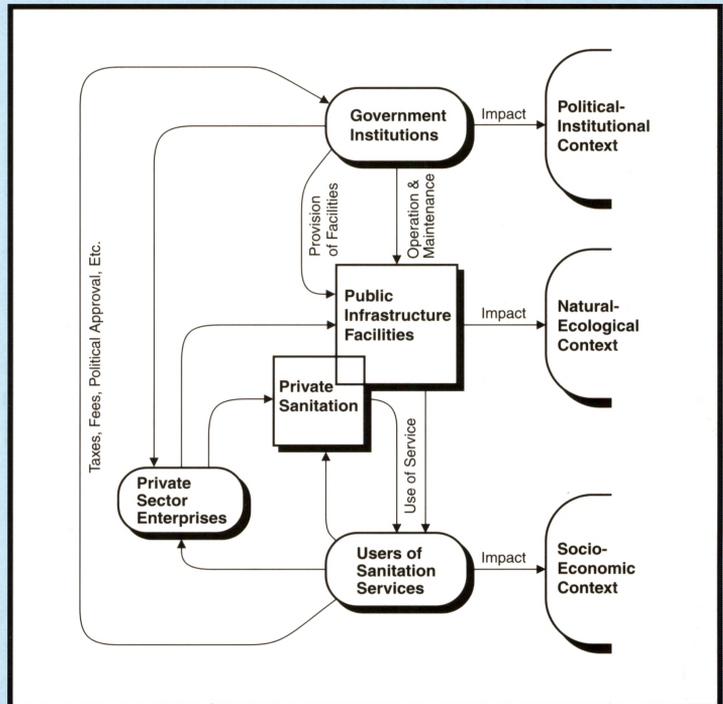




Urban sanitation management in developing countries: three conceptual tools

Peter Schübeler



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Impressum

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Origins

The cases and tools discussed in this brochure are based on materials presented at the 11th AGUASAN Workshop in Gersau, Switzerland, in June 1995.¹ AGUASAN is an informal interdisciplinary coordination group composed of persons active in the field of water and sanitation in developing countries. Individual members are associated with Swiss Development Cooperation’s technical service for Water Supply and Infrastructure (SDC), SANDEC/EAWAG, HELVETAS, Swiss Federal Institute of Technology in Zurich and Lausanne, Zurich University, Swiss Centre for Development Cooperation in Technology and Management (SKAT) and WHO.

¹ see Schübeler, P., *Urban Sanitation: the Challenge to Communities, Private Sector Actors, Local Governments and External Support Agencies, Proceedings of the 11th Aguasan Workshop, Gersau, Switzerland, 26-30 June, 1995*, SKAT, 1995

About the contents...

*This brochure is concerned with urban sanitation in developing countries. Rather than focusing on sanitation problems or possible solutions, its aim is to present three **conceptual tools** for assessing urban sanitation systems and illustrate the use of these tools with regard to a few selected cases.*

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1. Why are tools required?

Sanitation systems are basically management systems. While the underlying technical infrastructure is relatively simple, the problems of providing adequate sanitation services in the cities of developing countries are rather complex. To better understand urban sanitation as a management system, and deal more effectively with its complexity, appropriate conceptual tools are required.

Urban sanitation: conditions and consequences

The purpose of sanitation systems is to control, collect, recycle and treat various forms of waste water, human waste and solid wastes before returning them to the environment. Ultimate responsibility for ensuring urban sanitation services lies with governments—primarily local and municipal governments.

The provision of adequate sanitation is a daunting challenge in the densely-settled and fast-growing cities of developing countries. Enormous efforts have been made in recent years, and some progress has been achieved. While only 23% of the urban population in low-income countries had access to sanitation services in 1975, 42% had service access in 1995. In medium-income countries, the portion of the urban population served by sanitation systems increased from 44% to 68% in this period.² Nonetheless, more than one-third of the urban population in developing countries still lacks access to sanitation services. Furthermore, because the total urban population has doubled

² The World Bank, *World Development Report*, 1994, p. 26

since 1975, the absolute number of unserved persons in low-income countries has actually increased.

Figure 1 Consequences of inadequate urban sanitation

Porto Alegre, Brazil: One fifth of the population of urban population lives in shanty towns with poor infrastructure services. Infant mortality rates among residents of these areas is three times as high as among residents of other parts of the city (Hardoy, J., Cairncross, S. and Satherthwaite, D., *The Poor Die Young; Housing and Health in Third World Cities*, Earthscan Publications, London, 1990)

Urban Areas of Guatemala: Infant mortality rates for different population groups vary from 113 per 1 000 for the children of households in the lowest income group to 33 per 1 000 in the highest income group (Hardoy, J., Cairncross, S. and Satherthwaite, D., op. cit.)

Kampala, Uganda: According to a 1981 survey, 81% of the population used pit latrines; in poor neighbourhoods, up to 40 persons used each latrine. Only 18% of households had a potable water source within 100 metres; most relied on springs, streams or wells, many of which are polluted by human waste. (Hogrewe, W., Joyce, S. and Perez, E., *The Unique Challenges of Improving Peri-Urban Sanitation*, WASH-Technical Report No. 86, USAID, July 1993).

Dar es Salaam, Tanzania: A 1987 survey shows that only 13% of waste water and sewage is adequately disposed of. 89% of the population employed simple pit-latrines; most of them are shared facilities. Overflowing latrines are a serious problem, especially in the rainy season (Hogrewe, W., Joyce, S. and Perez, E., op. cit.)

Bombay, India: 60% of the population is connected to sewers, 10% use community toilets and the remainder use open areas. All rivers are heavily polluted. Infant mortality is 59 per 1 000 (Kingsley, G., Ferguson, B., Bower, B. and Dice, S., op. cit.). In the central area of Bombay, the crude death rate is twice as high as that of the suburbs and three times that of the extended suburbs (Hogrewe, W., Joyce, S. and Perez, E., op. cit.)

Manila Bay, Philippines: only 12% is sewered; septic tanks perform poorly. 70% of wastes dumped into the main river comes from households, 30% from industries. The rivers are biologically dead. Manila is threatened. Over 70,000 cases of gastrointestinal diseases were reported in one year (Kingsley, G., Ferguson, B., Bower, B. and Dice, S., *Managing Urban Environmental Quality in Asia*, World Bank Technical Paper No. 220, 1993).

Beijing, China: Daily municipal sewer discharge is more than 2 million tons, of which only 12 percent is treated; the remainder flows directly into rivers. Industrial effluents account for 80% of the total. Rivers downstream are intensely polluted. Much of the city relies on ground water for drinking; drinking water sources are threatened by excess exploitation (Kingsley, G., Ferguson, B., Bower, B. and Dice, S., op. cit.)

Today, about 600 million people live in unsanitary “life- and health-threatening” conditions—most of them in the informal, peri-urban settlements of third world cities.³

The human consequences of inadequate sanitation are disastrous. WHO estimates that 75% of all illnesses and 80% of child deaths in these cities are associated with unsafe excreta disposal, poor hygiene and contaminated drinking water. Along with health problems, inadequate sanitation implies daily hardship, stress and diminished human potential for enormous numbers of poor urban residents. The impact of inadequate sanitation on the ecology of urban regions is often catastrophic.

Evident needs, simple technologies, complex solutions

What can be done to improve urban sanitation in developing countries? In view of the urgency of needs and relative simplicity of available technical solutions, the obvious answer would be to greatly increase investments in sanitation facilities. In fact, the situation is not so simple. Urban sanitation poses complex problems with regard to several *issues*:

■ **Resource mobilisation**

Governments do not have the financial resources needed to expand existing sanitation systems to meet present and future demands. Less expensive solutions must be found. More importantly, alternative means must be mobilised for financing and delivering sanitation services. These alternatives involve active contributions of service users—as indi-

³ Hogrewe, W., Joyce, S. and Perez, E., *The Unique Challenges of Improving Peri-Urban Sanitation*, WASH-Technical Report No. 86, USAID, July 1993

viduals and as community groups—and private sector service suppliers. A range of organisational issues is implied.

