# STUDY TO IDENTIFY GAPS, ISSUES AND CONSTRAINTS IN URBAN ENVIRONMENTAL SANITATION

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## REPORT NO. 1: PRELIMINARY IDENTIFICATION OF GAPS

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# ACRONYMS

| | |
|---|---|
| ARGOSS | Assessing Risk to Groundwater from On-Site Sanitation |
| BOO | Build-Operate-Own |
| BOT | Build-Operate-Transfer |
| CBO | Community-Based Organization |
| CV | Contingent Valuation |
| DBA | Demand-Based Approach |
| DFID | Department For International Development, U.K. |
| ESA | External Support Agency |
| MSW | Municipal Solid Waste |
| O&M | Operation and Maintenance |
| NGO | Non-Governmental Organization |
| PF | Pour-Flush (toilet) |
| SITS | Sewered Interceptor Tank System |
| SSA | Strategic Sanitation Approach |
| TACH | Total Annual Cost per Household |
| UES | Urban Environmental Services (removal and safe disposal of excreta and wastewater, the management of municipal solid waste, and stormwater drainage |
| UESNET | Urban Environmental Services Network |
| UFW | Unaccounted-For Water |
| VIP | Ventilated Improved Pit (latrine) |

# EXECUTIVE SUMMARY

This report sets out preliminary conclusions from an analysis of the gaps in knowledge that are hindering the provision of urban environmental sanitation services[1] in developing countries.

In general, it appears that most of the necessary technical information is available, although not necessarily easily accessible. There are however, some surprising omissions or disagreements, for example in comparative costs of alternative approaches and even on basic design criteria. In view of the impending water scarcity in many countries, it is also surprising that there has not been more serious consideration of sanitation systems that use little or no water, and of water recycling.

It is increasingly being recognized that the failures to achieve sustainability are due far more to institutional weaknesses and poor financial performance than to the technologies themselves - sophisticated and expensive technologies, which may function well in industrialized countries, have no chance of working for long where there are no trained staff to operate them, no local facilities for maintenance, and inadequate funds. This realization has resulted in two fundamental shifts in approach. The first is to consult the users concerning the level of service that they are willing to pay for - the so-called "demand-based approach". The second is to reduce the role of public sector agencies, making them enablers and regulators rather than service providers, and entrusting actual service provision to a variety of institutions, trying to benefit from the commercial orientation of the private sector. However, at this point both of these approaches are still experimental. There have been both successes and failures, and it may be some time before theoretical concepts can be translated into operational procedures that can be adopted with confidence and implemented by developing countries themselves (at present, most applications are heavily donor-driven).

Hampering the adoption of new approaches is a lack of independent case studies, describing and evaluating what was proposed and what was actually achieved. Preparation and dissemination of such materials would enable practitioners to make informed judgements about the costs and benefits of changing their existing practices; at present there is often unrelenting pressure from external donors to abandon existing (admittedly unsatisfactory) approaches, often without any clear guarantee that the new concepts will be feasible or replicable on a scale relevant to the developing countries' problems.

With a clearer understanding of the implications of these various technical solutions and the institutional and financial frameworks that can make them effective, planning can proceed with much greater confidence than at present. However, there needs to be a shift away from planning which is oriented towards the provision of a single service: not only do UES services influence each other, and therefore need to be considered together, but, more importantly, they are just one of many elements which contribute to the quality of people's lives and which place burdens on family finances. Therefore planning needs not only to be holistic, but also customer-focused.

[1] Throughout this report, urban environmental sanitation (UES) refers to the removal and safe disposal of excreta and wastewater, the management of municipal solid waste (MSW), and stormwater drainage.

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This is occurring to a limited extent at present, but there are serious unresolved questions about the application of "Demand-Based Approaches" and similar techniques to such decisions, which need to be addressed.

Planning also suffers from a lack of economic quantification of many of the impacts of UES. If users themselves are not able or willing to meet enough of the costs to make the services sustainable (sewage treatment being a good example), then either that part of the service has to be abandoned or it has to be subsidized from some other revenues. However, the approach to quantification of "externalities" such as environmental protection and public health is not at all clear, and even if there are economic benefits to the community at large these may not be translated into financial returns. Therefore there is still a major area of debate concerning the justifiable extent of subsidies, and how these are to be secured on a sustainable basis.

There are other areas in which economic and financial considerations lead to quite different conclusions about which investment proposals should be adopted. The use of shadow pricing and of discounting techniques is well-established and indeed appropriate for national planning; however, it can lead to solutions which are not at all optimal from the perspective of the service providers or the users, and which therefore may not be financially sustainable. A means needs to be found to bridge this gulf.

Although there are clearly many areas where our present knowledge is incomplete, it is very encouraging that far greater attention than before is being given to UES services, and that there is an lively debate about the best way to remedy the present deficits. Attacking and solving these problems is essential if the cities of the 21st century are to provide proper living conditions for their rapidly growing populations.

## 1. Introduction

At least two-thirds of the population of developing countries does not have access to adequate urban environmental sanitation services. As urbanization proceeds, the need for such services, and the costs of failure to provide them on a sustainable basis, will increase significantly. Recognizing this threat, much more attention is being paid to developing better approaches, using a wider range of technical solutions, and placing greater emphasis on the social, institutional and financial aspects of sustainability. Nevertheless, it often remains difficult, especially for people in developing countries, to learn what is being done, what is successful (and, just as important, what does not work), and to identify useful sources of information.

This study is one of three parallel activities which are being undertaken to try to address this problem. One is the compilation of a Resource Guide, which will help people find out where they can get information and assistance; this is now under preparation and should be completed by late 1999. The second is the creation of a UES Network (UESNET), providing a forum for different organizations to exchange experience and obtain information; planning of this network is about to commence. The third activity is this study, which is intended to identify the major gaps in knowledge and propose ways in which they could be filled.

