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## The Human Element in Sanitation Systems

DURING THE DISCUSSION of the possible health benefits from improved sanitation (chapter 3) and the specific, alternative technologies for excreta disposal (chapters 5–7), some rather demanding stipulations about the social conditions under which maximum benefits can be achieved have been made. Several beneficial effects can only be expected to occur, for instance, if latrines are properly used and maintained. Changes in the public's knowledge and practices may be required before some systems are acceptable. Good maintenance of both the private and the public components of sanitation systems is vital. That there are many calls for health education or more effective program administration is a clear indication that the social prerequisites for effective sanitation are seldom achieved in practice. Yet the diagnosis of social ills has often taken a simply deductive form: if a sanitation technology fails, the fault must lie with the users. Careful analysis of these social factors may reveal that sometimes the public's response cannot reasonably be otherwise.

A recurrent theme in this study has been that excreta disposal systems must be suited to their environmental conditions (the climate, endemic diseases, water availability, or civic wealth), many of which are clearly beyond the control of public authorities. It is too often assumed, however, that society is within governmental control and that communities should simply change to accommodate a technology that has been introduced. The task is considerably more complex. Because of their low capital cost, several of the technologies that are appropriate for the urban or rural poor make heavy demands on the users (table 3-2). They may also levy considerable demands on the limited resources of finance and trained manpower of the public bodies that have responsibilities for operation and maintenance.

It is reasonable to hope for some social change from

*Note:* The first draft of this chapter was prepared by Dr. Donald Curtis, Institute of Local Government Studies, University of Birmingham, England.

any sanitation intervention, but program designers should ask themselves which changes are really practicable and, conversely, how far social, administrative, or political factors should be viewed as constraints on policy options. To do this requires that a planner have a good "feel" for a society and the way in which sanitation is handled within it. Two questions form the basis of the discussion in this chapter: how do social values and understandings associated with health or defecation influence sanitation programs, and what possibilities are there for controlling excreta disposal through the activities of households, community groups or urban government? The questions are interrelated because understandings and values influence institutions, and the consequences of institutional behavior in turn influence individual understandings and values.

The social, behavioral and institutional aspects of excreta disposal, and of programs designed to change excreta disposal practice, are severely neglected areas of study. Very few good field studies or thorough project evaluations have been carried out. The writings of Curtis, Goyder, Kochar, and Streefland in Pacey (1978) are of interest, as are studies on the comfort stations in Ibadan, Nigeria (Ademuwagun 1975 and Pasteur 1979). Recent studies undertaken by the World Bank have yielded insights into behavioral and institutional aspects of sanitation programs in Latin America (Elmendorf 1980) and in Africa (Feachem, Mara and Iwugo 1980) and have led to a general review of current knowledge on these matters (Elmendorf and Buckles 1980). Some valuable work in this field has been carried out not only by those investigating social aspects of sanitation programs, but also by those investigating the social aspects of the transmission of particular excreta-related pathogens. For instance, Dunn has written on the behavioral aspects of intestinal parasitism (Dunn 1972), Bancroftian and Malayan filariases (Dunn 1976) and parasitic diseases in general (Dunn 1979), and Kochar (1978, 1979) has

done outstanding work on hookworm transmission in West Bengal. Other recent works of interest include a comprehensive literature review of community participation and education (Van Wijk-Sijbesma 1979) and contributions by Feachem (1980) and Jackson (1979).

### Relevance of Cultural Values and Attitudes

How people react to excreta disposal schemes or arrangements depends both upon deep-rooted cultural values and upon more mundane matters of cost, convenience, and comfort. Each of these may affect user preference or acceptance, and each should be explored in every project in which the acceptability of the technology is the least bit in doubt.<sup>1</sup> Resistance to new latrines, for example, might be due to inadequate door catches (a mundane factor, yet indicative of a preference for individual privacy) or perhaps, for Muslims, inadvertent and inappropriate orientation of the facilities in relation to Mecca (an objection implicating values and conventions; Goyder 1978).

Cultural interpretations of excreta and defecation underlie people's responses both to the deposition technologies and to removal and reuse processes. Excreta usually have a rather special psychosocial status. In many societies excreta are only referred to in everyday speech with calculated disrespect for the values of society. Excrement is a thing apart, despised, taboo. How deeply this view prevails varies: for some peoples, excrement is simply dirty, but for others it is dangerous, a matter for personal defilement or for evil uses, to be scrupulously avoided or carefully disposed of (Curtis 1978). There are in fact many interpretations of the significance of excreta besides that of modern science, with its concern for the pathogens that excreta contain.