■ **Operating capacity**

Poor sanitation results not only from the lack of facilities, but also from the ineffectiveness and low operating efficiency of existing facilities and systems. Additional capital investment would not necessarily increase the effectiveness existing facilities, however, nor improve operating efficiency. In many cases, rehabilitation of existing facilities and improvement of operation and maintenance capacities yields greater benefits than investment in new facilities. Required inputs consist of “software”—organisational design and capacity-building—as well as the “hardware” of physical facilities.

■ **Economic and ecological sustainability**

In industrialised countries of the West, urban managers are becoming increasingly aware of the limits of modern, centralised infrastructure systems. In large cities, water is piped from great distances, treated and distributed throughout the metropolitan area—only to be used primarily for the transport of wastes, prior to retreatment and ultimately return to the environment. Besides producing vast quantities of waste water and enormous associated costs, metropolitan water supply, drainage and sewage systems seriously disrupt regional groundwater systems. Their long-term economic and ecological sustainability is questionable. Emerging concepts of water supply and sanitation thus focus less on water production, collection and treatment and more on limiting drinking water demand and preventing water contamination at source. Realisation of these concepts requires that certain responsibilities be decentralised and shifted back from the public to the private realm. These lessons are even more urgent in the fast-growing cities and mega-cities of developing countries.

■ Choice of objectives and priorities

Sanitation development programmes may pursue a variety of objectives, aiming, for example, to:

1. extend the physical capacity of a service network,
2. reduce ground and surface water pollution,
3. provide adequate revenue for operation and maintenance,
4. improve public health conditions,
5. improve public awareness of environmental health, and
6. increase community capacity for sanitation management.

These objectives are largely complementary and most may be cited in any given programme. In many cases, however, planners fail to respect a logical hierarchy of policy objectives. For example, sanitation projects commonly focus on “hardware” objectives such as extension of a sewer network (objective 1), while citing higher-level objectives such as public health (objective 4) as justification. However, if planners had focused on the highest priority objective, public health, they might have arrived at a different development strategy: public awareness and community-based sanitation management (objectives 6 and 7) might have been given more weight, and a variety of locally-adapted technical solutions might have been favoured over a centralised sewer network.

Sanitation is a management problem

The issues described above demonstrate the futility of attempting to solve sanitation problems at the technical and financial levels alone. Sanitation systems are not just engineering systems; they are, above all, management systems.

From the *management perspective*, urban sanitation systems:

- comprise inter-linked technical, economic, social, institutional, political and ecological components,
- involve a variety of public and private sector actors, both as users and as suppliers of sanitation services, and
- incorporate and mediate between various interests and objectives.

A crucial characteristic of management systems—as opposed to engineering systems—is that the objectives cannot be taken as given at the outset. Defining the objectives and priorities of various concerned actors is itself a part of the problem-solving process.⁴ Dealing with this kind of complexity, which is inherent to sanitation management, may be facilitated by appropriate conceptual tools.

⁴ Checkland, Peter B., “Soft Systems Methodology”, in *Human Systems Management* 8, IOS, 1989, pp. 273-289

2. What are the main features of the tools?

There are many concepts, models or tools which may be used to understand, analyse and plan urban sanitation systems. This brochure proposes a simple “toolbox” of three:

Figure 2 Overview of the tools

	Purpose	Description
Tool 1	Assessing modes of sanitation development	A systematic description of current modes of urban sanitation development, assessing the strengths and weaknesses of each.
Tool 2	Modelling sanitation management systems	A graphical schema of sanitation systems identifying main components, actors and processes and the relationships and interactions between them.
Tool 3	Analysing participatory approaches	A typology describing and analysing task-sharing, participation and partnership arrangements between stakeholders in sanitation management.

These tools may be used for assessing and monitoring existing sanitation systems and development programmes, and for preparing future development activities. They are not theories or methods, and should not be expected to produce solutions; they are merely aids for systematically approaching and working on problems. The tools are intended for all those who are concerned with urban sanitation in developing countries, including planners and urban managers, NGO personnel, project field staff, desk officers, experts and consultants. They are not finished products, but should be further elaborated, modified and adapted to suit the needs of the user in each particular situation.

Tool 1: Assessing sanitation modes

Attempts to improve the functioning of complex systems should begin with an analysis of how they currently work—an appraisal of their strengths and weaknesses. In the case of urban sanitation, a comprehensive view is particularly important. The large numbers of people living beyond the reach of municipal systems are not completely devoid of sanitation services, and it is important to understand how alternatives operate.

In general terms, three modes of urban sanitation may be distinguished—*conventional*, *informal* and *low-cost*—each with its own organisational, technological and economic characteristics. These are identified in Fig. 3 and assessed in Tool 1 (see Fig. 4, p. 13). The modes are not mutually exclusive; a mix of all three modes is commonly found.

Figure 3 Modes of sanitation development

Mode of Sanitation	Initiator	Technical characteristics	Developmental and operational processes
Conventional	Government	Centralised sewerage and waste collection networks	Developed by central government agencies; operated by local government; largely supply-driven.
Informal	Users, mainly low-income groups	Improvised, often poorly executed, mostly on-site solutions (e.g. latrines)	Developed and operated by households, community groups and informal private enterprises; demand-driven.
Low-cost	Government, NGOs and external support agencies	Locally adapted, on-site solutions; simplified sewerered options	Developed by government agencies with some user participation in planning, implementation and O&M

Conventional mode

The conventional mode of urban sanitation normally employs a long-term (e.g. 20-year) sectoral master plan which specifies phased implementation of a comprehensive infrastructure system—a water-borne sewerage network, for example—according to accepted standards of design and service levels. This top-down, future-oriented approach makes it possible, in principle, to plan a technically coherent system for the entire urban region, taking due account of natural parameters and the anticipated—and desired—patterns of urban growth.

In the context of developing countries, however, the conventional mode has serious shortcomings: long-term plans often employ unrealistic assumptions regarding population growth, economic potential and final cost of the proposed system. As a technical response to anticipated sanitation needs, the conventional mode offer supply-driven, “blue-print” solutions which take little account of actual priorities, specific needs or varying ability to pay in different localities of the city.⁵

In many cities, the conventional mode has produced unaffordable proposals which cannot be implemented as planned. Those facilities which are implemented only serve a limited portion of the population while burdening the municipality’s operation and maintenance capacity both technically and financially. The outcome is low operating effectiveness, physical deterioration of facilities and neglect of the areas not reached by the municipal service network. When implemented in low-income areas—

⁵ see, Peterson, G. et. al., *Multi Sectoral Investment Planning*, Urban Management Programme Working Paper Series No. 3, UNDP/UNCHS (Habitat)/World Bank, June 1994,

usually with external financing—conventional facilities normally prove to be too expensive. Only a small portion of the population can afford a sewer connection, and investments remain under-utilised and financially unsustainable.

Informal mode

Public authorities and the formal private sector are, in most cases, incapable of providing housing which meets the needs of low-income households at prices which they can afford. About 30% to 50% of the housing in most cities of developing countries is therefore produced informally by low-income households—outside of the official planning and regulatory systems, without recognised tenure rights, through an incremental process of owner-managed development.

Informal housing production is not limited to the dwelling unit alone, but also encompasses infrastructure facilities and services. Roads, footpaths, drains, water supply, sanitary facilities, garbage disposal and transport services are commonly provided, extended and improved through the efforts of individual residents, community-based organisations (CBOs) and informal private sector actors. While the popular image is one of a “self-help” activity, the terms “community-based” and “owner-managed” development are more accurate. Beyond the contributions of individuals and CBOs, the informal mode depends on small-scale informal private sector enterprises and workers for the provision of technical skills, organisational capacity, labour, materials and even credit. In contrast to conventional sanitation, the informal mode is bottom-up, demand-driven, localised and oriented towards present needs and priorities.

