.

There is always a trade-off between a large single pit and two shallow pits. The former is constructed and emptied with a higher cost and provides only limited treatment of the waste, but requires minimum maintenance in terms of the frequency of emptying. The latter are easier to construct and empty but require more frequent maintenance in terms of both emptying and operating. It seems that many Bank projects promote the use of twin pit latrines because of their low construction cost, health benefits and the fact that once built, the pits are more or less permanent.

Technical options for on-site sanitation are summarized in Attachment 2. The use of overhung latrines, bucket latrines, vaults and cesspits is not recommended.

Other Important Considerations

Groundwater pollution

Soakage pits pose a risk to health where there is an inadequate separation between the pit and the groundwater table.¹ In these circumstances, pathogens may contaminate ground water leading to contamination of water supplies in the vicinity. However, where the pit is well above the groundwater table, water may be safely abstracted from a well or borehole a few meters away from a latrine. In the saturated zone (below the groundwater table), bacteria and viruses have been observed to travel several hundred meters with the groundwater (Lewis and others, 1982). As such, it is very difficult to establish a safe

minimum lateral spacing between a water supply and an on-site sanitation unit in saturated soil because of the complexity of factors such as permeability and hydraulic gradients that control saturated flow rate. Nonetheless, it is obvious that in areas where soil is sandy and groundwater table is high, building a latrine within a few meters of a well is not acceptable. Bank projects in Indonesia and the Philippines report a minimum required distance of 15-20 meters. However, there is no evidence to show whether this distance is 'safe' as groundwater surveys for every project area are both financially and technically unrealistic. Although many Bank projects do have some sort of water source monitoring program for bacteria, no efforts have seemingly been made to relate any problems with the location of latrine pits. This is either because water supply and sanitation components of a project are rarely coordinated, or because the beneficiaries and the project implementators do not understand the link between water source contamination and inappropriately positioned latrine pits.

Small plots and high-density population

Critics of pit latrines often claim that they are unsuitable for small plots in urban areas. In Indonesia, regulations state that areas with over 250 persons per hectare shall be classified as densely populated and shall not use on-site excreta disposal. The smallest plot size recommended for twin-pit pour-flush latrines in India is 26 square meters. However, Cotton and others (1995) pointed out that none of the criteria used appears to be based on reasoned argument or evidence of performance. A survey conducted in Bihar, India, indicated that among 3,246 households that had failed to convert to pour-flush pits from dry latrines when funds were available,

1. According to Lewis and others (1982), the risk of faecal groundwater pollution is minimal when the thickness of relatively fine (<1mm), continuous unsaturated soil beneath the base of a latrine is greater than 2 m, provided that hydraulic loading does not exceed 50 mm/day. Here, the hydraulic loading is defined as the probable range of daily effluent volume divided by the basal excavation area of the latrine concerned (values of 25 ± 15 mm/d for VIP latrines to 90 ± 30 mm/d for pour-flush latrines).

only 0.9 per cent of respondents gave 'lack of space' as the reason for not taking advantage of the scheme.

Users' perceptions of different on-site technologies

Cotton and Saywell (1998) conducted research on users' perceptions of different on-site technologies in Ghana, Mozambique and India. They employed several different methodological tools simultaneously: household surveys, semi-structured interviews, quantitative testing, postal surveys, and literature review. Results show that both lid-covered simple pit latrines and septic tanks enjoy a more than 90 per cent level of overall user satisfaction, while both VIP latrines and pour-flush latrines have a satisfaction level of 83 per cent. Bucket latrines receive a low 33 per cent overall user satisfaction, a result of the frequency and cost of emptying and associated odor and insect nuisance. The study by Cotton and Saywell also indicates that the motivating factors for households to build a latrine are primarily social: comfort, convenience and privacy. This is true even for households that have received health education.

Technology for low-income, high density urban communities

Because of regulations in many developing countries, densely populated low-income urban communities often do not adopt on-site sanitation solutions. Public latrines or public sewerage toilets are often adopted instead. However, these often fall apart quickly due to poor operation and maintenance practices. This problem is particularly grim for public facilities built with Bank project funds. The communities or the public organizations assigned to do the operation and maintenance rarely honor contracts or pledges to provide

water or maintain the toilets. Examples of such failure can be found in the Indonesia Jakarta Sewerage and Sanitation Project (1983) and in the India First, Second, and Third Mumbai Water Supply and Sewerage Project (World Bank, 1978, 1986a, 1990d, 1996d, 1997c).

In many communities, sharing a toilet with strangers is just unacceptable. In addition, public facilities are inconvenient and users often return to their previous habits. Successful stories of public facilities in low-income high-density areas are often associated with privatized ownership and a 'pay and use' model. For instance, in the Philippines First Water Supply, Sewerage and Sanitation Sector Project (World Bank, 1990a), the most successful public toilet facilities appeared to be located in areas served by a private entity such as a church or a market association. Such facilities were able to collect fees for use, which were then used to purchase water and maintenance services. In some instances, these facilities returned substantial profits which could then be reinvested.

Condominial sewerage

A recent innovative development in solving the sanitation problem in crowded low-income areas uses intermediate-cost sewers for carrying away the effluent from pour-flush toilets or septic tanks (Wright, 1997). Simplified sewerage systems are less expensive than conventional systems but have the same benefits. Since the technology carries the effluent away from the house it reduces the land requirements of household latrines. The condominial system is a good example of an intermediate cost system. Developed by the Brazilian engineer Jose Carlos de Melo, the condominial system saves on both household and trunk sewer costs. It replaces the conventional deep main sewers with shallow

feeder sewers running through the backyards of neighborhoods.² Because the feeder sewers are shallow and there is only one main sewer connection per block, the main sewers can also be much shallower, saving on costs. These systems usually enjoy fairly good operations and maintenance; if one household drain blocks, neighbors quickly bring it to the attention of the user and the blockage is quickly cleared. Condominial systems have proven to be highly successful in north east Brazil and are being replicated on a large scale (Wright, 1997).