These culturally relative interpretations are reflected in the principles and practices of personal hygiene found around the world. Many hygienic practices have little to do with pathogen avoidance (for instance, the doctoring of a house against witchcraft), and many substances that are of little interest to modern science (such as fingernails or hair clippings) may be regarded as dangerous. Yet in most cases there is a large element

1. The study of community reaction to a proposed sanitation project, and the elicitation of support and acceptance, are valuable activities in all countries. Krauss (1979) described the replacement of a malfunctioning tertiary sewage treatment plant in Greenville, Maine, USA, by an innovative land application system after extensive public consultation and participation. An immediate practical outcome was an increased willingness to pay sewer rates on the part of households connected, and an increased demand for connections on the part of those households unconnected.

of common ground—if not in interpretation, then at least in practice—between science and these other beliefs. The ancient Israelites, for example, were instructed to take a stick with them on their early morning journeys from the camp to the bush, the stick to be used for burying their feces. This is an effective sanitary prescription in the modern sense, but it is clear from the context that the instruction had more to do with the ritual cleanliness of warriors before battle than with disease transmission as such (Deuteronomy 23:12).

Mary Douglas, seeking an explanation of the universal existence of taboos, suggests that those things become taboo which are difficult to classify culturally (Douglas 1966). A corollary to this idea is that most societies prefer to maintain a clear distinction between man and animal: man is the thinker, tool user, made in the image of divinity, and so on, whereas animals are instinctive, confined to their creature strengths, and of a lower order of existence. But this distinction is difficult to maintain, particularly in relation to bodily functions. Defecation and excreta are taboo because they reveal to man an aspect of his animal existence that he would prefer to forget. This anthropological observation may have sufficiently widespread relevance to explain why man seeks privacy to defecate, defecation is confined to the bush, and excreta are, if possible, avoided.

Interpretation aside, a number of fairly universal and deeply felt human reactions to the phenomenon of defecation exist, all of which can be utilized to promote practices conducive to improved hygiene in the scientific sense of the word. Privacy, apartness, and dirt avoidance are all values that lend themselves to the use of modern excreta disposal technologies. Beyond these there are a range of widely shared values: smell avoidance, household cleansing, sweeping, clothes washing, and so on that contribute to a reliable common basis for domestic sanitation programs. Effective excreta disposal may, of course, require that people come to have some new understandings of the health hazards from excreta and of the measures that can be taken to avoid these hazards. There will be some situations in which traditional understanding and practice—for example, defecating into rivers that are also water supplies—is strongly contraindicated by modern interpretations of health and disease. In these instances, authorities may have to assume didactic roles, but they can nearly always do so by building upon traditional culture rather than by starting from scratch.

The widely shared cultural evaluations of excreta have an equally common but regrettable side effect:

people who, by their occupation, come into regular contact with excreta become themselves persons to be avoided. In many towns throughout the world, sweepers and night soil removers are drawn from disadvantaged minority groups living in segregated communities within the towns, and their occupation tends only further to reinforce their segregation. This is a rather intractable problem wherever some kind of cartage system is necessary for night soil removal.

### Influence of Social Structure and Organization

Any excreta disposal system is a complex social activity involving planners, administrators, politicians, and corporation workers as well as the individual user. Officials, for their part, can plan improved systems but may face difficulties in raising the necessary resources, cooperating with other agencies, delivering the goods, and, crucially, building up routine services for maintenance. There are additional problems in securing political support for low-income schemes when upper-income groups, who can better afford to pay and have more political weight, themselves clamor for higher standards of service.

Politicians face the full brunt of deciding priorities in urban development and, if they have to recruit public support to keep themselves in office, they often face pressures to employ more sweepers or to favor particular parts of the community. Workers, such as the operatives of cartage systems, will also have a number of preoccupations besides service to the city. They must secure for themselves a living wage and tolerable working conditions, and in their struggles with the authorities or with a public unwilling to see taxes increased they will use what sanctions they have at their disposal, chiefly the disruption of services.

In short, whatever high ideals about the quality of human life may be embodied in sanitation programs, such programs cannot escape being a part of the complex social system of a city, and any attempt to make them work better has to take this complex system into account. The following sections examine these social values and organizational issues in relation to the deposition, transport, and reuse of excreta.