Informal sanitation, drainage, and waste disposal systems constitute the only available service for large numbers of low-income households; the solutions they provide are far from satisfactory, however. In densely populated informal settlements, on-site disposal of human waste is very problematic from the public health and ecological perspectives. Channelling waste water into open street drains and dumping solid wastes on open plots are widespread but environmentally unacceptable practices. Informal sanitation facilities are normally improvised, poorly executed and fragmentary solutions to pressing sanitation needs. Following no coherent plan, they are rarely linked to municipal service networks.

Low-cost mode

Governments in developing countries have not always responded positively to the rapid expansion of informal housing and infrastructure systems. Up to the 1970s, authorities frequently destroyed informal squatter housing while attempting to provide low-cost solutions of their own. By the mid-1970s, though, it had become apparent to most authorities that low-income residents make important contributions to housing and service provision—and to the urban economy—in spite of their lack of tenure rights. Official development efforts, very often initiated, technically supported and partially financed by external support agencies, have thus sought increasingly to implement technically-adapted, low-cost solutions which mobilise self-help potentials. These efforts have taken the form of “site and service” schemes on new residential land, and “slum upgrading” programmes in existing low-income settlements.

The outcome of low-cost sanitation strategies has been generally positive: technical solutions have been implemented which meet the needs and ability-to-pay of low-income households, and user communities have become involved to some degree in planning and implementing, operating and maintaining sanitation improvements. Besides the mobilisation of users' contributions, an important advantage of low-cost approaches lies in the more effective use of public resources through better targeting of investments to the real demands of the people.

At the same time, user participation within government directed projects has often proven problematic. Community mobilisation is a time-consuming activity which calls for specific skills and methods. Wary of rising expectations and lengthy decision-making processes, authorities tend to limit beneficiary involvement to a brief planning consultation. The pressure to implement projects on schedule—particularly when foreign donors are involved—often gives a supply-driven character to this mode. Under these circumstances, participation may be more perfunctory than real, and the project may fail to engage informal self-help development processes. When the beneficiary community does not acquire “ownership” of the project, cost recovery tends to be poor.

Apart from a few notable exceptions, low-cost mode sanitation development is limited to isolated improvements which are poorly linked to municipal service networks. The main reasons for this are institutional, as most low-cost programmes are implemented by special purpose agencies whose activities are poorly coordinated with the relevant sectoral departments.

Figure 4

Tool 1: Assessing modes of urban sanitation

Mode	Strengths	Weaknesses
Conventional	<ul style="list-style-type: none"> • Technically coherent, city-wide plan • Regional scope enables consideration of ecological and natural constraints • Long-term plan allows consideration of future urban development trends and objectives 	<ul style="list-style-type: none"> • High-cost, unaffordable to most low-income households • Lack of demand-orientation, unresponsive to real needs and priorities • Poor cost recovery • Insufficient O&M leads to low operating effectiveness • Bureaucratic management with no real incentive or competition.
Informal	<ul style="list-style-type: none"> • Development responsive to people's real demands and aspirations • Affordable, low-cost solutions • Community-management of services where organisation is adequate • Productive, employment-generating involvement of informal private sector enterprises 	<ul style="list-style-type: none"> • Poor technical quality • Individual household solutions predominate; community-level services are often neglected • Limited positive impact on environmental and public health conditions • Isolated solutions with poor links to municipal systems
Low-Cost	<ul style="list-style-type: none"> • Generally affordable solutions • Allows people a certain voice in the use of public resources • Mobilisation of people's resources for local improvements • Creates possibility of coordination between area-wide and municipal networks. 	<ul style="list-style-type: none"> • Implementation pressure leads to supply-driven approaches, limits participation and reduces project "ownership" by users • Limited project ownership leads to poor cost recovery • Limited engagement of informal and self-help development processes • Local solutions are often poorly linked to municipal systems • Small-scale, local efforts are not adequate to the magnitude of needs

Political unwillingness to recognise the tenure and service rights of squatter residents often limits the scope of the low-cost mode. Finally, government initiated low-cost schemes are normally still too expensive for very low-income users; cost recovery is fragmentary and the shortage of financial resources limits development to a few selected areas. A relatively small portion of the needy population is actually reached.

Tool 2: Modelling sanitation management systems

A realistic model of urban sanitation management should identify all principal actors, facilities, and processes, and qualify the interactions and objectives involved in sanitation service delivery. This is attempted by the graphical schema (Fig. 5).

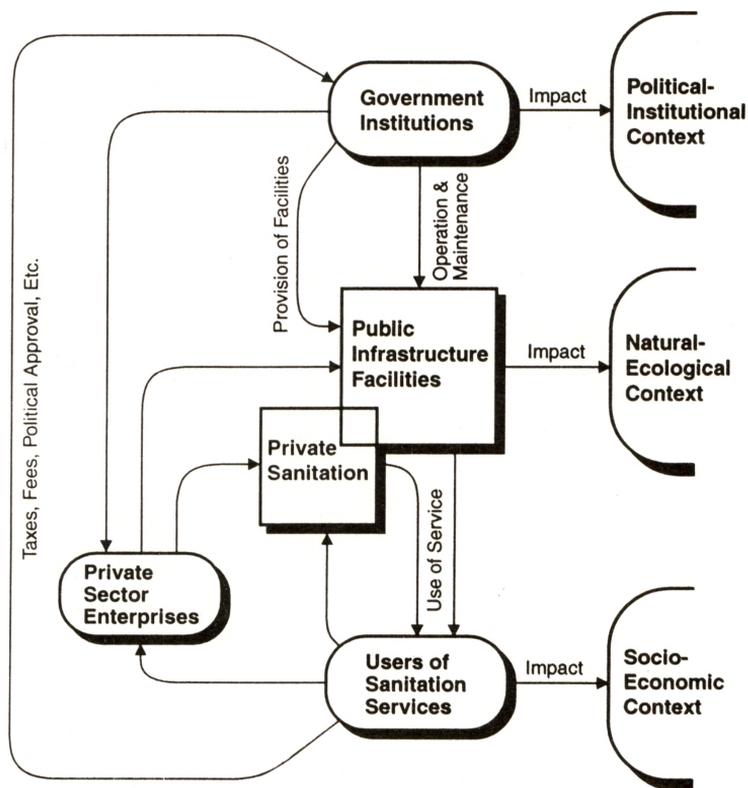
The main *components* of sanitation management systems are:

- | | |
|---------------------|--|
| Users | Consumers of infrastructure services, including individual households, residential communities, commercial and industrial establishments, institutions and other public and private users of infrastructure services |
| Facilities | Technical installations and equipment |
| Institutions | Local and higher government authorities responsible for delivering sanitation services and providing the required infrastructure facilities |

Components are linked by *processes* of "supply" and "use". *Supply processes* comprise the operation and maintenance of physical infrastructure facilities and all other activities required for service delivery. *Use processes* include all activities related to obtaining and consuming services. Actual service access is

the outcome of both supply and use processes. It is influenced by factors such as the behaviour patterns and attitudes of the users and the capacities and skills of institutions responsible. Physical facilities constitute important conditions, but are hardly the sole determinants of service access and quality.

Figure 5
Tool 2: Modelling sanitation management systems



Legend:

→ Potential process / interaction

➔ Important process / interaction

Interaction not functional

↯ Problem or conflict area

Provision of facilities is the process of developing (planning, financing, implementing and procuring) new, extended or improved public sector installations and equipment. In many countries, the provision of new facilities is accomplished by central or provincial authorities (not shown in the schema) while their operation is left to local government. This separation of developmental and operational functions often hinders a coherent approach to system development.

Informal and private facilities are part of a “sub-circuit” of user-initiated provision, supply and use. They include informal private facilities in low-income residential areas (e.g. individual soak-pit toilets, community-built drains and locally organised solid waste collection) as well as formal private facilities of high-income residents and large-scale enterprises (e.g. the septic tank of a hotel or the waste treatment facilities an industrial enterprise).