Issues and Problems of Bank-supported On-site Sanitation Projects

Almost every Bank-supported water supply project has a sanitation or sewerage component. Linking sanitation to water supply investments makes sense to secure improved health benefits. Low-cost on-site sanitation is often, although not always, the natural choice for low-income rural and peri-urban communities, because of the high cost and technical constraints of a conventional sewerage system. But many of the projects studied experienced problems.

Low priority for sanitation

Despite its importance, sanitation always received a small proportion of the project resources and staff time. Within the 11 projects that have records of cost or budget for sanitation, eight show investment in sanitation as being less than 10 per cent of the total cost. The two projects that took place in the Philippines are exceptions, with spending on sanitation components being 43 per cent and 26 per cent, respectively. This could be a result of the Philippine Government's understanding and strong commitment to improving the

nation's sanitation conditions.

Sanitation investments are often unsuccessful because sanitation and hygiene interventions are:

- ◆ often not seen to be as important as water by either project managers or communities;
- ◆ more difficult as they rely on a change in behavior of targeted individuals, families and communities;
- ◆ inadequately coordinated with water investments, leading to conflicting messages being directed to communities; and
- ◆ not based on the priorities, cultural practices and needs of communities.³

To make matters worse, it is often difficult to prove direct cause-effect relationships between specific sanitation interventions and improvements in health. As a survey taken in five Nepalese urban centers revealed, low income families are rarely convinced of the benefits of sanitation by health statistics. Only 28 per cent of the people surveyed gave health as a reason for building latrines outside the government subsidized program; 43 per cent gave prestige, comfort, privacy or a combination of these as the primary reason (Cotton and others, 1995). With this perception of sanitation benefits in mind, it is not difficult to understand that in areas where poverty and indebtedness prevail, when money is available, it may well be prioritized for other essential items.

The limited attention that sanitation programs receive from project managers and beneficiaries can be illustrated by the following two cases. In the case of Bangladesh Third Dhaka Water Supply and Sanitation Project (World Bank, 1986b), funds were initially included for the Dhaka City Corporation (DCC), the entity responsible for municipal services including sanitation, to develop a low-cost sanitation program that involved an

2. Variations in the Brazilian design are possible, for instance, where access is not possible behind plots, shallow sewers can be laid in the street or under the pavement provided traffic loading is low.

3. Excerpted from *Rural Water Supply and Sanitation in Malawi: Sustainability Through Community-Based Management (Second Draft)*, Government of Malawi with support of the United Nations, (May 1995).

assessment of the sanitation in Dhaka and implementation of a pilot program providing 4,000 latrines covering about 88,000 people. However, due to lack of commitment by the DCC and insufficient interest by potential beneficiaries in the project, it took five years for the DCC to approve the terms of reference and finalize the bidding procedures. The short-list of consultants was submitted to the bank only nine months prior to the Credit closing date, when it was no longer possible for the DCC to implement the program. As a result, the low-cost sanitation program was 'eventually eliminated' (World Bank, 1996c). In the Somalia Second Mogadishu Water Supply Project (World Bank, 1982d), although the project was originally designed as a water supply stand-alone project, it was felt during preparation that a linkage between water and sewerage had to be established. However, the Government did not push for a component in the project beyond earmarking US\$ 0.3 million for sanitation studies. Nonetheless, a low-cost sanitation component consisting mainly of demonstration latrines and related technical assistance was prepared and the Bank assisted in looking for financing. Although the cost was modest (US\$ 0.6 million), no foreign grant funding could be mobilized. The Government indicated before the effectiveness of the Credit that it would finance it, but the commitment became less clear afterwards. In the end, the Project Completion Report (World Bank, 1990b) did not mention the low-cost sanitation component at all. Apparently, funding was not realized and the sanitation program was never implemented.

Considering the low level of attention that sanitation projects have received from clients and Bank staff, it is not difficult to understand the fact that information about sanitation components is often scattered through Bank

reports and project files and is often unfocused.

Bank reports, such as SARs, ICRs, and PPARs, rarely provide details of latrine designs or other technical considerations. Among the 24 projects encountered in this review, only one SAR has a diagram of the latrine proposed to be constructed in the project. More often, but not always, only the name of the technology employed is mentioned. Justification for the technology selection, design modifications and measures to limit groundwater pollution are rarely found in these reports. Project files, maintained as archives, may be a better source for such information but these are hard to access. Interviews with task managers show that sanitation programs often only adopt the most popular on-site sanitation technology in the project country or the region and use it for all project areas. In East Asia and South Asia for instance, the twin-pit pour-flush latrine is the most popular on-site technology, while for projects in Africa, the VIP latrine dominates. Other options may be more appropriate in some of these cases but choice is often restricted.

Design selection and demand generation

Considering the tight links between the income level, cost, cultural preferences and technology choice, it is not difficult to understand the importance of selecting an appropriate latrine design for a specific project area. Some Bank projects have tested an approach to let the project beneficiaries decide on the latrine designs they want. With this approach, more than one type of demonstration latrine will be built with full or partial subsidies in selected communities. Information about the cost of each design is made available to potential users. The

operation and maintenance of the latrines, and the benefits from using them are illustrated with the usage of the latrines. The purpose of this approach is two-fold: to identify a suitable latrine design and to generate demand for on-site sanitation. However, in two projects this approach failed for two reasons. In the Indonesia Water Supply and Sanitation for Low Income Communities Project (World Bank, 1993a) and the Philippines First Water Supply, Sewerage and Sanitation Project (World Bank, 1990a), contractors hired to construct demonstration latrines often gave poor performance which resulted in faulty latrines that quickly became unusable. Moreover, sometimes only public latrines were built. Both these factors contributed to defeating the original purpose of the approach. In the China Rural Water Supply and Sanitation Project (World Bank, 1992a), although villagers in project areas appreciated and enjoyed the benefits that a model latrine could bring to them, they simply were not able to afford to build one on their own. Apparently, affordability had not been accurately considered during the project design process. Of all the projects reviewed – the successful ones or the failed ones – none enabled the eventual users to make effective choices about technology.