### Social and Behavioral Aspects of Latrine Design

It is difficult to predict how people will respond to technical innovations because many factors enter into their choice. But much can be gained by the planner's

appreciating the position of the user and looking at innovations from the user's point of view. For the user, the toilet itself is a most important element in the excreta disposal system. He may have to decide whether to invest in one, and he has daily to face using it. Even the most hygiene-conscious people will take more than cleanliness into account in making these decisions, and disadvantages may not have to be great before some people will opt out of whatever innovation is being proposed.

#### *Cost*

The most obvious and perhaps most cogent of all social constraints on sanitation is the cost of latrines. The existing distribution of sanitary facilities (both nationally and internationally) is heavily skewed toward the rich to a large extent because sanitation is expensive. Many of the alternative technologies discussed in this book are cheaper (some much cheaper) in capital terms than the sewerage systems of the industrial West, but most of the savings occur in the cost to the public authority that is spared the expense of sewers.<sup>2</sup> The cost of the toilets themselves may still be considerable, and at some point down the scale of poverty it ceases to be reasonable to expect people to pay for their own installations. In many urban environments sanitation programs must be seen as attempts to overcome one of the multifarious effects of poverty; as such, they are bound to involve a degree of government intervention through subsidies. Where excreta have an economic value, some of the disposal costs can be balanced against the expected income from reuse, but this is more likely to defray the costs of cartage than the in-house costs of toilet fittings.

#### *Convenience*

The location of latrines is important and must balance advantages. Sometimes a technology constrains the choice of location, but, assuming that all options are open, toilets may be sited inside the house or compound or some distance away. People may be sensitive about such matters as the prominence of the toilet to public view, and such factors must be evaluated in detail for each situation. Some general principles, however, may be postulated.

If the latrine is sited at some distance from the living quarters, people may be discouraged from using it on

2. See Kalbermatten, Julius and Gunnerson (1982) for an economic comparison of alternative sanitation technologies and for proposed "sanitation sequences" that enable users to improve their sanitation facilities to a level and at a pace they can afford.

dark nights or in inclement weather. Yet if it is close to the house, there may be a feeling that defecation is not adequately segregated from the rest of daily living. In a new tenement project in Madras where toilets were provided in each flat, housing officials found that some of these were filled with sand and the space used for other purposes. One explanation of this response is that defecation within these small apartments, even behind closed doors, was unacceptable to the occupants (Curtis 1978).

Sufficiently private locations for outside toilets may be difficult to find in urban environments. Draft plans for an urban site and service scheme in Africa made provision for the siting of latrines in the front corner of plots, where they could be conveniently linked to sewer lines along the roads. But there were considerable doubts as to whether this technical convenience would be socially acceptable—the first thing to confront household visitors would be the toilet. A privy should be private. Most societies have conventions relating to domestic space—for example, that the back of the house is private, the front public—and these conventions need to be discovered and respected.

People may be sensitive not only about the location of the toilet but about the journey to it as well. In Botswana it was found, through careful monitoring of a latrine program, that the act of carrying a container of water to the new privy (something quite acceptable in India) was an embarrassing announcement to the world at large of an individual's intentions. The design was subsequently modified to provide a water source at the latrine.

A major difficulty with toilets may be providing access to the right people at the right time. Householders may be inclined to keep outdoor latrines locked to prevent misuse by passers by, with the unfortunate consequence that they are then not available for children to use during the day. Similarly, in the tenement project in Madras, interior toilets were inaccessible to children while both parents were out seeking work during the day (Curtis 1978). Private toilets have to be carefully designed and located to secure both adequate access and adequate control. Counterbalancing these factors is the fact that most toilets provide a degree of privacy such that the time of day when defecation may conveniently take place is greatly extended from the dawn or dusk periods that are often favored by those with no facilities at all.

### *Comfort*

Comfort has been found to be a great selling point for latrine programs, but again the social requirements

are difficult to predict. There are the well-recognized cultural preferences for sitting or squatting (the latter in part an act of avoidance of physical contact with possibly defiling surfaces), and there are also strong commitments to particular anal cleansing procedures that must either be accommodated by the new technology or, if necessary, changed. Additional design considerations are that children have anxieties about cavernous holes in squatting plates, that the aged may have special needs (the surroundings must not be slippery, for example), and that hot and malodorous latrines discourage all users.