This first report presents a preliminary identification of gaps, largely as result of literature searches and discussions in connection with sector experts in connection with the Resource Guide and the UESNET. The hope is that this report will lead readers to suggest additional gaps or issues that should be explored, point out information or research that has been overlooked, and generally suggest ways in which this study can more closely respond to the needs of developing countries. Based on this feedback, and on the findings of the parallel Resource Guide and UESNET activities, it is expected that a final report will be prepared by the end of September, 1999, which will recommend priority areas for further work and set out required inputs.

## 2. Technical Gaps

There is no doubt that a wide enough range of technologies now exists to permit extending of sustainable service to all income levels, provided that the technologies are carefully selected. However, getting sufficient information to make an informed choice is difficult, although this may be provided in the various sourcebooks which are currently under preparation for MSW management, sewerage and storm water drainage, and on-site sanitation. Once these are available, a further assessment of available information and detailed identification of remaining gaps will be necessary. These remaining gaps are likely to include:

### a) Comparative cost data

There appear to be very few studies, and even fewer that are recent, that provide cost data on a range of technologies so that their affordability and other impacts can be compared. Such data need to be:

i) Comprehensive: for example, on-site sanitation costs should include sullage management, and sewerage costs should include the cost of the toilet and flushing water. In addition, with the current emphasis on community consultation and "software", all such costs (including, where appropriate, the inputs from ESA staff and consultants) need to be considered, because they are not only substantial but also vary with the technology being adopted.

ii) Comparable: for example, on-site sanitation can produce humus needing no further treatment, and so should be compared to sewerage and full sewage treatment.

iii) Broken down into capital and recurrent costs: because households may not have access to loans for financing UES improvements, TACH values are useful but not sufficient for comparison purposes.

iv) Transferable: because unit costs of various inputs may vary widely between countries, it is useful to have "bills of quantities" of alternatives, illustrating what is required to construct and operate them. These inputs can then be costed to suit the intended application. Also, by comparing inputs it is usually possible to assess which alternatives will be least expensive, simply in terms of the materials and labor required.

v) Amenable to economic analysis: since national planners need to be able to assess the economic costs of services, the cost data should be presented in a way that makes it possible to extract information such as labor content and import content.

**b) Upgrading experience**

UES services (especially ones undertaken in close collaboration with the communities affected) take a long time to implement, and they last a long time once they are in place. Therefore, given the pace of urbanization in developing countries, the city which will be serviced by UES services planned today will bear little resemblance to today's city.

One early concept in introducing intermediate sanitation technologies was that they would enable households to upgrade their services progressively, as their circumstances changed and as their income levels improved. This concept could equally be applied to other services: as cities grow and informal settlements evolve into normal residential areas provided with in-house water supply and with paved streets, then both the level of UES services and the way in which they are managed may change as well. For example, micro-drainage under community management may evolve into roadside drains maintained through city contracts, and VIP latrines with the pits emptied by entrepreneurs selling the humus to farmers may be replaced by interceptor tanks and SITS systems, regularly serviced by pump trucks.

There seems to be no information on whether this progressive upgrading is actually taking place as anticipated. It would help planners of UES services to know whether over time people do indeed upgrade their services (with corresponding changes in institutional arrangements) in parallel with housing improvements, or replace them completely, or move to a "better neighborhood" as their incomes improve. With a better understanding of how cities change, UES services could be better designed to change with them.

### c) Boundary Conditions for Technologies

Proponents of various technologies tend to talk as if "their" solution was universally applicable. There are definite limits to the application of any technology, but information is not readily available on the values of the criteria determining these limits (so selection algorithms usually use generic criteria rather than numeric values). Thus, for example, the transition from (a) VIP/PF systems plus local sullage disposal by evapotranspiration to (b) septic tank systems with drainfields is dependent on criteria such as household water use, plot size and open space, local water table, soil permeability, and local climate. Apart from climate, the same criteria apply to the transition from septic tanks plus drain fields to some form of sewer system. The conditions governing whether local stormwater management is feasible include rainfall intensity and duration, impermeability, groundwater and soil conditions (for infiltration), and (for detention and infiltration systems) available public open space.

It would be valuable to extract information from existing "technology choice" systems and other sources, and attempt to develop simple procedures (such as algorithms) for screening alternatives and arriving at the most promising candidates (any such preliminary selection would of course have to be followed by more detailed studies, including site-specific costs).

### d) Groundwater vs. affordable sanitation

Two extreme positions held by sector professionals can be expressed as follows:

**1. Pro-groundwater**. Where there is groundwater beneath urban areas it is the cheapest form of supply for the city as well as the most affordable source of water supply for low-income peri-urban areas that are outside the reach of any reliable distribution network. On-site sanitation can contaminate shallow groundwater with pathogens and undesirable chemicals (especially nitrates). Therefore, where groundwater is a source of supply, on-site sanitation systems should be designed appropriately (e.g., raised VIPs, sand-wrapped PFs). If this is not feasible or acceptable, then low-cost sewerage should be used.

**2. Pro-sanitation**. Groundwater beneath cities is already heavily contaminated, or at risk of being so, due to limited (and leaking) sewerage, weak control of industrial pollution, poor sanitation, ineffectual MSW management, inadequate storm drainage, and uncontrolled mixed land use (e.g., small industries scattered all over the city)[2]. Groundwater remediation is expensive, and control of all potential polluters is impractical. Banning on-site sanitation will not solve this, and will deny people the only affordable solutions. Rather than prohibit on-site sanitation, the best use of available funds to maximize health and convenience would be to

[2] Of course, all these conditions also mean that water delivered through old leaky distribution systems only intermittently under pressure can never be considered "safe". This study is not concerned with the unresolved issues in urban water supply, but obviously these need to be addressed at the time that any UES interventions are being planned. For example, public health concerns and users' priorities may both indicate control of UFW so as to achieve safe 24-hour pressurized supply (without necessarily increasing overall water demand) to be crucial.

relocate water sources to places well outside the influence of the city, and strive for continuously pressurized distribution systems. The use of groundwater within the city limits should be phased out. No restrictions would be imposed on sanitation options because of groundwater considerations.