Other than constructing demonstration latrines, some projects employed a stimulating method to generate demand, by providing communities part or all the materials needed for constructing a latrine free of charge. In the Philippines First Water Supply, Sewerage and Sanitation Project (World Bank, 1990a), the pour-flush toilet bowls were issued at no cost to beneficiaries who had expressed interests in building a family pour-flush latrine. The beneficiaries provided labor and materials for pit digging and superstructure construction.

According to the Implementation Completion Report (ICR), 70 percent of the toilet bowls were installed, with virtually all of the remainder being completed after the loan was closed. However, in many instances the latrines were not installed according to project specifications. The most frequently reported problems were the lack of a vent pipe (about 40 percent) and substandard quality of superstructure (about 32 percent). In some instances, the p-trap that came with the bowl was not installed because beneficiaries or builders did not understand the importance of having a water seal. The ongoing Indonesia Water Supply and Sanitation for Low Income Communities Project (1993a) employs a more comprehensive stimulant strategy. One hundred packets of materials (two sacks of cement, one plastic or ceramic toilet pan, and a small section of ventilation pipe), necessary to build as many family latrines, were provided to each community where water supply facilities were constructed. Training in latrine construction methods was supposed to be provided by the civil work contractors of the Ministry of Public Works. However, according to the primary contractor of the overall implementation of the project, a field review in 120 target villages indicated that only half of these have constructed more than 30 percent of the latrines for which the materials were provided. There are two likely reasons for the low turnout of the stimulant strategy. Firstly, communities seldom received any training during the construction of the demonstration facilities. Secondly, the amount of material (cement, toilet pans, vent pipes) received by communities typically fell short from what was allocated in the budget, meaning that either the material or the money that should have been used to buy them was diverted.

A successful case of the demand-driven

method comes from an on-site sanitation program in Ouagadougou, Burkina Faso, (Ouayoro, 1998). This program is not a loan or credit program from the Bank. Instead, the UNDP/WB Water Supply and Sanitation Program provided advice and assistance while the local water and sanitation utility is financially self-reliant and covers program cost and cost recovery. The utility provides free slabs for pits and soakaways, which cover about 25 percent of the total cost of a twin pit VIP latrine. A distinguishing feature of this program is that, in order to take the advantage of the free slab, householders must show evidence that they have sufficient resources to complete the latrine. Apparently, a strong demand for the sanitation facilities is the basis to the success of the program. The utility runs TV and radio promotion programs and hires personnel to do field education and demonstrations. Since 1993, 14,000 units have been built. Starting from 1999, 7,000 more units are to be built each year until 2005. Latrines built are of good quality and are well maintained because of the clear ownership and the relative ease of operation and maintenance of the twin pit VIP system.

Cost sharing

Most of the projects reviewed in this study employed a cost sharing system of grant and loan or grant and user contribution. Grants were given out in the form of either construction materials or latrine parts, as in the stimulant schemes, or cash credits, as in the Kerala Water Supply and Sanitation Project (World Bank, 1985). The grant amount ranged from 20 percent to 100 percent of the total cost, depending upon the project design, which in turn was usually determined by income level in the project areas. Where necessary beneficiaries were expected to apply for loans

to cover the balance. Loans were usually paid in monthly instalments with or without an interest payment. For instance, the India Tamil Nadu Water Supply and Sanitation Project (World Bank, 1984) recommended that the loan element provided to households be recovered at an interest rate of 9.5 per cent over 25 years (the estimated lifetime of a latrine) in monthly instalments beginning from the month following the completion of the latrine installation.⁴ In Malawi First and Second Lilongwe Water Supply Engineering Project (World Bank, 1982a, 1986c), however, no interest payment was added to the three monthly instalments for the cost of raw materials. Often, householders who wanted to build a latrine contributed their share of the cost in the form of labor, such as pit digging, and using locally available materials, such as wood for superstructures.

The success of the loan programs depends heavily on the willingness of the households to apply for such credits. In the Indonesia Jakarta Sewerage and Sanitation Project (1983), many households perceived the cost of a twin-pit latrine (US \$200 equivalent) to be unaffordable. It was subsequently found that only 16 per cent of the household sites in need of sanitation were finally considered for an on-site facility. Had a more affordable design been chosen, there might have been greater interest in the program.

Another approach towards cost sharing is the 'revolving fund'. In the Indonesia Water Supply and Sanitation for Low Income Communities Project (World Bank, 1993a), 1 million Rupiah (US \$500) was provided to various communities for establishing a revolving fund. Households which built latrines financed by the fund, would subsequently deposit a certain amount of money back into the fund to enable the community to build

4. Since latrines are relatively inexpensive, monthly instalments would have been almost negligible, suggesting that the design of the loan regime was not well thought out.

more latrines. In the Sri Lanka Community Water Supply and Sanitation Project (World Bank, 1992b), the Community-based Organizations (CBOs) managed a revolving fund on behalf of the communities. The CBOs provided interest-free loans to those individuals in the community who wanted to construct or upgrade their sanitation services, and who were capable of repaying their loans within two years. The maximum projected loan amount for a new latrine represented about two-thirds of the cost.

Cost recovery

Cost recovery is always a problem that Bank-supported sanitation projects have to face. In the India Kerala Water Supply and Sanitation Project (World Bank, 1985), it was reported that cost recovery was generally poor. Many areas reported that hardly anyone was bothering to make loan payments on their latrine, although it went better in some other areas. Enforcement on the loan repayments was rare. Frequently, the beneficiaries or the project implementation units of Bank-supported projects perceived them as grant-in-aid projects for which funding would be provided by the national government. Generally, there was a low level of acceptance for the concept of cost sharing. In some projects with a water supply component, beneficiaries were charged a water fee intended to cover the costs of sanitation facilities as well as the water supply costs. However, no specific information could be found relating to the effectiveness of cost recovery for sanitation facilities in the projects reviewed in this study. In the Ghana Kumasi On-site Sanitation Program (Ouayoro, 1998), however, people who wanted to build a latrine had to finance the balance (after 40 percent government subsidy) with loans from local

commercial banks. Clearly, loan repayments will not be a problem in this program.