A vital aid to comfort has been the inclusion of personal washing facilities in toilet installations, as in the comfort station program in Ibadan, Nigeria (Ademuwagun 1975; Pasteur 1979). Facilities for hand washing at the place of defecation are highly desirable in any case, but total body washing in privacy could also be much appreciated. In India, for example, customary sanitary prescriptions require a bath to follow defecation (Kochar 1978); in these circumstances, linked bathing and toilet facilities would greatly encourage use of both private and public latrines. Comfort concerns both physical conditions and the fulfillment of conventional expectations. Householders in Botswana found the ventilation gap left at the bottom of doors to their outside toilets disconcerting because people could see their feet. Conventional expectations may be numerous, and the only way to discover them is by carefully monitoring reactions to new designs in each situation.

In many rural areas latrine programs may face the problem that people find the bush more acceptable and more comfortable than pit latrines or even some more sophisticated technologies. This choice may reflect both that defecation is often regarded as a shameful activity properly confined to the wilds [as Muhondwa (1976) found in Tanzania] and that the latrines may be hot, malodorous, and fly ridden (an acknowledged tendency of many pit latrines). The first problem decreases when the bush becomes inaccessible, as in town, or is so diminished that it constitutes highly contaminated spinneys or copses in areas of intensive cultivation. At this point the population presumably becomes susceptible to new interpretations of what constitutes an appropriate environment for defecation. Latrines can be presented as answers to the problem of privacy, and an analogy with the bush may be maintained by siting the facility at a suitable distance from the house. Crowded urban environments present opportunities for creating new conventions, practices, and concepts of comfort that program directors should seize upon.

*Group or communal toilets*

Private, domestic latrines have so many advantages to the user over any arrangements by which members of different households share their facility that they are always preferable wherever people can afford them and space is available. High costs and problems of land scarcity, however, may oblige authorities to select communal facilities even though, from past experience, their success is highly problematical. The difficulty in all cases is maintenance. Public toilets have a poor record in this respect and have inherent shortcomings. It takes only one misuser, perhaps a child avoiding the frightening squatting hole, to establish a chain of subsequent misuse for which no one is willing to take responsibility.

There are two possible responses to the problem of neglect of public facilities that public authorities can make: attendance by a cleaner, or the provision of public toilets for identified or self-identified groups of households. The first is an expensive proposition requiring the deployment of cleaning personnel on a large scale. In general, arrangements of this sort are common only in public places such as market areas or main thoroughfares, where provision must be made for large numbers of occasional users who are passers by. The additional expense of an attendant is often covered by a small charge to the users, which of course is not possible in toilets designed to serve the requirements of a resident population. The arrangement most likely to ensure sustained cleanliness is to have one cleaner constantly stationed at each public toilet. A cheaper alternative is to have a cleaner responsible for several public toilets, which he continually travels among. This latter option can work well if the cleaner has adequate water supply and equipment, so that he can cope with a toilet that has become grossly fouled since his last visit. This system is used to maintain public toilets in Beijing, China: the cleaner has a three-wheeled bicycle, with equipment and boxes, and water is available at each facility (Feachem, personal observation).

The potential for achieving better management of public toilets by associating them with an identifiable group of households is currently being explored in the Ibadan comfort station program in Nigeria where, in the old town, the indigenous social structure of family groups provides a framework for the social control of latrines (Pasteur 1979). The facilities, designed to serve between 350 and 700 people, are built by the authorities with the people themselves providing the land from family holdings and contributing to the cost of construction. The group, under the leadership of the traditional family head, then either appoints a cleaner

and pays him from a communal fund or allocates responsibility for cleaning and maintaining the separate toilets to each of the participating households. The pilot scheme was monitored by a health education team who identified several problems (Ademuwagun 1975). Cleaners were often badly in arrears in their pay, and, where the people themselves undertook to carry out cleaning and maintenance, the constant attention of the health education team seemed to be necessary if standards were to be upheld. A basic problem appeared to be paying for water and electricity, and in some cases supplies were withdrawn. This last problem raises questions about how best to divide tasks between the public authority and the local groups. Voluntary groups often have difficulties in collecting money from their members on a routine basis (Feachem and others 1978) because defaulters encourage those who would otherwise be inclined to pay regularly to be similarly lax.