A study should examine the economics and technical justification for choosing between these conflicting positions, and develop policy and planning recommendations and guidelines. These need to cover both short-term measures and long-term policies.[3]

**e) Resolution of other outstanding issues**

Although there seems to be broad agreement on many aspects of the new approaches to UES services, at least within the community of professionals concerned, there are a number of matters which still require resolution (as would be expected with any such revision to conventional practices). Examples include:

i) Design criteria for "simplified sewerage": in the absence of effective MSW management and of total exclusion of solids such as road grit, can such sewers really function effectively at flatter grades than conventional systems?

ii) Are composting latrines socially and economically feasible?

iii) How can informal sector MSW recycling, which accounts for a significant proportion of MSW management in many developing countries, and which provides significant employment, best be retained when formal sector collection and disposal are modernized?

iv) Given affordability limits, what standards should be set in technical specifications and procurement procedures in order to maximize user satisfaction and public benefits?[4]

v) What are suitable specifications for locally-fabricated equipment for servicing on-site sanitation systems, affordable to local entrepreneurs?

vi) What are the limits of recycling, whether circular systems for water and wastewater, or recovery of resources from MSW?

vii) Can "revenue-earning aquaculture" (such as duckweed cultivation linked to fish production) provide safe and sustainable waste treatment?

viii) In cities where MSW management is deficient (and so all storm drains are liable to block), should the street system be formally regarded as a component of the overall stormwater detention and conveyance system?

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[3] This does not appear to be addressed by the current DFID-sponsored study "Assessing Risk to Groundwater from On-Site Sanitation (ARGOSS)", which from its title seems to be based on a preconception that on-site sanitation presents hazards, whereas leaky sewers, septic tanks with or without drain fields, uncontrolled industrial discharges to watercourses, or complete absence of sanitation - the likely consequence of banning on-site solutions in squatter areas - are risk-free. This is clearly not the case.

[4] For example, evaluation of the Orangi sanitation project showed that self-help and community-based construction were substantially cheaper than public sector construction, which in turn was much less expensive than ESA-sponsored contracts. This strongly suggests that in general relaxation of standards to the point where some level of service is affordable and sustainable is a sound strategy.

ix) Can on-site sewage treatment (e.g., separation of black and gray water, multi-compartment septic tanks, upflow anaerobic filters) produce effluent suitable for local reuse for non-potable purposes or for direct discharge into storm drains?

The ongoing preparation of the various Sourcebooks and other authoritative guidelines on UES services should enable identification of the priority unresolved questions, and decisions on how best to address them.

### f) Innovations

As noted above, there already seems to be a range of technical options that could, if used properly, serve the needs of people in developing countries. It could therefore be argued that there is no pressing need to add to this range, because there is not an identified "gap" in present knowledge. However, there are some circumstances in which developing countries, given their existing lack of service, can leapfrog some levels of technology; a good example from another sector is how villages in Bangladesh are now using cellular phones, without ever having had land lines. Therefore, further consideration should be given to adapting some of the more sophisticated wastes management techniques in use in industrialized countries to use in appropriate circumstances in developing countries. Two sanitation examples illustrate the concept:

i) Many developing country cities have central business districts that are similar to those in industrialized countries. However, the sewer systems serving these districts often cannot cope with the resulting load, and the performance of public sewage treatment plants, where they exist, is usually poor.. To deal with such conditions, some "office parks" in the United States have on-site sewage treatment and recycling, operating on as close to a closed circular system as they can manage. This approach could be equally valid in high-value zones in developing countries.

ii) Sanitation systems on aircraft depend on oil rather than water as a flushing medium. The use of oil-flushed systems in developing countries, in commercial blocks, government buildings or educational establishments, would significantly reduce water consumption, and might allow for on-site treatment of excreta, and (with separate urinals) for recovery and reuse of nutrients.

## 3. Institutional Gaps

This is a time of immense change in the way in which UES services are managed in developing countries. Governments are relinquishing their role as direct providers of service, and becoming facilitators and regulators. Actual service provision is increasingly being undertaken by private sector enterprises[5], or, where it is retained in the public sector, by restructured institutions that are trying to operate according to commercial principles. Especially in slum and squatter areas, various types of organization are serving as intermediaries between the end users and the service

[5] This may be done through a bewildering array of acronyms and alternative institutional frameworks. The original system was that of concessions, but these have been joined by Build-Operate-Own (BOO), Build-Operate-Transfer (BOT) and many other options.

providers; these include Non-Governmental Organizations (NGOs) and Community-Based Organizations (CBOs).

Underlying these changes are some fundamental principles. The most important from the institutional perspective is that of devolving responsibility to the lowest level that can successfully handle it. The second is that services must be demand-responsive rather than supply-driven; this requires finding out from the end users what level of service they want and are willing to pay for. The third is to achieve sustainability by commercializing operations. Ideally, the eventual solution (which will usually be site-specific) will combine the best features of government's social concerns, the private sector's efficiency and commercial expertise, and the user focus of the informal sector (which already provides a substantial proportion of service in low-income areas).

Given this major transition, there is an urgent need for practitioners in developing countries to have access to guidelines, based on case studies and independent evaluations (see Section 7), on how to select the best institutional framework and how to manage the legislative changes, extensive HRD, financial reforms (see Section 4) and other processes that are needed to put it into effect and make it work. This effort needs to be supported by training of local consultants; it is unrealistic to expect the present UES backlog to be resolved by the use of foreign experts and ESA staff.

It should also be recognized that in some countries the new framework may not actually be feasible. Any number of obstacles may hinder or delay its introduction: existing institutions may be too constrained by existing weakness, overall government philosophy, or inadequate budgets; there may be deep antipathy to "user-friendly" approaches; the business climate may not favor private sector entrepreneurs; there may be a lack of competent NGOs; communities may be suspicious of government's intentions and reluctant to participate; and so on. There are legitimate concerns that introduction of commercialization and the profit motive into basic services will unfairly discriminate against the poor. Translating a theoretically desirable approach into actual institutional reforms and new services may take many years - during which time urbanization in the developing countries will add many more people to those needing service.