Project sustainability

Lack of sustainability is a problem frequently cited in the appraisal reports for the sanitation projects reviewed in this study. Many lessons can be learned from unsuccessful experiences. Lack of a sense of ownership and inappropriate operation and maintenance services appear to be the major reasons why investments in sanitation fail in the long run.

In the Philippines First Water Supply, Sewerage and Sanitation Project (World Bank, 1990a), the Project Management Office of the Department of Health was responsible for overall supervision of the sanitation program and providing nationwide planning, programming, management, monitoring, reporting, and logistic support to its district offices, which were responsible for the actual implementation of the project activities. This top-down project implementation scheme resulted in beneficiaries' low sense of project ownership. Because some of the facilities were inappropriate to the actual needs of the communities, some beneficiaries refused to organize themselves for the operation and maintenance of the facilities. Although household latrines built in the project were generally maintained in good condition because there was a clear sense of ownership, the sustainability of some of them is questionable because of sub-standard construction. Public toilets assigned to private organizations for operation and maintenance remained in good condition but those operated and maintained by public organizations, such as schools, fell into disuse shortly after construction. In the Malawi First and Second Lilongwe Water Supply Engineering Projects (World Bank, 1982a, 1986c), the sustainability

of household latrines was threatened because emptying services were not easily available. When the audit was conducted, there were only four vacuum tanks in operating condition, three of which were owned by private contractors. The rates for pit emptying were also reported to be high (as much as the average monthly family income of about 50 per cent of Lilongwe's population). Although no project design details are available, the unsustainability of this project is apparently the result of an inappropriate latrine design that required frequent emptying service and inadequate consideration of post-project services.⁵

Some successful examples of sustainable sanitation programs come from India. In the India Kerala Water Supply and Sanitation Project (World Bank, 1985), latrines constructed were reported to be properly maintained because:

- ◆ ownership of the latrine was clearly defined with a household;
- ◆ the users appeared satisfied with the functioning of the latrines; and
- ◆ the users were aware of the operation and maintenance procedures including the switching of pits, as this had already been demonstrated with the help of local masons.

In the India Gujarat Water Supply and Sewerage Project (World Bank, 1982b), it was reported that those who had a latrine were highly satisfied and in cities owners even kept the facilities locked to prevent stray animals from spoiling them. In villages, people took pride in keeping units sparkling clean. Most people considered toilets to be some kind of a status symbol. Interestingly, the concept of communal latrines was abandoned as unworkable in this project because the facilities could not be maintained. The two cases again show the importance of a clear

sense of ownership to the sustainability of sanitation facilities.

Environmental sustainability

Information on the environmental sustainability of the projects was rarely included in Bank documentation. Apparently, not much attention has been paid to this issue in Bank-supported sanitation projects which is not surprising considering the low priority that sanitation investments have generally received. Groundwater pollution was the only related issue addressed by a few references, but no overall conclusions could be drawn from the information available.

The Community Involvement Approach

In the early 1980s, the Bank realized that to ensure success in a sanitation project, users' participation should extend from the initial collection of baseline data and identification of preferences, through design and construction, to the continued operation and maintenance of facilities. The reasons for this are both practical and psychological. Sanitation facilities that are socially unacceptable will not be used by their intended owners. For instance, the household of the first demonstration unit constructed in Kumasi, Ghana, refused to use the latrine because he was a Moslem and the latrine faced in the direction of Mecca (Cotton and others, 1995). It is, therefore, clearly worth the effort involved to determine the preferences of the intended users. This way users will not only accept the design but also feel involved; the system becomes essentially theirs and will not be perceived as having been imposed upon them by a remote government agency. The sense of being the partner of a project and the owner of the system will promote cost sharing and ensure sustainability. User involvement

5. Long term arrangements for emptying of on-site latrines and disposal of the contents is a recurring problem. In urban areas, in particular, it is often difficult for local authorities to manage and finance such services effectively. Use of private operators may help, but this issue indicates that use of on-site technologies does not do away with the need for good overall management planning at city level.

also makes it much easier for a local authority to train users to operate and maintain household systems properly, and also to mount successful health education programs.

There is a large body of literature dealing with approaches to community participation in sanitation and water projects. See for instance Kalbermatten and others (1980), Mara (1982) etc. Most of the literature agrees that, to be successful, participation of users must extend from preliminary planning right through to implementation and operation and maintenance. Such planning is often jeopardized by demands to speed up projects and reduce spending on non-hardware investments.

It must be pointed out however, that the degree of community participation and users' willingness to pay for improved service levels by contribution of money, labor or materials, depends fundamentally upon household income levels and perceived needs. Whether a project properly meets the demands of the community depends upon the accuracy, completeness and timeliness of information exchanged between residents and project implementors at the planning stage.

Community-centred approaches can be time-consuming, labor-intensive, and costly. Nonetheless, it is clear that in all the projects reviewed in this study the community involvement approach has been more or less accepted and utilized by project developers, both from the Bank and the governments. Efforts have been made in each of the projects to establish community-based organizations or engage existing organizations. However, in many cases, the approach did not give the expected results. In the Philippines Rural Water Supply and Sanitation Project (World Bank, 1982c), a local community organization – the Rural Water and Sanitation Association (RWSA)

was formed to engage in all phases of the project activities, from negotiation on financing and repayment schedules, to design, construction, operation, and maintenance of facilities. The project completion report stated however, that there were problems in creating RWSAs and this very important component of the project's institutional development was unsuccessful. The reason for this failure was that the Rural Waterworks Development Corporation, which was established by the project to be responsible for coordination of all rural water supply and sanitation activities including the RWSA program, never received the necessary political support from the government. In the Philippines First Water Supply, Sewerage and Sanitation Project (World Bank, 1990a), some of the Barangay (Village) Waterworks and Sanitation Associations (BWSAs), did not function well because they felt they were not treated as project partners but mere recipients of assistance. Top-down aspects of the project design also resulted, at times, in a low sense of project ownership, with some facilities being inappropriate to the actual needs of the community, and some beneficiaries refusing to organize themselves.