Besides service delivery, the interactions between suppliers and users include various kinds of feedback such as the payment of user fees, evidence of service demand and expressions of satisfaction (or dissatisfaction) with service delivery. Such feedback often has political implications.

Each component operates in a particular *context*—political-institutional, natural-ecological and socio-economic—to which it must adapt. Conversely, system operation has an impact on the respective context which may be either positive or negative. An increase in satisfied customers and good cost recovery will produce positive impacts at the institutional and political levels, for example, and the opposite may have negative impacts.

Similarly, effective infrastructure facilities will produce positive environmental impacts, and adequate service access will positively affect the socio-economic context.

Although not shown in Fig. 5, *goals and objectives* can be situated by means of the schema. Higher-level goals such as public health and environmental protection generally lie at the context level, while more immediate objectives (improving cost recovery, extending network capacity, building community waste management capacity, etc.) refer to the main components of the management system.

Development activities of external support agencies or NGOs (not shown in Fig. 5) normally take the form of inputs to the main components aiming, for example, at institutional strengthening, physical improvement of facilities and/or community development.

Tool 3: Analysing participatory approaches

Effective management of sanitation systems calls for the coordinated activity of several stakeholders. With regard to the potential role of users, planners commonly refer to “community participation”. However, this notion of “participation” hardly expresses the full range of potential task-sharing, cooperation and partnership.

On one hand, when support is extended to informal community-based and self-help development, it is not really the people who are participating, but rather the government—or another development agent—who seeks, in a sense, to “participate in”

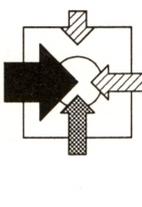
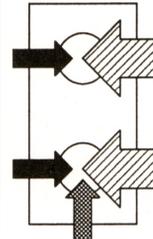
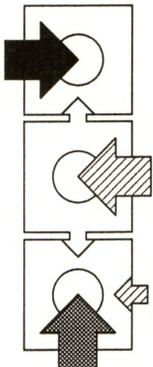
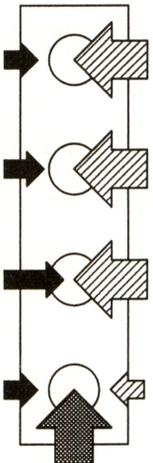
the people's development activities. On the other hand, governments are ultimately responsible for service provision. In order to meet these responsibilities effectively, they depend upon various forms of popular involvement. Generally, people may participate in government-based sanitation management in three different ways: as *customers* who demand certain services, as *producers* who contribute to service provision, and as *citizens* who exercise their voice in public processes of formulating policies and planning goals.

Between the extremes of government participation in community-based processes and people's participation in government-based processes, various forms of involvement and collaboration are possible. A four-part typology of participatory approaches is thus proposed (see Fig. 6). The approaches are not mutually exclusive; they may be applied quite flexibly, and one approach commonly evolves into the next.

Community-based approach

The most elementary participatory approach focuses on community-based activities for developing and improving local sanitation services. The essential frame of reference for development inputs and partnership is the social group itself. Technical and organisational assistance aims to *support* community-based—mostly informal—activities, and to *enable* them through improvements in the legal, regulatory, economic and/or political context. Regularisation of tenure rights and provision of credit access are examples of the latter. In practice, it is very often an NGO, and not a government agency, which takes the lead in community-based approaches.

Figure 6
Tool 3: Analysing Participatory Approaches

Legend	Approach			
	Community-based	Area-based	Functionally-based	Process-based
<p>Actors</p> <p>  = Community  = Private Sector  = Public Sector </p> <p>Roles</p> <p>  Management/Direction  Participation/Support  Consultation/Coordination </p>				
Frame of reference	Social group or community	Residential area	Service delivery functions	Management process
Development objectives	Enable and support user-managed development	Consult and involve beneficiaries in a government managed development process	Establish collaboration between stakeholders, each taking responsibility for a particular functional domain	Decentralise and privatise management processes with appropriate participation in each function

Area-based approach

In most government-sponsored programmes of participatory development, it is not a social group but a selected poorly-served residential area which constitutes the *frame of reference* for organising and managing sanitation development. The approach aims to *involve* beneficiaries in a development process which is initiated and directed by authorities or development agencies.

The objectives of beneficiary involvement are: to improve the targeting of measures through participatory planning; promote efficient implementation through beneficiary support and co-operation; mobilise the beneficiary's financial or material inputs to project implementation and promote their contributions to the use, operation and maintenance of services.

Functionally-based approach

The functionally-based approach is somewhat more differentiated and, at the same time, more balanced than the previous two. The essential *frame of reference* for structuring participation is not a social group or geographic area, but the particular *functions* of infrastructure management. Typical examples include task-sharing between community groups and government whereby the former organises local solid waste collection or constructs local tertiary sewer lines while the latter transfers and disposes the collected solid waste or constructs and operated corresponding secondary and primary sewers.

Rather than arranging for the participation of one stakeholder in activities which are directed by another, this approach aims

to establish clearly-defined functional domains, so that each stakeholder may manage his own domain in a relatively independent manner. The functional domains must be structured so that each stakeholder brings his particular interests and capacities to bear. Most importantly, channels of communication and procedures for *collaboration* must be established to ensure an efficient functional integration between the respective domains.

Besides organisational planning and development, development measures focus on building the management capacity of partner organisations. This may involve community development, organisational and technical support and training programmes. It is often necessary to provide credit access to enable participating community groups or private sector actors to establish some degree of operating autonomy.

Process-based approach

Process-based approaches aim at decentralising responsibility for infrastructure services and rendering them more responsive to users. Their *frame of reference* comprises the entire process of sanitation management, including such functions as strategy formulation, long-term planning, revenue generation and financial management, investment programming, physical implementation, service delivery, operation and maintenance, monitoring and evaluation. While the form and intensity of citizen and/or user participation may vary from function to function, some form of participation is relevant to each.

Decentralisation implies a double movement in which the location of management and decision-making functions is shifted

towards more local bodies (city, ward, community, neighbourhood etc.) while the functions themselves are opened to input from "below". Important measures include institutional analysis and development, the introduction of improved procedures and methods, training and human resource development. Public information programmes, media campaigns and school programmes may be introduced. An important objective is to improve communication between users and responsible authorities. Participatory monitoring and evaluation may be important in this regard.

Decentralisation concerns not only the administrative and political domains, in which responsibility is devolved to more local bodies, but also the economic domain, in which certain public functions are devolved towards private sector enterprises. Privatisation is an important component of the approach.

3. How do the tools apply in practice?

The purpose of the three tools is to promote understanding of sanitation development and management systems and assist in the preparation of future activities. To illustrate and test the tools' relevance in the first regard, case studies of four different projects have been selected (see Fig. 7). After a short introduction, each case is analysed briefly employing the three conceptual tools.

Figure 7 Four cases of sanitation development

Case	Location	Initiator	Main activities	Results
Orangi Pilot Project (OPP)	Karachi, Pakistan	Orangi Pilot Project (OPP), an NGO	Low-cost, self-managed sewer construction	In Orangi, over 750,000 persons served by sewers after 14 years work
Self-help Family Toilet Scheme (STS)	Yogyakarta Indonesia	Yayasan Dian Desa (YDD), an NGO, with the Yogyakarta Urban Development Project	Supported self-managed sanitation improvements	NGO scheme distributed 153 loans, latrines built, 100% recovery; (govt. scheme 65% recovery)
Micro-enterprise Waste Management (MWM)	Cucuta and Los Patios, Columbia	Consultant engineer with a national health programme and local governments	Contracting community-based micro-enterprises for solid waste management	First micro-enterprise with 15 associates serving over 50,000 inhabitants; replication in other cities
Strategic Sanitation Programme (SSP)	Kumasi, Ghana	UNDP/World Bank Water and Sanitation Division, local government	Planning, implementing sanitation improvement and institution-building—city-wide	Development plan, new agency, 250 home latrines, sewers for 20,000 people, privately managed public toilets

Figure 8 Orangi Pilot Project, Karachi

Orangi is one of the largest "katchi abadi" or squatter settlements in Karachi. The Orangi Pilot Project (OPP) was started in 1980 by an eminent social scientist with the support of a local foundation. Work began not with surveys, but with an extensive period of contacts and discussions with the people of Orangi and their leaders. Sanitation emerged as the residents' priority problem.