Even under optimal conditions, widespread use of the new approaches (which will probably need to be modified and refined in the light of future experience) will take time to put into effect. Given the backlog, it is therefore not sufficient to say that sectoral reforms will solve the problem. In fact, an interim solution has to be found that will improve present operations as well, but this is not a priority concern at the moment - most of the efforts, led by the ESAs, are focused on the ultimate goal. At present it is not at all clear what form this interim solution should take[6].

[6] It is perhaps worth noting that in the course of the past few years, the "optimum institutional solution" for the problem of providing water supply and sewer services has been, successively, a water department of a municipal corporation, an independent public sector water and sewerage company, an urban upgrading institution, and now a private sector entrepreneur. None of these options has proved generally sustainable or capable or extending service to all the people. Identifying a suitable interim institutional framework is therefore a particularly serious challenge: none of the earlier versions proved reliable under developing country conditions.

## 4. Financial Gaps

The financial viability of UES services is always in question. In fact, many experienced people believe that these services can never be fully self-financing, especially as they are extended to serve informal settlements and similar situations where willingness to pay may be low (because of the struggle to survive and lack of concern with downstream effects), and where cost recovery from the users is hard to enforce. Certainly the past record suggests that costs recovery targets are not only too low to cover costs, but also often not achieved.

The major changes in approach to UES services described in Section 3 above need to be seen in this context, and this raises legitimate questions about how the sector is to become more financially viable in future. The institutional transformations now under way with ESA sponsorship are complex and slow, and almost invariably undertaken with heavy (and expensive) involvement of external consultants. Most institutions in developing countries do not have easy access to materials which would help them to make an independent assessment of the costs and benefits in order to decide whether they should also attempt this transition, and, if so, how they should go about it.

The institutional changes are not simply a reassignment of roles and responsibilities; they also have a significant effect on the financial position of the sector. By definition, privatization implies transferring responsibilities to a private sector organization which is profit-oriented and which is responsible to its shareholders as well as to its customers. It cannot fall back on general revenues to meet shortfalls in cost recovery. Even without privatization, the emphasis on commercialization of infrastructure services and on the use of Demand-Based Approaches should be accompanied by a reduction in subsidies, and this will force public sector service providers to achieve higher levels of cost recovery.

In this process, information needs to be available at four distinct levels

### a) Government

Because the appropriate role of government is now seen to be as a facilitator and regulator rather than as a provider of service, governments need to have guidance on the issues they will have to confront, illustrated by others' experience in dealing with the new role. They also need to know the costs, establishment, and skills requirements necessary for effective regulation, so that these can be provided for in their budgets (possibly with costs recovered by a levy on the service providers being regulated), and the necessary staff or consultants identified and trained. This is particularly important where extensive privatization is envisaged, as the multinational companies that are taking over the management of the water and UES sectors have very much more experience and expertise to draw upon than the developing country institutions which are negotiating with them and which will eventually regulate them.

**b) Public sector service providers in "reformed" situations.**

Where services are commercialized but not privatized, public sector service providers will be faced with a transition to a situation where subsides are likely to be minimal, and where they will be expected to operate according to quite different principles. Budgeting and accounting systems are likely to be changed, cost recovery will need to be substantially improved, and there may be strong opposition to the necessary tariff increases unless the quality of service improves first, which may be very hard to achieve.

Nearly four decades of World Bank lending to various forms of UES sector institutions (almost all of them reorganized as a condition of the loan) suggest that the necessary financial improvements are elusive, and very dependent on political will and institutional commitment. Privatization often appears to be a solution adopted because neither the ESAs nor their borrowers are prepared to devote the resources needed to achieve commercial viability, preferring to delegate this responsibility to external companies. However, information should be available to service providers who wished to retain responsibility and who wanted to know the most cost-effective approaches to becoming commercially viable.

**c) Public sector service providers in traditional situations**

Given the long preparations needed to ensure successful privatization, and the extensive community consultations needed to convert to a Demand-Based Approach, it is probable that many municipalities will continue to operate along conventional lines for the foreseeable future. They will therefore continue to operate within the constraints of public sector accounting systems, annual non-accruable budgets, politically-determined tariffs, etc.. The only thing that may have changed, and (from their perspective) for the worse, is that government's new policies may reduce subsidies to the UES sector. Therefore these municipalities need information on how best to manage their financial affairs within the constraints that continue to exist. This type of information does not appear to be readily available at present: most publications refer to what is being done in urban areas where ESAs are involved, and where privatization and other sector reforms are already under way.

A desk study that would be valuable in finding ways to improve performance in such situations would be an analysis of what could be achieved if the municipalities were to be given the some of the freedoms that are granted to private sector entrepreneurs when they take over responsibility for service provision. For example, privatization is often accompanied by relaxation of employment conditions that lead to chronic over-manning and low productivity, by a much stricter policy on billing for services and on sanctions for non-payment, by better procurement procedures, and by substantial tariff increases. Piloting of such approaches might provide useful guidance on how to achieve interim performance improvement pending overall sector reform, or on quicker and more cost-effective reform processes.

**d) Communities and households.**

When Demand-Based Approaches are introduced as a basis for planning publicly-sponsored UES programs, the intended users are closely involved in decisions on service coverage and service level, because these are largely based on users' expressed willingness to pay (about which there are also some unanswered questions: see Section 5 below). Therefore the users must be informed not only about the capital and recurrent costs of the various alternatives, but also about what level of external subsidy (if any) will be available for each, and what share will have to be borne by the users themselves. However, this is not sufficient; they will also need to be consulted on how their share of the costs will be recovered, because this can radically affect affordability.