Engaging non-governmental organizations to undertake some of the work can sometimes greatly enhance the efficiency and effectiveness of sanitation projects. For instance, in the Indian Gujarat Water Supply and Sewerage Project (1983), initially the Gujarat Water Supply and Sewerage Board undertook implementation through its own staff and progress was extremely slow. After six years of frustration, in 1989, the Environmental Sanitation Institute, a reputed local non-governmental organization with considerable experience throughout India in low-cost sanitation, began participating in the project.

The positive impact of this engagement was very impressive: by the credit closing date, 29,946 latrines had been installed, an increase of 12 per cent over the original objective.

Experience of Other Organizations

Besides the World Bank, many other international and national development organizations, such as UNICEF, UNDP, Canadian International Development Agency (CIDA), and Kreditanstalt für Wiederaufbau (KfW), Germany, have financed low-cost sanitation programs in developing countries. The experiences and lessons learned from these programs are valuable sources for the further development of effective low-cost sanitation programs.

The successful low-cost urban sanitation program started in Lesotho in 1980 provides many widely applicable lessons (Blackett, 1994). The program was started on a pilot basis as part of an IDA funded urban development project. The Urban Sanitation Improvement Team (USIT) was established within the framework of the IDA project. Over the years, USIT has received funding and assistance from many development organizations, especially KfW, Overseas Development Administration (ODA), UK, CIDA, and the International Development Research Center (IDRC). USIT later became a department in the Lesotho government. Four key lessons emerged from this sanitation program:

- ◆ **Get the design right:** Ensure that the system is technically adequate, affordable for most people and acceptable to the users; then standardize it for economy and simplicity. It was concluded that the VIP latrine was the most suitable design. However, the detailed designs had to be modified for the particular

conditions in Lesotho. For instance, consumer preferences dictated that squatting slabs in VIPs were totally unacceptable and a seat must be incorporated into the design.

- ◆ **Don't subsidize:** 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.

- ◆ **Focus on promotion:** To attract the users, and to make them pay for the latrines, the issues of health and status should be addressed through various media. Promotional materials need not be professionally produced, but must be thoroughly tested. USIT has been very successful in advertising the VIP latrines. Two primary approaches were used, separately and together. The first was to publicize the health, hygiene and cleanliness benefits of improved sanitation, and the second approach heightened the status of a VIP latrine as a new, desirable, modern, and convenient product. The promotion program was so successful that it is becoming increasingly embarrassing in urban areas of Lesotho to be unable to offer house guests the use of a latrine.

- ◆ **Ensure proper institutional arrangements:** Work within government structures if possible. Encourage collaboration with related programs, and keep running costs appropriate to government budgets, so that the local government can afford to take over the costs once donor financing is phased out. Select staff carefully, and create a team spirit. Hire a few expatriates who demonstrate a long-term commitment to the program, but localize the staff over time.

The Strategic Sanitation Approach

The range of project and other experience

has led many groups both inside and outside the Bank to accept that effective sanitation requires not only appropriate technological and social strategies, but also improvement in institutional design (policies and organizations) and overall sound financial management. This has led to the development of a number of 'frameworks' within which sanitation investments can be developed.

Conceptualized by the World Bank/UNDP Water and Sanitation Program, the Strategic Sanitation Approach (SSA) is a set of ideas to help improve investment effectiveness in urban areas. The approach is built upon the idea that provision of sustainable sanitation to urban areas is only possible by a demand-oriented service delivery system, or in other words, when public agencies are able to deliver services that the people want and are willing to pay for. This means a system that has the flexibility and space to offer alternative technological options and corresponding institutional arrangements of delivery. In

addition, the SSA looks at sanitation services for the city as a whole and not as stand alone projects for specific communities or specific services. It also stresses the importance of viable financial policies and careful attention to incentives of various actors towards long term sustainability of service.

In a UNICEF report titled *A Handbook for Improving Sanitation Programs* (1995), some guiding principles of sanitation improvement were proposed. The table below is a summary of these principles divided into five categories. These principles resemble the SSA and echo lessons from USIT in Lesotho.

All these typologies suggest a need to shift from independent project interventions towards a more 'programmatic' approach which aims to change the way government institutions do business. It seems to be increasingly clear that this approach is needed to address the systematic problems which have previously dogged sanitation investments all over the world.

Guiding Principles for Better Sanitation and Hygiene Programs

Positive Behavior	Sustainability	Replicability	Partnership	Responsiveness
Be people-centred		Use local institutions	Establish clear rules	Be flexible and adaptive
Use enabling approaches		Scale-up and multiply results	Clarify responsibilities and commitments at the start	Take the community perspective from the start
Rely on local people		Be realistic		
Use local knowledge and practices		Develop simple, standard management systems	Clarify the time frame at the start	Learn from experience

CONCLUSIONS

The following broad conclusions can be drawn from both the review of Bank-supported projects and the available literature.

Technology

Many latrine designs have proved effective for low-cost on-site sanitation. Care must be taken to select appropriate and acceptable designs in every situation. Innovative technology is needed for low-cost sanitation in low-income urban areas with high population density. Latrine pit emptying and disposal of waste remains a serious challenge in many cases. It is difficult to determine and measure groundwater contamination by pit latrines, especially in saturated zones. More work is required to provide information on the pollution risks associated with on-site latrines.

Latrine Design – Community Involvement

The importance of selecting an appropriate latrine design for a specific project area cannot be overemphasized. Getting communities involved in the selection process is the key to finding an economically and culturally acceptable design. Demonstration latrines can be used to explore technological options and to generate demand, but they must be well constructed and suitable for target

communities' needs and levels of affordability.

Low Priority of Sanitation Programs

It is commonly true that target communities, sometimes even project managers, do not understand the importance of sanitation to fully realize the health benefits that water supply programs are intended to bring. Limited political support and low public awareness often jeopardize sanitation programs. The Bank and all donors need to focus on all aspects of sanitation programs to give sanitation a higher profile, improve project preparation and supervision and to build understanding and commitment among clients.