Noting that the construction of most houses in Orangi was owner-managed, the OPP became convinced that the people would also be capable of constructing a local sewer system. Some households had, indeed, attempted to construct sanitary improvements, but lacked the technical know-how, organisation and co-ordination required to build an effective system. The OPP thus undertook research aimed at developing low-cost sanitation solutions and devising an appropriate organisational form for community-managed implementation. Through technical simplification and, above all, efficient management of contractors, the cost of sewer construction was markedly reduced. With the support of local activists, the people were then encouraged to establish lane-level organisations to manage the financing and implementation of local sewer lines. The success of the early lane sewers created a "snow-ball" effect as neighbouring areas followed suit. Related programmes were initiated for low-cost housing improvement, small-scale enterprise credit, health education and schools.

An important feature of the approach was the distinction between the "internal" and "external" components of sanitation infrastructure. The former comprises private sanitary facilities, local or tertiary sewer pipes and, in some cases, secondary sewers. The latter includes trunk sewers and treatment facilities. While the lane-organisations (CBO) assumed responsibility for financing and managing "internal" components of the system, the municipality was expected to assume responsibility for the "external" components.

The low-cost sanitation scheme is being replicated in several other areas of Karachi, and other cities of Sindh and Punjab: for example, the Swiss supported "Collaborative Katchi Abadi Improvement Project" (CKAIP) in Hyderabad, which is undertaken in collaboration with the municipal government; and a more recent programme in Karachi, which is being implemented by the Sindh Katchi Adadi Authority (SKAA) together with the OPP.

The main **results** of these different projects are:

- In Orangi, since 1980, a total of 80,503 houses encompassing about 85% of the population of about 900,000 people have been provided with sewer connections and in-house toilets through self-financed, self-managed efforts.
- In Hyderabad, after two years of work, the local government has managed to complete about one-third of the "external" trunk sewer, which was scheduled to take six months. Due to this inordinate delay in "external" works, it is not yet possible to begin "internal" development, and the people have begun to lose faith in the project.
- In Karachi, after one year's work with SKAA (an energetically directed Provincial agency), external sewers have been completed in six katchi abadi. Internal sewer connections reached 12,789 houses, about 53% of the total.

Case Review: Orangi Pilot Project, Karachi (OPP)

Tool 1: Mode of sanitation development, OPP

The OPP approach to sanitation is anchored in the *informal mode* of service provision. It follows a user-managed process in which individual households join together at the neighbourhood level to plan and implement sewer construction, together with small-scale contractors and workers. The project aimed to correct inherent weaknesses of the informal mode: poor technical quality and fragmented, individual solutions. This was accomplished through technical extension services and an organisational model which facilitated bottom-up coordination of lane-level improvements over the extended area of Orangi.

While incorporating technical features characteristic of the *low-cost mode*—adapted shallow sewers with simplified manhole designs, for example, the project sought to avoid weaknesses common to government-managed low-cost projects: namely, restricted participation, supply-driven implementation, limited project “ownership” and low rates of cost recovery. This was accomplished by relying on 100% financing by the communities themselves and the self-management of planning, implementation and maintenance functions.

At the same time, the OPP project attempted to counteract a weakness common to both *informal* and *low-cost modes of sanitation*: the tendency to produce isolated localised solutions with no functional links to the municipal network. A key element in this regard was the choice of a technical solution—water-borne sewerage—which is compatible with the municipal network and anticipates (and, in a sense provokes) the integra-

tion of community-based and municipal systems. The OPP firmly—and correctly—resisted the advice of UN experts to implement cheaper on-site soak-pit latrines, rather than the (supposedly) unaffordable sewer system.

To enable the “bottom-up” implementation of a technology which is normally planned and implemented in a “top-down” hierarchical manner, it was necessary to divide the system into “internal” and “external” portions and coordinate implementation of the two. The model thus strives for a new synthesis between informal and conventional modes. This coordination—which the NGO sought to provoke through community pressure in Orangi and arrange by collaborative agreement in Hyderabad—proved very difficult to achieve in practice.

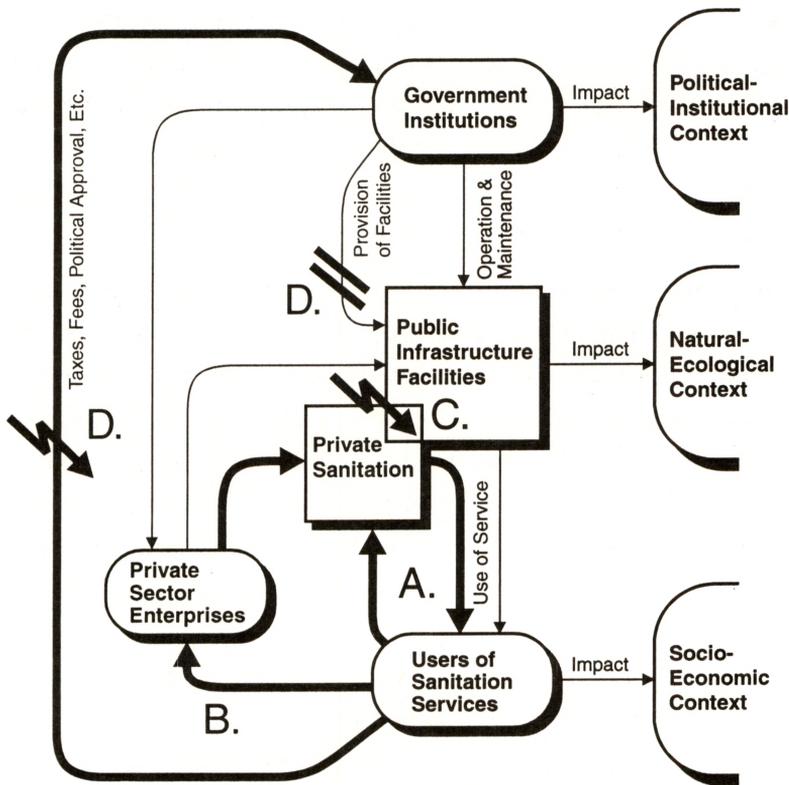
Tool 2: Model of sanitation management OPP

The management system of the OPP sanitation approach is illustrated in Fig. 9. Activities began with the existing private circuit, by which residents and informal construction enterprises provide sanitation facilities and services (A). The technical quality and organisation of the community-based solution were improved through support to private enterprises, and promotion of their collaboration with community-based organisations (B).

The logic of the approach calls for physical integration between the private (“internal”) and public (“external”) segments of the system (C). To accomplish this, close coordination is required between user communities and municipal authorities (D). After more than a decade of successful community-based develop-

ment, municipal governments have, in principle, accepted the approach. In practice, however, government agencies—with the important exception of SKAA—have not managed to significantly alter the prevailing, ineffective procedures of service provision, or to promote and complement the potential of the community-based approach. The process of collaborative public sector development (D) remains most problematic.

Figure 9 Model of sanitation management, Orangi Pilot Project



Tool 3: Analysis of participatory approach OPP

The OPP model has, from the outset, followed a *community-based approach* towards participation: the social group with its internal dynamics of decision-making and self-managed development activities is the main frame of reference for project implementation. However, to overcome the technical and organisational limits of a purely community-based approach, the OPP devised the concept of dividing the sanitation system into “internal” and “external” portions, and basing private-public collaboration for sanitation development on these two differently organised domains. In this sense, the ideal of the OPP model is a *functionally-based approach* (which, at the same time, incorporates features of the community-based approach).