For upper-income users, this has not usually presented a problem: most capital improvements are funded through long-term loans or municipal bonds, and are recovered over time (usually only partially) along with recurrent costs through user fees, property taxes, etc., or from general revenues. For lower-income people, however, it is often expected that they will contribute directly to improvements, either in kind (materials or labor inputs into local-level construction) or by direct payments (for example, paying a local contractor to construct a latrine). They may also be expected to play a role in managing and maintaining local services. Even where payments are spread out, they may be difficult to meet: low-income people often have seasonal incomes, have no free time to devote to in-kind contributions, or find it hard to put aside enough funds for a monthly payment (whereas daily payments of much smaller amounts are feasible).

Although individual projects and programs have developed solutions to these problems, what seems to be missing at present is a compilation of information (derived from independent case studies and evaluations; see Section 7) which would help low-income people afford the services they need and are willing to pay for. This might cover topics such as:

i) Translating theoretical willingness to pay into actual receipts: experience with user charges, up-front contributions, fees, general taxes, self-help (including O&M and management inputs as well as construction), and other means to mobilize the necessary resources
ii) Spreading capital investments: credit for households with little or no surety
iii) Community-managed cost recovery
iv) Protecting people's investments: security of tenure, rent levels, and similar landlord-tenant issues

(The question of levels of subsidy appropriate to reflect externalities is an economic issue rather than a financial one; see Section 5(a).)

## 5. Planning Gaps

Traditional UES planning involves a technical assessment of the problem to be solved, identification of the least-cost way of dealing with it, and a financial assessment of the consequences. If the solution can be financed by a combination of available government grants, user charges and general revenues, it is built. Institutional capacity, sustainability, and externalities are usually given much less detailed attention than the technical analysis and capital funding. Affordability, if considered at all, is usually expressed in terms of some percentage of estimated average income.

This approach still persists in many cities in developing countries. However, particularly in cities where ESAs are involved, new methodologies are being introduced, in an attempt to improve the quality of investment decisions and the sustainability of the resulting projects. Typical of these new approaches are Strategic Sanitation Approaches (SSA) and Demand-Based Approaches (DBA).

Both of these systems are intended to match sanitation systems to the users' ability and willingness to pay, using techniques such as Contingent Valuation (CV). They therefore involve considerable preliminary consultation with potential users, and complex judgements on what costs should be reasonably met by which parts of the community, and which should be met from general revenues[7]. Often there seems to be an implicit underlying assumption that existing informal expenditures on services are sufficient, if mobilized correctly, to provide affordable and sustainable service of satisfactory quality, at least at community level (i.e., excluding downstream facilities). The practicality of these approaches is being tested by DFID-sponsored studies[8], but only in relation to sanitation. When considering all the UES services, it is necessary to decide on the optimum service mix that will provide most benefit for the city and the various communities, and to avoid over-investment in one single service[9]. Depending on the outcome of the ongoing studies, and the additional issues that will need to be addressed in a multi-service analysis, it is likely that a number of problems will remain to be resolved; for example:

a) What are the costs and personnel inputs required in order to make use of these approaches? Are these costs affordable, and are the inputs available, in developing countries?
b) Given the extent of the existing service backlog and future needs, can these approaches provide the information necessary to extend service to those unserved, within a relevant time scale?
c) Can users make realistic decisions if the alternatives offered to them are unfamiliar?[10]

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[7] A hierarchy of cost allocation is set out in the World Bank's publication on SSA. This was developed further as an organizational framework in an experts' meeting on UES at Hilterfingen, Switzerland, in March 1999.

[8] "Practical Development of Strategic Sanitation Concepts", implemented by GHK Research and Training of London.

[9] For example, if a community devotes all its resources to water supply, it will almost certainly not have the resources necessary to dispose of the resulting wastewater properly.

[10] For example, people may be familiar with pit latrines and with flush toilets; asking them to decide what they would be willing to pay for other sanitation options may not be meaningful.

d) Are the conclusions derived from these studies accurate (that is, did the results match the predictions after, say, 5 years of operation of facilities which were planned and implemented according to the predictions of these techniques)?
e) Is this approach appropriate in conditions of rapid urbanization, when the characteristics of areas to be served are changing fast, and people's expectations may also change? In general, how can these approaches be modified so as to be truly "strategic" - dealing with a longer-term vision and the transitional process needed to achieve it, rather than just with the immediate situation?
f) Since willingness-to-pay often does not extend to "downstream" costs, what weight should be given to downstream effects in service selection and user consultations? How are downstream costs to be covered if beneficiaries are unwilling to meet them? In general, how are the economic benefits of externalities to be sustained financially?
g) How can these approaches be applied when considering more than a single sector, as is necessary when planning UES services for a city? How can users' priorities be reconciled with broader city needs and priorities, and service interactions and dependencies?
h) Should DBA be the preferred method of arriving at the service levels, service mix, user contributions, etc.? What other alternatives exist that might be more cost-effective, sufficiently precise for the intended purpose, or more appropriate to developing country institutional capacity?

## 6. Economics Gaps

### a) Valuation of externalities

Payments for services received have often been taken as a proxy for the economic benefits of UES services. Purists, however, argue that since these are usually mandatory payments for what is often a monopoly, they do not provide any economic "signals", and that a better method would be to determine willingness to pay, as measured through Contingent Valuation or similar techniques (see Section 5 above for a discussion of unresolved issues in connection with such techniques). Whichever technique is used, however, it is common experience that there is a significant shortfall between what people actually pay, or say they would be willing to pay, and the true costs of the services. If the service is to be provided on a sustainable basis, this difference has to be made up from sources other than the immediate beneficiaries, for example from general revenues (at the city level or, less sustainably, through grants from central government); the only other alternative is not to provide service at all, since it will eventually fail due to lack of funds.

The use of public money to meet these shortfalls should be justified by the anticipated public good which will result. Therefore it is important to be able to quantify the public benefits of UES services, or externalities. These might include items such as:

i) Improved public health (including increased productivity, reduced infant morbidity and mortality, lower medical expenses)
ii) Reduced traffic congestion
iii) Reduced risk of flood damage

iv) Increased property values
v) Environmental and aesthetic improvements, such as improved air quality, cleaner streets, and less polluted waterways
vi) Increased property values and urban renewal in general
vii) Increased tourism
viii) Fewer nuisances (such as mosquitoes and rats, quite apart from their role as disease vectors)

Doubtless each of these impacts has been evaluated at some point in a number of UES feasibility studies. However, there appears to be no ready source of consolidated information to guide developing country practitioners on how to carry out these analyses, and certainly no readily available method of analyzing the comparative benefits of various UES service mixes at various service levels[11], in order to decide on the most cost-effective investment.