Users' Perceptions of On-site Sanitation

Most latrine users consider latrines to be some kind of a status symbol. The motivating factors for many households to build a latrine are not hygienic but primarily social: comfort, convenience and privacy. This is true even where households have been exposed to health education. When promoting and marketing sanitation, therefore, project implementers should focus on the social benefits that a latrine can bring as well as the hygiene benefits.

Cost Sharing and Recovery

Most of the projects reviewed in this study employed a cost sharing scheme of grant and loan or grant and user contribution. The success of loan programs depended heavily on the willingness of the households to apply for credit. A low sense of ownership, high subsidies, and the perception of being mere recipients of assistance, rendered cost recovery difficult in some of the projects. Effective cost sharing and cost recovery policies are essential to build user-ownership of sanitation facilities.

Sustainability

Many of the projects reviewed in this study failed to result in sustained improvements through sanitation. This is often the result of a low sense of ownership by the users, or a low level of users' awareness of operation and maintenance procedures. Sustainable investment in household sanitation require explicit approaches which involve users and give them a degree of control over investment

decisions. It also requires that usable systems for operation and maintenance be identified and established as an integral part of all projects or programs. Such arrangements should be self-financing and suitable to the needs of the users.

Strategic Approaches

Many strategies have been developed by the Bank and other development organizations to develop sustainable sanitation programs. The principles implied in these strategies include developing demand-driven programs, focusing on promotion, expanding community participation, user-oriented financial management, and making proper institutional arrangements. Engaging NGOs to undertake some of the work can also enhance efficiency and effectiveness of sanitation projects. When preparing a sanitation project, the Bank should look outward to identify successful approaches, including up-to-date, sustainable, and tested technologies and institutional approaches.

BIBLIOGRAPHY

1. Blackett, Isabel. C. 1994. *Low-Cost Urban Sanitation in Lesotho*. UNDP-World Bank Water and Sanitation Program. DP No. 10, Washington, D.C.
2. Cotton, Andrew, Richard Franceys, John Pickford and Darren Saywell. 1995. *On-plot Sanitation in Low-income Urban Communities-A review of Literature*. Water, Engineering and Development Center, Loughborough University Technology, UK.
3. Cotton, Andrew and Darren Saywell. 1998. *On-plot Sanitation in Low-income Urban Communities-Guidelines for selection*. Water, Engineering and Development Center, Loughborough University Technology, UK.
4. Franceys, R., John Aston Pickford, and R. Reed. 1992. *A Guide to the Development of On-site Sanitation*. World Health Organization. Geneva.
5. Kalbermatten, John. M., DeAnne S. Julius, and Charles G. Gunnerson. 1980. *A Summary of Technical and Economic Options*. Transportation, Water, and Telecommunications Department. Appropriate Technology for Water Supply and Sanitation, v.1a. World Bank. Washington, D.C.
6. Kalbermatten, John. M. 1976. *Health in the Third World: Studies from Vietnam*, Spokesman Books, London.
7. Lewis, W. John, Stephen S.D. Foster, and Bohumil S. Drasar. 1982. *The Risk of Groundwater Pollution by On-site Sanitation in Developing Countries: A Literature Review*, IRCWD Report No. 01/82. International Reference Center for Wastes Disposal. Duebendorf, Switzerland.
8. Mara, D. Duncan. 1982. *Appropriate Sanitation Alternatives for Low-income Communities: A Brief Introduction*, Transportation, Water, and Telecommunications Department. Appropriate Technology for Water Supply and Sanitation, Vol.1b. World Bank. Washington, D.C.
9. ORG-MARG SMART Survey and Market Research Team (PVT) LTD. 1998. *Impact Evaluation Study of the Rural Water Supply and Sanitation Project in Sri Lanka*. World Bank, Operations Evaluation Department, Vol. 1 & 2. Washington, D.C.
10. Ouayoro, E. 1998. Interview (07/22/98), AFTU2. World Bank.
11. Parlato, Ronald. 1984. *A Monitoring and Evaluation Manual for Low-Cost Sanitation Programs in India*. UNDP-World Bank, Technical Advisory Group, TAG Technical Note No. 12. Washington, D.C.
12. Perrett, Heli. 1984. *Monitoring and Evaluation of Communication Support Activities in Low-Cost Sanitation Projects*. UNDP-World Bank, Technical Advisory Group, TAG Technical Note No. 11. Washington, D.C.
13. UNICEF. 1995. *A Handbook for Improving*