Implemented in collaboration with SKAA, the approach has been very successful. An important factor in this success is SKAA’s capacity to finance external sewer investments. In Hyderabad, however, municipal agencies employing conventional sanitation planning and programming approaches have not been able to provide external investments within a useful period. In practice, the OPP operates a *community-based approach*. Evolution towards a more extensive *functionally-based approach* is blocked by the lack of responsive planning and programming capacity on the part of the local government. In principle, this would require greater decentralisation of sanitation system management in line with the *process-based approach*.

Figure 10 Participatory approach, Orangi Pilot Project

Approach	Community-based	Area-based	Functionally-based	Process-based
Frame of reference	Social group or community	Residential area	Service delivery functions	Management process
Development objectives	Enable and support user-managed development	Consult and involve beneficiaries in development process	Establish collaboration between self-sufficient stakeholders	Decentralise and privatise management processes

Shading indicates degree to which the approach has been applied

Figure 11 Self-help Toilet Scheme, Yogyakarta

The Yayasan Dian Desa (YDD) is an NGO based in Yogyakarta, Indonesia, with many years of experience in rural and urban development projects. In the framework of the Yogyakarta Urban Development Project (YUDP)—a Swiss supported project for municipal management support—the NGO has assumed responsibility for specific tasks of community-based and community-oriented development. As a first step, an extensive “real demand study” of urban households was conducted to gather data on the people’s specific needs and economic demands for infrastructure services in different parts of the city. The study was intended to promote more effective programming of infrastructure development, introducing measures for increasing community involvement in the process.

The pilot project for self-provision of family toilets was an initial step towards the implementation of the “real demand study” findings. Besides the immediate aim of improving sanitation conditions of poorly served households, the project’s objective within the YUDP was to improve the municipal authority’s capacity to implement community-based infrastructure development approaches.

The pilot scheme, which began in January 1993, provided technical support and credit facilities for the construction of private toilets and privately-managed public toilets in areas where the space for private toilets was lacking. Two types of approaches were implemented: Type I, implemented with government collaboration, and Type II, implemented by the NGO alone. Different conditions and features were applied in each type:

Type I: administered by YDD under YUDP umbrella with direct government involvement

- no collateral required of borrowers
- borrowers were selected by local government officials
- interest-free loans were provided
- credit limit of about CHF 160.

Type II: administered directly by YDD with no government involvement

- private or social collateral was required
- borrowers were selected by borrower groups; local officials were informed
- interest rate of 12%, compared with commercial rate of 15.5%
- credit limit of about CHF 200.

While both programme types have produced functional on-site sanitary solutions, a comparison between them is quite instructive. Type I (government managed) has distributed 123 loans since December 1992. The recovery rate is 65%, meaning that 35% of the loans are “bad”. The Type II (NGO) version has distributed 153 loans since August 1993. It has avoided the “Santa Claus syndrome” which plagues the public sector version, and the loan recovery rate is 100%.

Case Review: Self-help Toilet Scheme, Yogyakarta (STS)

Tool 1: Mode of sanitation development STS

The scheme for supporting self-help provision of household toilets contains features from different modes of sanitation development. From the *informal mode*, the scheme incorporates owner-managed implementation in collaboration with small-scale construction enterprises. As in the case of the OPP, the scheme attempts to alleviate weaknesses of the informal system through technical support and credit.

A resemblance to the *conventional mode of sanitation* is evident at the level of strategic planning. The scheme is conceived as a component of the improved, increasingly demand-oriented planning approach which is being introduced in the city-wide YUDP project. In fact, the integration of technical and managerial functions from the pilot scheme into the YUDP project have not yet been accomplished, and this link remains somewhat tenuous.

The scheme also exhibits characteristics of the standard *low-cost mode of sanitation development* with regard to the use of low-cost, on-site technology and government-managed credit and technical support. In the "Type I" programme (with government participation), the model fails to overcome typical weaknesses of the low-cost approach: the government maintains its traditional paternalistic relationship with the beneficiaries, and no real sense of project "ownership" arises to replace the "Santa Clause syndrome"; cost recovery is correspondingly poor.

The “Type II” scheme without government participation scored much better with regard to project ownership. In effect, the NGO operated much as a private enterprise, as in the *informal mode*: credit is provided on a commercial basis, beneficiaries act independently and cost recovery functions well.

Neither programme type overcomes the failing functional linkage between local and municipal systems—a characteristic weakness of *informal* and *low-cost modes*.

Tool 2: Model of sanitation management STS

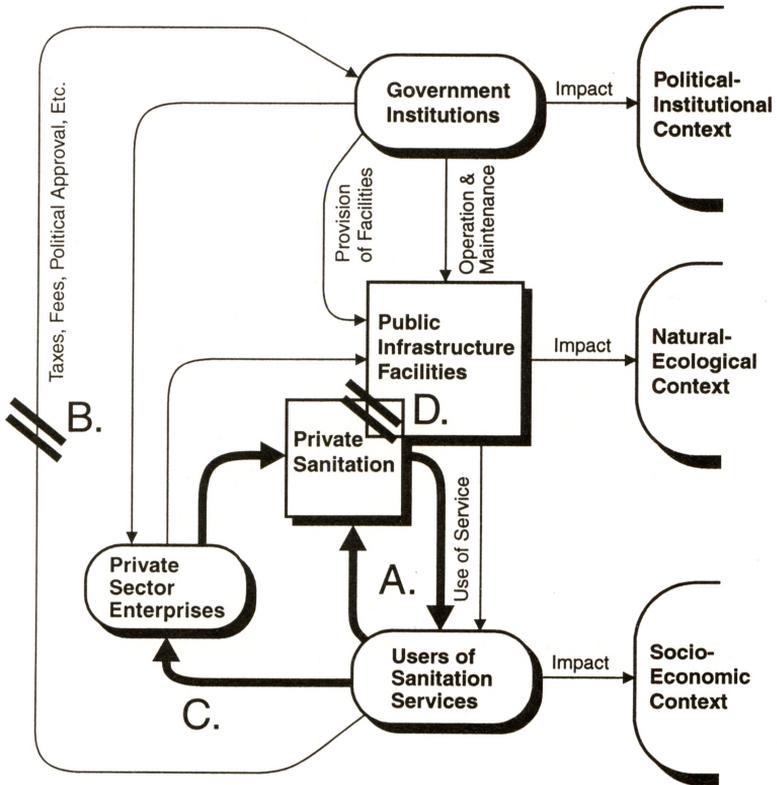
The organisational setting of the project is illustrated in Fig. 12. As in the case of the OPP, the management circuit is quite local, involving only individual users, community groups and private enterprises in the construction of private sanitation facilities (A). It is not apparent what role the government should play at this level. In the Type I government-led approach, interest seemed to be directed primarily towards winning political approval (B).

As noted, the NGO assumed characteristics of a private sector enterprise which managed credit facilities on a near-commercial basis (C). There is a limit to the potential expansion of the NGO in this role, however, and the failure to involve private sector enterprises casts doubt on the potential for scaling up the approach.

The absence of a functional interface between private and public infrastructure facilities (D) is another important constraint. Dealing only with on-site facilities, the scheme avoids this is-

sue, but provides no solution for densely-settled residential areas where off-site solutions (sewers) are required.

Figure 12
Model of sanitation management, Self-help Toilet Scheme



Legend:

- Potential process / interaction
- Important process / interaction
- ⚡ Interaction not functional
- ⚡ Problem or conflict area

Tool 3: Analysis of participatory approach STS

While the scheme does not fit very clearly into any of the participatory types, characteristics of the *area-based approach* predominate. The project began with a city-wide geographical analysis of sanitation conditions and socio-economic characteristics, which was then employed to determine appropriate technical and organisational solutions for each locality. As in the area-based approach, development activities were initiated by the government-sponsored project, and implemented for the most part by individual households.