**b) Reconciliation of economic and financial criteria**

A persistent problem in choice of technology and service levels is the discrepancy between economic and financial analyses. In part this is due to the existence of externalities, as discussed in Section 6(a) above, which may justify making investments which cannot (and often should not) be fully supported by the immediate beneficiaries. This leads to the question:

> How can the costs of externalities be financed and recovered (e.g., through cross subsidies, general or special taxes) so that local authorities will not suffer from being required, as a result of national economic considerations, to select a system which is not financially viable?

However, there are two other aspects of the economic analysis which also lead to difficulties.

The first is the use of "shadow pricing". This substitutes shadow prices - the true costs to the national economy - for financial prices in comparing investment alternatives. For example, there may be significant differences between the two sets of prices for foreign exchange (under-valued financially), or labor inputs (over-valued). Thus shadow pricing may favor one solution, while financial considerations favor another: for example, a utility manager has to pay salaries at prevailing rate, even though unemployment is very high (and so the shadow value of labor will be low) – as a result, a labor-intensive solution favored by economic analysis may not be financially sustainable. Similarly, an over-valued local currency may lead utility managers to prefer imported equipment, while national interest would favor import substitution and the support of local manufacturing. (It should be noted that these two examples are especially relevant when considering community-based approaches and the use

[11] This analysis has to deal with incremental decisions, and so the issue is not whether better water supply results in health benefits, but whether upgrading water supply from a public standpost to a yard connection results in an increase in health benefits sufficient to justify the increase in cost.

of intermediate technology, which is typically locally fabricated and labor-intensive, so failure to resolve this issue will jeopardize the adoption of more affordable and sustainable solutions).

The sorts of questions that arise are therefore:

i) Is shadow pricing an appropriate technique for deciding between investment alternatives which have to be financially sustainable at the local or community level?

ii) If shadow pricing is used to identify optimum investments from a national economic perspective, what financial penalties are suffered by local institutions which adopt such solutions, and how can these be offset from national revenues on a sustainable basis?

The second cause of difficulties is the use of discounting techniques to identify "optimal" solutions. These techniques have been used for years in order to choose between alternatives and to decide on project staging, but they depend on the concept of the "time value of money" which may have little relevance to an institution in a developing country that has no power to make investments except through an authorized government budget, and has no ability to invest funds in interest-bearing accounts. This can result in investment proposals which are far from optimal from the city's (and especially the users') perspective. For example, it is in the city's interest to secure concessionary capital funding which is as large as possible, and to minimize recurrent expenditures (which are always hard to obtain from revenues, especially where politicians seek to hold down tariffs). But discounting (at the high rates appropriate to developing countries) almost eliminates long-term recurrent costs from consideration, much more weight being given to capital investment. Similarly, discounting favors multi-stage investments, deferring capital costs where possible, but this conflicts with the financial economies of scale possible in many UES elements, quite apart from the transaction costs and uncertainty of having to implement projects in several stages. So, for example, a city might prefer a large-diameter gravity sewer (grant-funded) with capacity adequate for many years to come, while economic analysis would dictate a smaller staged system with multiple pumping stations. Therefore issues need to be addressed such as:

i) How can financial optimality (from the service providers' perspective) and "engineering economics" be reconciled?

ii) What incentives might be applied to encourage service providers to adopt financially non-optimal solutions, to avoid penalizing users?

The question underlying most of the discussion above is:

If economic analysis is so valuable in planning public sector investments, why is it only used when ESAs and their consultants are involved, but not when local authorities plan independently?

Making economic analysis relevant to UES decision-making is the fundamental issue.

## 7. Learning from Experience: independent evaluations and case studies

During the last two decades, the UES sector has undergone many changes. With the change in focus, away from technology and towards community participation and socio-cultural issues, new approaches and tools have been developed and used, in an effort to achieve service sustainability. Any significant change in the way a conservative sector such as UES does business will first come to the attention of the profession through presentations and publications prepared by the protagonists of the new concepts. That is a natural stage in the dissemination of new knowledge. But it needs to be followed by critical analysis of the claims made, peer review prior to publication of papers, testing of hypotheses, and progressive refinement of the innovations until they become part of accepted "good practice".

However, to a surprising extent this has not happened with the breakthroughs in UES services, although many major changes have been in effect long enough for a clear understanding of their impact to be critically assessed. The literature reveals little about the success or failure of these new approaches. There are occasional case studies, but hard evidence about the validity of some of the newer concepts is scarce. There seems to be general agreement that "business as usual" is no longer acceptable, but no agreement on what should replace it.

Some ESAs conduct evaluations, but they are usually performed by the ESAs' staffs or their consultants, and therefore may be perceived as biased. In general, while there are important exceptions, much of the existing literature has been prepared under the direction, or even by the staff themselves, of the sponsoring ESAs. There has been little independent analysis that would withstand peer review by the conservative and skeptical elements of the profession, and so lead to more general acceptance.

Most evaluations are designed to examine technical and financial performance during and shortly after the implementation of projects, rather than the longer-term impacts. Because of their limited objectives, these evaluations generally do not report (and cannot, given their timing) on critical longer-term issues such as technical, institutional and financial sustainability, coverage (especially the impact of privatization on service coverage and affordability), user satisfaction, environmental consequences, the effectiveness and cost of community management, the validity of the conclusions of strategic planning, relationships with other agencies (such as regulatory bodies), and so on. Without these "building blocks", no realistic assessment of the overall planning project development and implementation processes is possible.