- Sanitation Programmes. Second Draft, Oct. 10.
14. United Nations. 1990. Report A1451327 of the Secretary General of the Economic and Social Council to the UN General Assembly, July 1990, United Nations, New York.
 15. World Bank. 1978. *Staff Appraisal Report: India: The Second Bombay Water Supply and Sewerage Project*. Regional Projects Department, South Asia Regional Department, Report No. 1970b-IN. Washington, D.C.
 16. _____. 1982a. *Report and Recommendation of The President of the International Bank for Reconstruction and Development: Malawi: First Lilongwe Water Supply Engineering Project*. World Bank, Report No. P-3274-MAI. Washington, D.C.
 17. _____. 1982b. *Staff Appraisal Report: India: Gujarat Water Supply and Sewerage Project*. Regional Projects Department, South Asia Projects, Report No. 3667b-IN. Washington, D.C.
 18. _____. 1982c. *Staff Appraisal Report: Philippines: First Rural Water Supply and Sanitation Project*. Urban and Water Supply Division, East Asia and Pacific Projects Department, Report No. 3866-PH. Washington, D.C.
 19. _____. 1982d. *Staff Appraisal Report: Somalia: Second Mogadishu Water Supply Project*. Energy & Water Supply Division, Eastern Africa Regional Office, Report No. 3252-SO. Washington, D.C.
 20. _____. 1983. *Staff Appraisal Report: Indonesia: Jakarta Sewerage and Sanitation Project*. Projects Department, Urban and Water Supply Division, East Asia and Pacific Regional Office, Report No. 4158-IND. Washington, D.C.
 21. _____. 1984. *Staff Appraisal Report: India: Tamil Nadu Water Supply and Sanitation Project*. Urban and Water Supply Division, South Asia Projects Department, Report No. 4707-IN. Washington, D.C.
 22. _____. 1985. *Staff Appraisal Report: India: Kerala Water Supply and Sanitation Project*. Urban and Water Supply Division, South Asia Projects Department, Report No. 5397-IN. Washington, D.C.
 23. _____. 1986a. *Staff Appraisal Report: India: The Third Bombay Water Supply and Sewerage Project*. Urban and Water Supply Division, South Asia Projects Department, Report No. 5733-IN. Washington, D.C.
 24. _____. 1986b. *Staff Appraisal Report: Bangladesh: Third Dhaka Water Supply and Sanitation Project*. Urban and Water Supply Division, South Asia Projects Department, Report No. 5964-BD. Washington, D.C.
 25. _____. 1986c. *Staff Appraisal Report: Malawi: Second Lilongwe Water Supply Engineering Project*. Water Supply and Urban Development Division, Eastern and Southern Africa Projects Department, Report No. 6212-MAI. Washington, D.C.
 26. _____. 1987. *Staff Appraisal Report: India: Uttar Pradesh Urban Development Project*. Urban and Water Supply Division, South Asia Projects Department, Report No. 6458-IN. Washington, D.C.
 27. _____. 1990a. *Staff Appraisal Report: Philippines: First Water Supply, Sewerage and Sanitation*. Infrastructure Operations Division, Country Department II, Asia Regional Office, Report No. 8143-PH. Washington, D.C.
 28. _____. 1990b. *Project Completion Report: Somalia: Mogadishu Second Water Supply Project*. Infrastructure Operations Division, Eastern Africa Department, Africa Regional Office. Report No. 8454. Washington, D.C.
 29. _____. 1990c. *Project Completion Report: Malawi: First Lilongwe Water Supply Engineering Project*. Infrastructure Operations Division, Southern Africa Department, Africa Regional Office, Report No. 8642.

Washington, D.C.

30. _____. 1990d. *Project Performance Audit Report: India: The Second Bombay Water Supply and Sewerage Project*. Operations Evaluation Department, Report No. 9265. Washington, D.C.
31. _____. 1991a. *Project Performance Audit Report: Somalia: Mogadishu Second Water Supply Project*. Operations Evaluation Department, Report No. 9727. Washington, D.C.
32. _____. 1991b. *Project Completion Report: Philippines: Rural Water Supply and Sanitation Project*. Infrastructure Operations Division, Country Department II, Asia Regional Office, Report No. 10225. Washington, D.C.
33. _____. 1992a. *Staff Appraisal Report: China: Rural Water Supply and Sanitation Project*, Environment, Human Resources and Urban Development Operations Division, Country Department II, East Asia Regional Office, Report No. 10028-CHA. Washington, D.C.
34. _____. 1992b. *Staff Appraisal Report: Sri Lanka: Community Water Supply and Sanitation Project*. Energy and Infrastructure Operations Division, Country Department III, South Asia Regional Office, Report No. 10571-CE. Washington, D.C.
35. _____. 1993a. *Staff Appraisal Report: Indonesia: Water Supply and Sanitation for Low Income Communities Project*. Population and Human Resources Operations Division, Country Department III, East Asia and Pacific Regional Office, Report No. 11777-IND. Washington, D.C.
36. _____. 1993b. *Project Completion Report: Indonesia: Jakarta Sewerage and Sanitation Project*. Infrastructure Operations Division, Country Department III, East Asia and Pacific Regional Office. Report No. 12150. Washington, D.C.
37. _____. 1993c. *Project Completion Report: India: Gujarat Water Supply and Sewerage Project*. Infrastructure Operation Division, Country Department II, South Asia Regional Office, Report No. 12349, Washington, D.C.
38. _____. 1994a. *Project Completion Report: Indonesia: Jakarta Sewerage and Sanitation Project*. Operations Evaluation Division, Report No. 13285. Washington, D.C.
39. _____. 1994b. *Project Completion Report: Malawi: Second Lilongwe Water Supply Engineering Project*. Infrastructure Operations Division, Southern Africa Department, Africa Region, Report No. 13744. Washington, D.C.
40. _____. 1995. *Implementation Completion Report: India: Kerala Water Supply and Sanitation Project*. Agriculture and Water Operations Division, Country Department II, South Asia Regional Office, Report No. 14783. Washington, D.C.
41. _____. 1996a. *Implementation Completion Report: India: Tamil Nadu Water Supply and Sanitation Project*. Agriculture and Water Operations Division, Country Department II, South Asia Regional Office, Report No. 15475. Washington, D.C.
42. _____. 1996b. *Performance Audit Report: India: Gujarat Water Supply and Sewerage Project*. Operations Evaluation Department, Report No. 15715. Washington, D.C.
43. _____. 1996c. *Performance Audit Report: Bangladesh: Second and Third Dhaka Water Supply and Sanitation Project and Second Chittagong Water Supply Project*. Operations Evaluations Division, Report No. 15848. Washington, D.C.
44. _____. 1996d. *Impact Evaluation Report: India: Water Supply and Wastewater Services in Bombay*. Operation Evaluation Department, Report No. 15849. Washington, D.C.
45. _____. 1996e. *Project Completion Report: Bangladesh: Third Dhaka Water Supply and*