In most cases public facilities must be provided either by public authorities or by these authorities in conjunction with the users. Where night soil has a commercial value, however, there may be potential for the commercial organization responsible for reuse to provide the toilets themselves. In Indonesia fishpond owners, who stand to make a profit from the cultivation of fish, provide a number of latrines overhanging their ponds for the use of the neighborhood. Whatever virtues or vices attend this system, the great advantage is that management and maintenance by a public authority is minimized because the fishpond owner has to maintain the facilities in a manner that is attractive to the requisite potential users. It is not clear, however, whether in other circumstances—cartage systems, for instance—it is possible to push contractors beyond servicing into providing the latrines.

### Social and Organizational Aspects of Excreta Cartage Systems

It is perhaps regrettable that a sewerage system is not only a technically efficient removal system (given the massive financial outlays to introduce it) but, once constructed, that it is also the easiest to organize and run. The technology may in part be complex, but the need for servicing is limited. Instead of an army of sweepers required to empty buckets and pushcarts, a sewerage system may be run by white-coated technicians assisted by a few manual workers whose job is performed away from the public gaze,

either underground or beyond the urban bounds. The labor force required is small, elite, and dispensable for short periods. Breakdowns in a sewage system usually cause environmental pollution at the treatment works and beyond rather than any direct contamination or disruption of the domestic environment of the users. In other words, as is the case with many modern technologies (Dickson 1974), a sewerage system is more amenable to social control than any of the less automated technical alternatives.

By contrast, cartage in its simplest bucket-latrine form requires large numbers of workers carrying out routine collection of night soil from households by using buckets, boxes, or barrows that must be emptied into carts of some sort for conveyance to a disposal point. The buckets have limited capacity, and the system is prone to crises both from mismanagement and from collective action on the part of the workers. Civic authorities face on the one side citizens with various means at their disposal for insisting upon reasonable service; on the other, authorities face workers who wish to exercise what strength they have to get a reasonable reward for performing an unpleasant and socially degrading job. Which party gets the relative advantage depends upon the labor market, politicians' need for political support, and other factors; in any case, cartage systems often present organizational and political problems for civic authorities. If these authorities decide to change to sewerage systems, the decision may reflect a desire to escape from the organizational problems involved in cartage.

Direct handling of night soil in cartage systems leads to a situation in which it is often only groups of strangers, refugees, or other disadvantaged minorities of the urban community who are prepared to take the job. In the Indian subcontinent the work is associated with the sweeper castes, whose untouchable status the Indian government has been endeavoring to overcome. In practice this kind of social change has proved very difficult wherever there is continuing association of a caste or single group with occupations such as night soil removal, and eliminating a stigmatized occupation is a major additional incentive to changing an excreta disposal system. But even stigmatized occupations may be in strong demand if alternative sources of employment are unavailable. Operators in parts of cities covered by private cartage systems may have to purchase the rights to service a street (Streefland 1978), and municipalities are often under strong political pressure to expand the number of sweepers in their employ. For a sweeper there is perhaps only one thing worse than being of low social status in a lowly

regarded occupation, and that is being of low social status without any occupation at all. Thus, from a social as well as economic point of view, whether night soil cartage systems are appropriate or not depends on the state of the wider economy. If there are equally well-paid or better jobs available, then it must be assumed that night soil removers will select these, and there will be a strong argument for changing the disposal system. If there are not other jobs available, there will be strong pressure from the disadvantaged groups themselves to maintain the cartage systems.

If hand-operated cartage systems remain necessary, something can be done to improve the social position of the operator by improving the terms and conditions of service. Low status frequently is reinforced by low pay, which, if improved, would somewhat counteract low status. It may be difficult, however, to alter the pay structure radically while there remains a reserve corps of unemployed sweepers without simply encouraging subcontracting. Government policy on public sector pay may also limit the options and create problems of its own. In some cases minimum wage legislation may set the scale for manual labor in the public sector above market rates, causing labor-intensive technologies to be uneconomic while there are still surplus workers willing to do the job. In other cases, as in Port Sudan, Sudan (Spencer 1978), rates of pay set at levels not competitive with private sector employment make it difficult to build up and train adequate staff. But even if it is difficult to make major changes in pay, working conditions can be improved in other ways. Where work clothes are issued, they often are similar in appearance to those of convicts and serve to set the users socially apart more than to protect their bodies. Equipment is also often poorly designed and badly maintained, and facilities for washing and changing after work are inadequate or neglected altogether. Improvement in any of these dimensions will improve the social status of night soil removers.