Project beneficiaries were mobilised to form borrower groups, at least in the NGO-operated Type II version. These groups did not actually manage development activities, however, as would be the case in a *community-based approach*. There was some degree of functionally-based division of tasks, particularly in the case of privately-operated public toilets. However, technical linkages between these units and the municipal network—which would be characteristic of a *functionally-based approach*—were not developed.

Figure 13 Participatory approach, Self-help Toilet Scheme

Approach	Community-based	Area-based	Functionally-based	Process-based
Frame of reference	Social group or community	Residential area	Service delivery functions	Management process
Development objectives	Enable and support user-managed development	Consult and involve beneficiaries in development process	Establish collaboration between self-sufficient stakeholders	Decentralise and privatise management processes

Shading indicates degree to which the approach has been applied

Figure 14 Micro-Enterprise Waste Management, Columbia

The project began in 1989 in the cities of Cucuta and Los Patios, Columbia, as a response to the urgent need for improved environmental sanitation in low-income areas of the city. This need was identified by a primary health care programme implemented by the Ministry of Health with German technical assistance.

The basic idea was to organise solid waste collection by micro-enterprises composed of members of the user community. Any local group or small-scale firm was eligible to bid for the job of waste collection. The micro-enterprise with the best offer was contracted by the municipality to provide solid waste services in a designated area. The micro-enterprise was paid by the municipality, which retained responsibility for collecting fees from customers and for final disposal of the collected waste at the city's dump site.

An advisory "project promoting team" furnished technical planning studies, engineering designs, financial planning and technical support to the micro-enterprises. Credit was provided to the micro-enterprises on commercial terms to enable them to procure equipment and start operations. Once the loan was repaid, the micro-enterprises were able to earn a reasonable profit. Supervision of operations was the joint responsibility of the municipality, representatives of the community and the micro-enterprise itself.

The first micro-enterprise, which started in 1991, was composed of 13 associates and provided a solid waste collection service twice weekly to 43,000 inhabitants. By 1995, it had expanded to 15 associates and served over 50,000 inhabitants (10,000 households). Over 15 tons of waste were collected daily. The scheme has been implemented in five other urban communities of Columbia, and is presently being replicated elsewhere in Latin America.

Case Review: Micro-Enterprise Waste Management, Columbia (MWM)

Tool 1: Mode of sanitation development MWM

This community-based project for solid waste management is not simply an improved *informal mode*, nor can it be seen as a reformed *conventional mode* of sanitation development. The contribution of the approach model derives from its synthesis of specific aspects of both informal and conventional approaches. By devolving waste collection functions to community-based micro-enterprises, the municipality effectively

counters the high service costs, poor demand-orientation, low cost recovery and lack of incentive, which are characteristic weaknesses of the *conventional mode*. At the same time, through municipal control and regulation of service delivery, it is possible to overcome characteristic weaknesses of the *informal mode*, such as poor technical quality, isolated solutions and limited scope of service delivery.

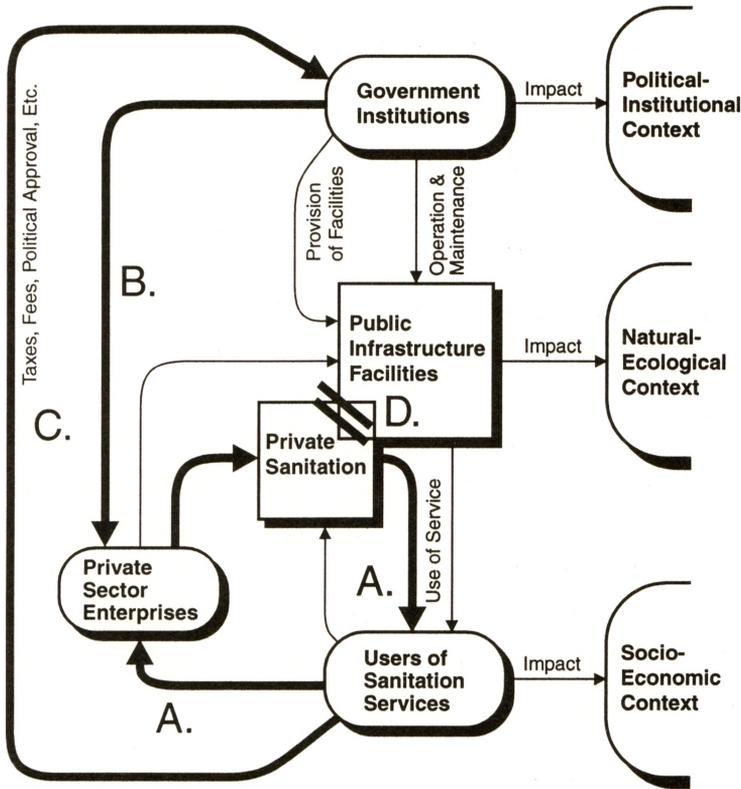
At the technical level, the model also incorporates some aspects of the *low-cost mode*. Thanks to privatisation, however, it avoids the typical problems of unresponsive, supply-driven services. Cost recovery, which remains a public sector responsibility, still presents problems, however.

One problem which the project has not been able to solve concerns the lack of provision for environmentally-sound waste disposal. This is an area in which the conventional mode should, in principle, be strong; it remains outside the scope of this project, however.

Tool 2: Model of sanitation management MWM

The schematic model of this project (Fig. 15) is characterised by a double circuit. At the community level (A), privatised service provision involves close cooperation between user groups, local micro-enterprises and privately-owned waste collection facilities. At the municipal level, a government agency is responsible for contracting private micro-enterprises and regulating their performance (B), and for fee collection from the users (C).

Figure 15 Model of sanitation management, Micro-enterprise Waste Management, Columbia



The public sector is responsible for the transfer and final disposal of collected waste. This function has not been satisfactorily solved, and technical links between community-based collection and public waste transfer (D) still need improvement.

Irregular payment by some households also poses a problem. It is not clear if this problem is caused by poverty or whether it is

a structural problem related to the separation of service delivery (A) and fee collection (C) functions.

Tool 3: Analysis of participatory approach MWM

The micro-enterprise model of waste management demonstrates the essential characteristics of the *functionally-based approach* to participation. Community groups and municipal agencies each assume full responsibility for particular functions of waste management, while clear operational procedures are defined—and contractually concluded—to ensure effective collaboration between them.

At the same time, the model also incorporates certain aspects of the *community-based approach*: community-based micro-enterprises receive technical and organisational support from the project to build their capacity for independent activity. The determining characteristic of the project is the ordered linkage of two self-managed functional domains, as in the *functionally-based approach*.

Figure 16 Participatory approach, Micro-enterprise waste management

Approach	Community-based	Area-based	Functionally-based	Process-based
Frame of reference	Social group or community	Residential area	Service delivery functions	Management process
Development objectives	Enable and support user-managed development	Consult and involve beneficiaries in development process	Establish collaboration between self-sufficient stakeholders	Decentralise and privatise management processes

Shading indicates degree to which the approach has been applied

Figure 17 Strategic Sanitation Programme, Kumasi

The Strategic Sanitation Planning (SSP) approach was developed by the UNDP-World Bank Water and Sanitation Division and pioneered in the Kumasi Sanitation Project. The basic idea of SSP is to provide demand-oriented sanitation services by tailoring technical options to the particular housing types and conditions in each area of the city, taking careful account of the preferences and willingness to pay of the respective populations. Flexible planning methods with a relatively short-term planning horizon are employed; implementation follows an incremental, project by project process. Although the programme is implemented in a "top-down" manner by municipal authorities, it seeks, to devolve and privatise planning and service delivery functions to local administrative units and private sector enterprises.