Eliminating the present UES service shortfall, and meeting the needs of future urban populations, will require the investment of billions of dollars, whether this money comes from national resources, city treasuries, communities, individual households, or ESAs. Before adopting and insisting upon processes which will guide these massive expenditures, it would be advisable to make sure that these processes are the right ones for the task. The new culture of "knowledge management" in the ESAs should contribute towards this, but only if unbiased assessments can be made, lessons learned from failures as well as much-publicized successes, and the necessary information made widely available.

More systematic evaluation of UES interventions should be undertaken. In particular, the performance of organizations responsible for UES services should be monitored and evaluated after ESAs have left the scene, in order to reveal the permanent impact of interventions. Ideally, an organization independent of the project-sponsoring agency should perform the evaluation, similar to the work performed by independent auditors in the case of commercial borrowers and lenders.

## 8. Dissemination of information

Despite the dawn of the "information age", it is hard for most UES practitioners in developing countries to obtain the information that they need. Much material on the Internet is not directly helpful and may not be reliable (and, outside academic institutions, many people do not have access to the Internet), technical publications are inevitably some years out of date, and consultants' studies are rarely made available beyond the "need to know" of official distribution lists[12]. There appears to be a serious gap in disseminating knowledge; at present much of the information available remains within select groups (the famous "old boys' clubs").

Once information and case studies have been collected, conclusions drawn, and recommendations made on how to improve performance in the future (as discussed in Section 7 above), the findings need to be widely disseminated to those who need it. This effort has to be pro-active; in dissemination, relying on a "demand driven" approach is not an effective option, because most of the intended audience will not be aware that the information is available.[13]

[12] One immediate measure that would increase the amount of useful information available would be for ESAs to require consultants engaged using their funds to produce an end-of-study report summarizing key points of information. This would not of course replace the need to have a proper independent ex post evaluation, but it could do much to fill the present gaps in basic data, such as comparative costs of alternatives, institutional requirements, cost recovery proposals, etc.. This work would be an addition to the usual consultants' scope of work, and so would need to be separately funded.

[13] The entire subject of access to UES information is to be addressed by a separate DFID-sponsored study, concerning the creation of a UES Network; it is not considered in detail here.

# UNDP-World Bank Water and Sanitation Program

The World Bank 1818 H Street, NW Washington, DC 20433 Tel.: (202) 473-9785 Fax: (202) 522-3228


March 11, 1999

Dear Friend and Colleague:

*Resource Guide on Urban Environmental Sanitation*

I am pleased to inform you that the UNDP-World Bank Water and Sanitation Program has made significant progress in its effort to compile a Resource Guide on urban environmental sanitation. After careful analysis, a number of publications have now been selected for discussion in a preliminary draft of the Resource Guide, and a new outline has been prepared, revised to reflect the document's function as a resource guide rather than a sourcebook.

You may recall that the Resource Guide was originally conceived as a sourcebook on urban environmental sanitation. However, as indicated in our most recent update on this subject--the December Progress Report covering the October 1 to December 31, 1998 period--a number of sourcebooks devoted to urban environmental sanitation issues have already been, or are about to be published. Many of these sourcebooks address the technological aspects of urban environmental sanitation. Rather than repeat information readily available elsewhere, a decision was made to produce a Resource Guide de-emphasizing technology and focussing instead on cross-cutting issues. In preparing the enclosed outline we have therefore deviated substantially from the original list of search topics that was sent to you. While the outline might not now reflect all the comments that we received, we hope to address them more fully in the preliminary draft because some comments are more pertinent to the text than the outline. Nonetheless, your comments on any major omissions from the outline would of course be welcome.

Publications were chosen for inclusion in the Resource Guide with the preceding developments in mind. Potentially suitable documents were identified either upon the recommendation of a sector specialist such as yourself, or as a result of searching several databases. An initial list of more than 3,500 documents with some apparent relevance to urban environmental sanitation was assembled. Upon closer inspection of the abstracts and scope of coverage of these publications, this list was narrowed to 361 documents. These 361 publications were then prioritized for preliminary screening and commentary. The review of those documents with the highest priority is now nearly complete. As a result, some 51 publications have been designated for inclusion in the Guide as primary references, 18 as secondary sources, and 62 as outside the scope of the publication. These titles, Groups 1, 2, and 3 respectively, are noted in one of two attached lists of documents. The second list contains those publications remaining from the original list of 361; these documents are not at present scheduled for review unless we receive recommendations to the contrary.

These attachments are being sent to your attention as an update on this phase of the Resource Guide project and in the hope that you will share your views on the accuracy and completeness--or lack thereof--of the lists. While mindful of how very busy you are, we are nevertheless hopeful that you will

take a few minutes to look at the lists and share your reactions with us. We may well have been remiss in overlooking, including or omitting a reference and we would be very grateful for your input in this regard. Our work and by implication that of our target audience--sector professionals and practitioners--can only be enhanced by your candor and insightful commentary.

Please direct your comments to any member of the editorial team with a copy to the team's researcher, Denise Bennett. Contact information for team members follows immediately below the signature. Please know that the editorial team and the Program at large are very appreciative of the contributions you have already made to this project. We are duly indebted for your continued assistance and we look forward to learning from your advice and counsel.

Sincerely yours,

Bruce Gross
Deputy Program Manager

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Enclosures:
Resource Guide Outline
Publications Reviewed
Publications Not Currently Scheduled for Review

# IRC International Water and Sanitation Centre

## *Urban Basic Services*



Search

**Themes & Topics**
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*IRC Annual Report 1997*

### URBANIZATION, BASIC SERVICES AND THE HEALTH OF PEOPLE

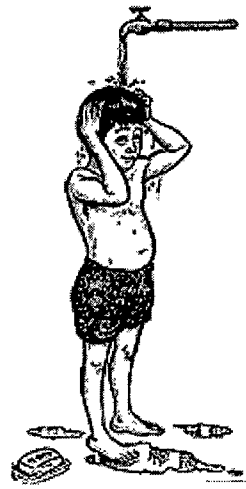

image: UNICEF

Innovative ideas combined with participatory approaches are the best way to ensure a better environment and water supply in low-income urban areas. Partnerships between the public and private sectors are helping provide the urban poor with access to basic water supply and sanitation services.