Operators of vacuum trucks have a stronger bargaining position than workers in manual cartage systems because they are more skilled and, in any one town, fewer in number. Sealed vaults, because they have no treatment potential and limited capacity, also have a crisis point if they are not emptied on time, and organized labor can use this to its advantage. Septic tanks, in contrast, are less crisis prone and may for this reason be favored by authorities worried about the power of their organized labor force to make demands.

Improved technologies, requiring less direct handling of feces, may facilitate an upgrading of the status of night soil removers. Jobs with more skill will attract higher pay, enabling the workers to maintain a higher

standard of living. One seemingly counterproductive effect here is that, if the social stigma attached to night soil removal is effectively lifted by improved technology, these jobs may then be open and attractive to people outside the minority traditionally filling the occupation, so that this minority group loses its employment monopoly while keeping its low social status.

Because many towns will require improved cartage systems of one kind or another in the future, it is important to discover whether the social stigma attached to night soil removal can under any circumstances be removed. Evidence is hard to come by. Some reports from China (Streefland 1978) indicate that, because of the importance attached to health in that society, the status of night soil removers has improved since the revolution. In a society where reuse of excreta has always been practiced, however, it is unlikely that the job has ever carried the stigma that it does, say, in India, where the rituals of excreta avoidance are highly developed. Furthermore, the Chinese approach of involving the public in hygiene and sanitation improvement committees (Schwartz 1977), if tried elsewhere, would not necessarily lead to an improvement in the status of those people who are employed in night soil removal. As with attitudes towards excreta and waste disposal, the willingness of a society to participate in an organized way in this sector is culturally dependant. This remains an important area for future investigation.

In many societies where night soil is valued as a fertilizer, cartage is a private sector activity. Cartage contractors make their money by selling the material to farmers, by being paid for the job of removal itself, or by a combination of both. In some towns, different areas are serviced by small-scale contractors who make agreements with individual householders for night soil removal. In others, larger-scale operatives undertake contracts with city corporations. Some operate simple cartage systems, others may service septic tanks with vacuum trucks. Private contractors may be difficult to control, particularly where they are numerous and stand to gain from dumping their loads in the nearest watercourse instead of removing them from the city to agreed disposal points. A good price for the product, however, is an effective incentive to efficient night soil removal.

### Social and Organizational Aspects of Excreta Reuse Systems

It is now widely accepted among agricultural and sanitation planners that reuse of wastes is a desirable objective if it can be hygienically achieved. This

conclusion brings experts into line with the large part of mankind that has always favored reuse. In many parts of the world the problem is not reuse but how to persuade people that additional stages of treatment are sufficiently important for their health to warrant the increased time and expense that treatment requires. Elsewhere, however, the idea of reuse is not easily accepted culturally. Many people share the prejudice of the villagers in Zola's novel *La Terre* against the old lady who nurtured beautiful vegetables by night soil, thus relieving her poverty but placing herself beyond the bounds of social acceptance. However deep seated these prejudices may be, the situation is far from irredeemable. There are several reasons why the significance of cultural barriers to reuse is less than it might first appear. Processing can transform something that is socially unacceptable into something that is much more easily accepted. An analogy may be drawn to the universal practice of food preparation: an animal or vegetable, unattractive in the wild state, becomes appetizing when cooked, arranged on a plate, and served with a sauce; so may excreta, despite their malodorous nature and value-laden associations, become attractive when treated and moved to another environment as compost or fertilizer. Part of the art of treatment must be the achievement of this cultural transformation that would enable farmers to use a substance with pleasant texture and acceptable odor for the enrichment of their land.

Unlike the true subsistence farmer who experiences the whole cycle of agriculture from production to consumption and back to production, a commercial farmer produces for a distant and impersonal market and is better prepared to use any agricultural aids conducive to a good market return. The urban consumer, for his part, can only judge food by its appearance in the market stall and knows little of its origins. The separation of producer and customer is both geographical and institutional. Its positive aspect is the diminished significance of individual preferences and prejudices upon the production processes; its negative aspect is that the public must be protected from unscrupulous or unhygienic practices through bureaucratically administered controls upon these production and marketing processes. Thus, fish grown in oxidation ponds managed by city corporations under controlled conditions can escape any stigma because, in the marketplace, they cannot be easily identified. In India, for example, produce grown in sewage-irrigated fields enters the market unnoticed, although in parts of that country reuse of night soil is not a favored practice. In London, England, on December 23 and 24, housewives of slavonic extraction

(mainly Poles) buy imported carp for their traditional Christmas Eve feast, little suspecting that some of these carp have been raised in sewage ponds.