The Kumasi project grew out of an initiative of the Kumasi Municipal Authority (KMA), which was dismayed, among other things, by the high mortality rate of sanitation workers. Project goals were to provide sanitation services to all households, eliminate human waste from the living environment, and protect the health of sanitation workers. By promoting the involvement of private enterprises and communities, the KMA sought to withdraw from service provision functions in favour of a planning, facilitating and regulating role. The components implemented in appropriate areas included home latrines, simplified sewer networks, institutional (school and government office) sanitary facilities, and rehabilitated, privately operated public toilets.

The main results of the project, after five years work, include:

- completion of a Strategic Sanitation Plan to provide services to the entire city (1991-2000)
- establishment of a Municipal Waste Management Department with trained and experienced personnel
- first phase implementation of the SSP, including: the testing of technical, financial and institutional aspects; completion of 250 home latrines; construction of simplified sewers serving 20,000 people; rehabilitation of public latrines in the CBD and franchising their operation to private enterprises
- support to health care and solid waste management projects
- initial replication in other cities of Ghana and other West African countries.

Case Review: Strategic Sanitation Program, Kumasi (SSP)

Tool 1: Mode of sanitation development SSP

SSP arises within the *conventional mode of sanitation development* and may be seen as a reform programme aimed at correcting the main weaknesses of this mode while retaining its

characteristic strengths. A key feature of the Kumasi SSP is the far-reaching privatisation of service delivery functions, and the corresponding shift in the government's role from service provision to planning and regulation.

The SSP's central aim is to improve the demand-orientation and responsiveness of service delivery—characteristic weaknesses of the conventional mode. To this end, the solution adapts features of the *low-cost mode*, adapting the technical and organisational strategies to the particular conditions in each area of the city. The difference is that a city-wide strategy is followed in order to integrate the various individual solutions into a coherent network. Isolated local solutions characteristic of the low-cost mode may thus be avoided.

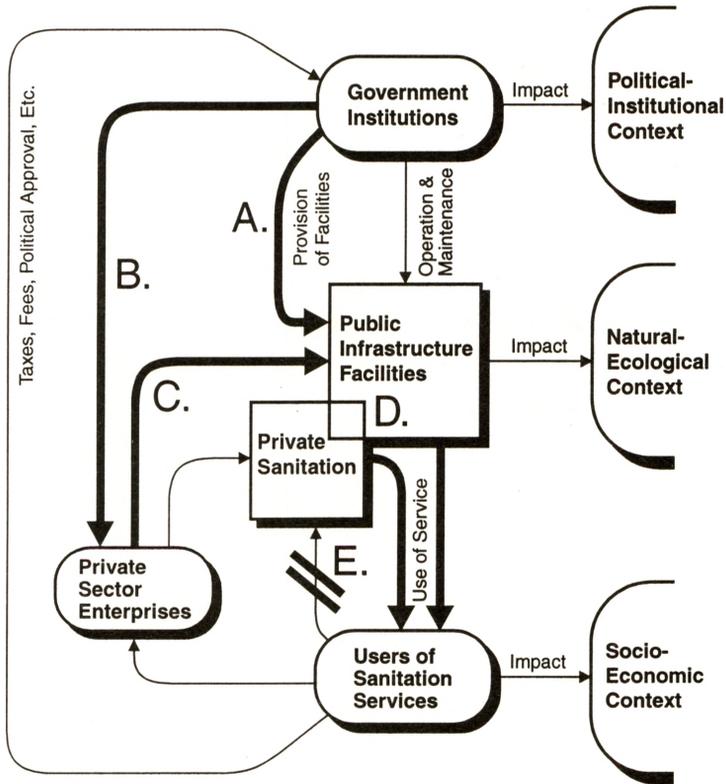
Users and community groups participate in the implementation of individual sanitation improvements; they do not assume a significant role in planning or implementing local improvements, however. The project did not explicitly promote community groups as partners in the sanitation development process. It has not, in this respect, mobilised the full potentials of the *informal mode*.

Tool 2: Model of sanitation management SSP

The key organisational characteristic of this project is the central role of municipal government institutions (see Fig. 18). Starting from the conventional mode of public sector infrastructure development and operation (A), the project aimed to decentralise certain functions to local and private sector actors and assist them to acquire the necessary capacities. While cost-

recovery functions are devolved to private enterprises, the municipal government maintains responsibility for contracting, franchising and regulation (B). External support was provided to help government agencies make important changes in their role and functions.

Figure 18 Model of Sanitation Management, Strategic Sanitation Approach



Legend:

- Potential process / interaction
- Important process / interaction
- // Interaction not functional
- ⚡ Problem or conflict area

New relationships were required to manage private enterprises (C), who were franchised to operate municipal facilities (public toilets). The approach facilitates the coordination between public and private facilities (D). Mechanisms for increasing the participation of users in the management of local sanitation facilities (E) were less well developed.

Tool 3: Analysis of participatory approach SSP

The SSP model in Kumasi is concerned with the full range of sanitation management processes and may be fairly described as a *process-based approach*. City-wide sanitation services are broken down into differentiated, area-specific systems, and the management of each system is devolved as far as possible to appropriate private sector actors. Mechanisms are introduced to enable the expression of specific local conditions and demands in the development planning process.

As in the other cases, a mix of approaches is apparent. Devolution of public toilet operation to private entrepreneurs resembles a *functionally-based approach*, for example. Other aspects—such as government-directed implementation of simplified sewers in selected areas—correspond to the *area-based approach*. In general, though, these activities may be seen as component parts of a decentralisation approach which applies to and reforms the entire process of sanitation management.

Figure 19 Participatory approach, Strategic Sanitation Programme

Approach	Community-based	Area-based	Functionally-based	Process-based
Frame of reference	Social group or community	Residential area	Service delivery functions	Management process
Development objectives	Enable and support user-managed development	Consult and involve beneficiaries in development process	Establish collaboration between self-sufficient stakeholders	Decentralise and privatise management processes

Shading indicates degree to which the approach has been applied

Conclusions regarding uses of the tools

Application of the tools to four actual cases has demonstrated the relevance of these conceptual instruments to crucial problems of urban sanitation management. Exactly how, and to what extent, one or more of the tools may be used is for the reader to ascertain. In general, three forms of application appear possible:

■ Descriptive device

Most simply, the tools may be employed to describe and understand the status of sanitation management in a particular city and/or to explain the condition and problems of an existing project to a newcomer. This level of application has been demonstrated in section 3.

■ Conceptual framework

Application of the tools “internally” by people responsible for a project is more challenging:

Applied individually, the tools may assist project staff to gain new insights and improve strategic concepts concerning the project.

Applied jointly by the various stakeholders of a project, the tools may promote better understanding of respective roles, relationships, problems and conflicts. As a common “language”, they may facilitate appreciation for other points of view and build a basis for agreement.

■ Design instrument

Most demanding is the use of tools for the preparation of new development activities or projects. While they should be useful at this level, this has still to be demonstrated. The tools would probably be most effective during the

stages of concept and strategy formulation; they would need to be complemented by more analytical and technical planning instruments at the detailed planning stages.

Assessment of the tools

Application has revealed a degree of apparent redundancy between the three tools; nevertheless, although they touch upon similar points, they do so from different perspectives.

Tool 1 which assesses existing modes of sanitation development is the most rudimentary. As a checklist of strengths and weaknesses, it contains little which is not covered by the other two. Its advantage derives from the reference to a familiar body of experience.

Tool 2 for modelling sanitation systems deals with many diverse aspects of system management. As a conceptual framework, it has considerable potential for describing and analysing complex situations. It may, in principle, be employed with regard to all management issues noted in section 1: resource mobilisation, operational capacity, economic and ecological sustainability, and the choice of objectives and priorities. The case reviews have illustrated only a small portion of this potential.

Tool 3 is more limited in scope, dealing only with organisational aspects. It may be more effective than the second for investigating questions of task sharing and management strategy, however.

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