Bibliography

- Sanitation Project. Infrastructure Operations Division, Country Department I, South Asia Regional Office, Report No.16205. Washington, D.C.*
46. _____. 1997a. *Performance Audit Report: Malawi: First and Second Lilongwe Water Supply Engineering Project. Operations Evaluation Department, Report No. 16430. Washington, D.C.*
47. _____. 1997b. *Implementation Completion Report: India: Uttar Pradesh Urban Development Project. Energy and Infrastructure Operations Division, Country Department II, South Asia Regional Office, Report No. 16579-IN. Washington, D.C.*
48. _____. 1997c. *Implementation Completion Report: India: Third Bombay Water Supply and Sewerage Project. Agriculture and Water Operations Division, Country Department II, South Asia Regional Office, Report No. 26650. Washington, D.C.*
49. _____. 1998a. *Performance Audit Report: India: Kerala Water Supply and Sanitation Project. Operations Evaluation Department, Report No. 17922. Washington, D.C.*
50. _____. 1998b. *Impact Evaluation Report: Paraguay: Community-based Rural Water Systems and the Development of Village Committees. Operations Evaluation Department, Report No. 17923. Washington, D.C.*
51. _____. 1998c. *Implementation Completion Report: Philippines: First Water Supply, Sewerage and Sanitation Sector Project. Rural Development and Natural Resources Unit, East Asia and Pacific Region, Report No. 18004. Washington, D.C.*
52. _____. 1998d. *Impact Evaluation Report: Sri Lanka: Community Water Supply and Sanitation Project. Operations Evaluation Department, Report No. 18113. Washington, D.C.*
53. _____. 1998e. *Impact Evaluation Report: India: Comparative Review of Rural Water Systems Experience. Operations Evaluation Department, Report No. 18114. Washington, D.C.*
54. Whittington, Dale, Donald Lauria, Albert Wright, Kyeongae Choe, Jeffrey Hughes, and Venkateswarlu Swarna. 1992. *Household Demand for Improved Sanitation Services: A Case Study of Kumasi, Ghana. UNDP-World Bank, Water and Sanitation Program. Washington, D.C.*
55. Wright, Albert Morgan. 1997. *Toward a Strategic Sanitation Approach: Improving the Sustainability of Urban Sanitation in Developing Countries. UNDP-World Bank, Water and Sanitation Program. Washington D.C.*

Attachment 1 List of Bank Projects Reviewed in This Study

Country	FY	Title	L/C num.	Status	WB Loan Amount (US\$ million)	Total cost/ San. (US\$ million)	Available Reports
Indonesia		WS & S for Low Income Communities		A		123.3/16.0	
Sri Lanka		Community WS & S Project	C-2442	A		32.3/1.4	
China		Rural WS & S Project		A		189.1/5.9	
Philippines		First WS, Sewerage & Sanitation Sector P.	L-3242	C		132.8/17.5	
India		Uttar Pradesh Urban Development Project	C-1780 L-2791	C		237.8/5.2	
Malawi	1987 (I)	First Lilongwe WS Engr. Project	C-1272 (I)	C		4.0 (I),	PR (I), SAR (I), PCR (I, II)
	1988 (II)	Second Lilongwe WS Engr. Project	C-1742 (II)			77.7(II)/0.15	PAR
India	1985	Kerala WS & S Project	C-1622	C	28.98	56.11/3	SAR
India	1984	Tamil Nadu WS & S Project	C-1452 SF 12	C	48.1 (IDA) 48.4 (SF 12)	171.0/2.88	SAR, ICR
India	1983	Gujarat WS & Sewerage Project	C-1280	C	54.5	78.1/2.5	SAR, PCR, PAR
Indonesia	1983	Jakarta Sewerage and Sanitation Project	L-2234	C	21.4	32.8/2.1	SAR, PCR, PAR, IER
Philippines	1983	Rural WS&S Project	L-2206	C	35.5	58.4/25.0	SAR, PCR
India	1980	Rajasthan Water Supply and Sewerage	C-1046	C	80.0		ICR
	1991	Maharashtra Rural WS & Environ. Sanit.	C-2234	C	100.0		
	1993	Karnataka Rural WS & Environ. Sanit.	C-2483	A	92.0		
Paraguay	1978 (I) 1981 (II) 1993 (III) 1998 (III)	Rural Water Supply (I-IV)	L-1502 (I) L-2014 (II) L-42222 (IV)	C (I) C (II) C (III) A (IV)	6.0 (I) 13.8 (II)	23.0 (III)	ICR 40.0 (IV)
India	1978 (II) 1986 (III)	Second, and Third Bombay Water Supply & Sewerage Project	C-390 (I) C-842 (II) L-2769/ C-1750 (III)	C	L-2769/ C-1750 (III)	SAR (II, III), 185 (III) 3.4.3 (III)	PAR (II), ICR (III) IER (I, II, III)
Bangladesh	1988	Third Dhaka WS & S Project	C-1734	C	29.6	47.22/	SAR, PCR, PAR
Somalia	1989	Second Mogadishu Water Supply Project	C-1236	C	7.5	40.2/	SAR, PCR, PAR

Attachment 2 Technical Options of On-site Sanitation

Type	Cost	Water Supply Requirement	Advantages	Disadvantages
Simple pit latrine	Low	None	<ul style="list-style-type: none"> • Can be built by household. 	<ul style="list-style-type: none"> • Insect and smell nuisance.
VIP latrine	Low	None	<ul style="list-style-type: none"> • Can be built by household; • Control of flies; • Control of smell. 	<ul style="list-style-type: none"> • Does not control mosquitoes; • Extra cost of vent pipe.
Water seal pour-flush latrine	Low	Standpipe	<ul style="list-style-type: none"> • Control of flies and mosquitoes; • Control of smell; • Content of pit not visible; • Gives users the convenience of a water closet; • Can be upgraded; • Latrine and pit can be located separately. 	<ul style="list-style-type: none"> • Needs reliable water supply; • Unsuitable where solid anal cleaning material is used.
Compost latrine	Medium	None	<ul style="list-style-type: none"> • A valuable humus is produced. 	<ul style="list-style-type: none"> • Requires careful operation; • Additives must be added regularly; • Urine has to be collected separately.
Septic tank	High	In-house tap connections	<ul style="list-style-type: none"> • Gives the users the convenience of a water closet. 	<ul style="list-style-type: none"> • High cost; • Requires reliable and ample piped water; • Only suitable for low-density housing; • Regular desludging required; • Permeable soil required.
Aqua-privy	Medium	Yard taps	<ul style="list-style-type: none"> • No need for piped water; • Less expensive than a septic tank. 	<ul style="list-style-type: none"> • Water must be available nearby; • Not easy to maintain a seal; • Regular desludging required; • Permeable soil required.



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