Finally, at least in the West (and the West as a great consumer of natural resources is very important in this respect), prejudices against reuse are being counteracted by a new consciousness of a need to achieve ecologically sound farming practices and patterns of human existence. This takes the form both of an awareness of the undesirability of polluting rivers and seaboard with untreated or inadequately treated sewage and of the need to find substitutes for the energy-consuming (often petroleum-derived) artificial fertilizers that are required in large volumes in agriculture. This transformation of values, coinciding as it does with the more structural changes described above, has now proceeded to the point that constraints upon effective reuse are more questions of cost and technical feasibility (particularly the problem of mixing domestic and industrial wastes in most urban sewerage systems) than questions of cultural predisposition. If there remain effective scruples regarding reuse, these are more likely to lie with policymakers than with the users themselves, and top managers are the people most exposed to the new ideologies about conservation and the need to manage resources effectively.

In summary, how successfully the reuse of urban wastes can be controlled depends upon organization. On the urban periphery, people may treat and reuse their own night soil in local fields or gardens, making it very difficult for local authorities to establish workable controls. Similarly, small-scale private contractors in night soil removal who service a number of households and sell their product to farmers in the countryside may easily escape bureaucratically administered control measures. If the municipality itself administers night soil removal or contracts it to large-scale commercial enterprises, however, the authority is then in a position to enforce suitable treatment before the product is made available for reuse.

### Improving the Management of Urban Sanitation Systems

The success of sanitation programs hinges largely on the capability of the municipal governments or other public authorities who must promote, control, and service the schemes. These authorities must not only understand the nature of the task but must also be able to exercise their authority to enforce routines and ensure that the public plays its part. The need for administrative discipline extends beyond the super-

vision of routine operations to the collection of dues and the control of access to services. Experience past and present indicates that this management ability is often the chief limiting factor in sanitation programs (Rybczynski, Polprasert and McGarry 1978). Not only are urban services often inadequate in extent (to be expected in rapidly growing cities), but existing systems also suffer from malpractices that add to their deficiency. Contractors dump night soil indiscriminately in rivers or drains. Workers gain political protection when attempts are made to enforce work routines. Members of the public get their houses preferentially connected to water supplies or sewer lines by paying "speed money" to minor officials. The poor pay their dues while the rich avoid payment.

These difficulties are unlikely to occur if the public at large is solidly behind the policies of their authorities and can effectively exercise some influence upon the course of events. It is noteworthy that in postrevolutionary China, where improved sanitation has high priority, urban public services are backed by voluntary committees, sponsored by the ruling party, that serve to keep the authorities on their toes, while at the same time mounting health improvement campaigns and other voluntary activities (Streefland 1978). Elsewhere, a major role for community development officials, health education teams, and civic leaders must be the generation of public support for and commitment to environmental improvement—not so much for the direct action that this can achieve as for the backing of the authorities attempting to carry out their proposals. No civic administration can maintain the integrity of its programs for long without active public support. Furthermore, because the kinds of sanitation schemes envisaged here require radical changes in the distribution and organization of services, radical changes in civic consciousness will also be required.

Such changes are not always forthcoming. In this imperfect world, realistic plans may need to accommodate existing interests and commitments and endeavor to promote change in spite of weaknesses in urban government and administration. Two different responses are currently in evidence. The first is to create special-purpose agencies beyond the influence of local interest groups to take responsibility for the development of a single city (as in the case of the urban development authorities found in most Indian cities), to look after the interests of a particular class of citizen, or to provide for one kind of service on a regional basis. There is a trend toward specialized water and sanitation authorities in many different parts of the world. The protagonists of these special-purpose agencies believe that such agencies will be more



effective development bodies than the traditional civic authorities because they are free to draw up rational plans and follow priorities. Yet these bodies often find themselves in a competitive position with other authorities with similar or overlapping responsibilities, and they still require constant political support to be effective.

The other approach is to rely upon technologies that require minimal municipal commitment and to ask the potential users to construct and maintain latrines through "self help." Pit latrines or on-site composting toilets require little municipal effort (see table 3-2) beyond grants or technical assistance as inducements, enforcement of bylaws if this is deemed necessary, and some long-term emptying arrangements.

Neither of these two approaches can be regarded as a substitute for getting wholehearted commitment to improved hygiene and sanitation, based upon a broad understanding of potential health and welfare benefits, from politicians and citizens alike. This chapter concludes with a discussion of the strengths and weaknesses of self-help schemes (which can be more than simple substitutes for municipal endeavor) in meeting these objectives, and of health education.

### Effectiveness and Limitations of Self-help Schemes

The potential of self-help programs lies in the willingness of individuals or groups, even among the poorest elements in society, to perform tasks such as laying pipes, digging pits, or improving their physical environment for themselves. Self-help schemes can take advantage of the spirit of self-reliance sometimes found in informal or squatter settlements; they may also work well where the ruling political party is active in urban management and can organize and control development, as in recent sites-and-services projects in Lusaka, Zambia. Carefully planned self-help exercises can totally transform a town, as in the case of Port Sudan, Sudan, where unplanned settlements have been rebuilt and provided with basic services through the authorities and the people working in unison for a few days in each quarter of the town. Critical evaluations of self-help schemes (Chambers 1974; Feachem and others 1978; Holmquist 1970; Lamb 1971; Schaffer 1969) reveal, however, that self-help often gets out of hand and ends in frustration for all parties. The potential hazards of self-help schemes in sanitation can be summarized as follows:

- If participation is voluntary, some households will not participate for one reason or another and,

because some health benefits depend upon complete coverage of the population, incomplete coverage will frustrate the objectives of the program.

- There is no guarantee that those people who are most in need will be those who are most willing to participate. To encourage self-help, the authorities will be obliged to help those who are prepared to help themselves. Thus, self-help initiatives can curtail the authorities' ability to decide upon priorities.
- Self-help can become a popular movement, backed by politicians for whom it provides a following, through which government finds itself committed to providing a level of service it lacks the financial or manpower resources to meet.
- Self-help programs have shown themselves to be much more effective at generating capital in the form of "one-shot" projects such as classrooms, clinics, or dams than in *maintaining* services once they have been established.

Some of these difficulties can be overcome if authorities take a more rigorous approach to the organization of self-help projects from their inception.<sup>3</sup> For instance, they may need to:

- Enact by-laws requiring all households to provide themselves with latrines
- Stipulate what categories of households they are prepared to assist with grants or technical guidance and only help those who help themselves within these categories
- Ensure that the number of projects undertaken does not outrun the funds available by persuading political leaders of the dangers in overstimulating demand and by requiring local groups to register their intentions with the authorities before undertaking a project
- Limit the scope of a scheme to a size that can be adequately serviced by the authority in the future.

In summary, self-help can best be used for clearly defined and limited operations, such as urban cleanliness campaigns or the initial construction of public or private facilities, in which the people's contribution reduces costs and generates enthusiasm. It can also be conveniently linked with the broader task of health education.

3. The advantages and dangers of self-help strategies in rural water supply programs, which have many similarities with sanitation programs, are discussed in detail by Cairncross and others (1980). The case against self-help is set out by Feachem (1980).

## Appropriate Health Education

At the beginning of this chapter it was said that some values, attitudes, and understandings can be accommodated by sanitary engineers, whereas other social factors must be confronted and changed. In rural areas little progress can be made in cholera elimination while people continue to locate privies over rivers that downstream are other people's water supply. Health education campaigns have to address specific issues of this kind while simultaneously creating a general awareness of the potentials of new technologies for improving living conditions. Health education is, however, often disappointing both in design and in results. There is a tendency to lecture the public about good hygiene, or balanced diet, or birth control, repeating textbook prescriptions without considering how the ideas apply in the listeners' particular circumstances. This tendency to patronize not only minimizes the many real strengths in existing knowledge and practice, it is also ineffectual. It fails to explore the users' viewpoint or to reveal the genuine problems that technical innovations pose for them. Health education has to be, above all, a dialogue between officials and users if full benefits are to be obtained (Isely, Sanwogou and Martin 1979). A good example of this two-way communication is the health education program that accompanied the Ibadan comfort station pilot scheme (Ademuwagun 1975). Not only were the positive values of the users explored here, but practical problems in implementation and maintenance, such as finding suitable sites and paying for water, were clarified. Without this kind of detailed knowledge of the users' perceptual and organizational problems, campaigns instituted by the authorities are almost certain to founder in disenchantment and disorder. Health education has a critical, sensory role in community affairs. It cannot merely be the vocal chords of the sanitation authorities, it must be their eyes and ears as well.

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