In providing basic services to safeguard the health of their citizens, municipal authorities want:

- interventions and investments to be planned right the first time around
- to recover the costs of reliable services that provide equitable coverage.

People, planners and politicians need to:

- build up a common vision
- prioritise areas where improvements will make the most difference
- choose the kind of services for which users are willing to pay
- make sure that existing services are operating efficiently and are effectively used.

This is more likely to be successful if

- low income community groups share information with, and voice their concerns to, municipal authorities through advisory committees, community forums, task-force groups, etc.
- all involved accept the use of indicators, not only as targets, but also as triggers for action and to gauge progress over time.

The most useful indicators are those detailed enough to highlight the difference within cities in terms of wealth, health, access to basic services and the quality of the living environment.

The EHUS research project involving IRC and ten partners from Europe and Africa brings together the findings of researchers and the savoir faire of field practitioners. Their work has focused on the use of a wide range of methods to collect and analyse data, methods to visualise results, as well as approaches to develop indicators with community groups and feed results back in the decision making process at community level. The project is funded by the European Commission DGXXII.



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# A RESOURCE GUIDE
# IN
# URBAN ENVIRONMENTAL SANITATION

## Executive Summary

## 1. Introduction

### a) Origin of/need for the document

i) Definition of UES.
ii) Past focus on water, not on UES.
iii) Current service levels.
iv) Impact of low coverage and poor UES services.
v) "Western" solutions not sustainable.
vi) Difficulty in obtaining reliable information on alternative approaches.
vii) Hence original proposal for a source book, later evolving into a Resource Guide.

### b) Intended scope and audience

i) Primarily concerning services to low-income communities in developing countries.
ii) Focussing on cross-cutting issues, not purely technical ones.
iii) Aimed at decision-makers and task managers, not community-level workers.

### c) Arrangement of the document

Brief presentation of arrangement and main issues/conclusions of each section[1].

### d) Complementary studies

i) Parallel Gaps Study, to address unresolved problems.
ii) UESNET.

**Chapter 1: End-of-chapter references**
(repeated for each chapter)

- Principal general sources of information
- Specific key references

## 2. Requirements for Sustainable Urban Environmental Services

### a) General

Without sustainability, even the best solutions have no permanent value. Major themes (amplified in later chapters) are:

### b) Environmental Sustainability

[1] Throughout, marginal notations as follows: {R} for references to the bibliography , {S} for suggestions for follow-up action, and {G} for topics to be considered for the Gaps Study.

All UES projects will have environmental impacts, mostly beneficial, but some negative. Project design should aim to minimize negative impacts. Environmental sustainability is then concerned with ensuring that in the long term any negative impacts do not exceed the capacity of the local ecosystem. Examples of potential areas requiring investigation include:

i) Wastewater reused for irrigation.
ii) Flood frequency and extent in relation to river regimes and riparian ecosystems.
iii) Use of water resources (surface and ground) in relation to reliable yields, required minimum flows, or natural recharge.
iv) Sewage and storm water discharges to rivers and coastal waters.
v) MSW and hazardous wastes disposal, including leachate management.
vi) Heavy metals and other pollutants possibly present in biosolids recycled for agricultural purposes.

**c) Technical Sustainability**

Technical sustainability refers to the capacity of the service providers (typically a combination of users of on-site systems, Community-Based Organizations, and public or private institutions) to operate and maintain the technology properly. In choosing sustainable technology, important factors include the following:

i) Technology must be appropriate to local conditions and culture.
ii) The intended user must be able to afford the technology, and willing to bear the costs.
iii) The service provider must have the skills and facilities necessary for proper operation and maintenance.
iv) The service provider must have access to expendable materials, spare parts and other necessary maintenance and repair services.
v) A support structure must exist, capable of assisting CBOs and individual users in tasks they are unable to handle by themselves.

**d) Economic Sustainability**

UES services must not pose unsustainable demands on the local and national economy. Examples of possible problems:

i) Technologies relying on imported equipment, expendable materials, spare parts, etc..
ii) Institutional procedures beyond local capabilities, therefore depending on foreign expertise and imported equipment.
iii) Unjustified subsidies from general revenues, depriving other sectors of needed support.

**e) Institutional Sustainability**

The institutions with responsibility for UES services must be able to maintain themselves in a position to provide effective service to their customers (or, in the case of community-based organizations, the community members). To support this, government has to establish an appropriate institutional and regulatory framework to provide a stable environment that enables institutions to perform their functions (see Chapter 6). Important factors contributing to sustainability include:

i) Clearly defined and consistent responsibilities and standards, within an appropriate legal structure.
ii) Participation in overall development planning.

iii) Fiscal autonomy.
iv) Cost recovery subject only to regulatory controls.
v) Management and operational autonomy.
vi) Consistent Human Resource Development policies, within institutions and across sectors.

**f) Social Sustainability**

Key factors include:

i) Public awareness campaigns to inform communities, encourage participation, and introduce and reinforce improved hygiene behavior to ensure full benefits of selected UES services.
ii) Community participation in planning, especially establishing priorities, implementation sequence, and responsibilities of various stakeholders.
iii) Participation of women as active planners and managers rather than just as beneficiaries.
iv) Development of culturally appropriate and socially acceptable alternative UES solutions.
v) Service provision based on effective demand (i.e., user selection of level of service, based on costs and benefits expected).
vi) Community participation in developing methods for recovering costs.
vii) Equitable access to services and benefits.
viii) Community-based management of services, and community selection of service provider.
ix) Appropriate and equitable remuneration (agreed with the community) for community inputs.
x) Effective provision of "downstream" support services not under the community's control (e.g., septic tank emptying, MSW removal, cleaning of trunk drains and sewers).

**g) Financial Sustainability**

Choice of service level must be based on clear understanding of financial implications (both initial capital costs and subsequent operating and maintenance costs) and on effective demand - willingness to meet those costs. Factors include:

i) Construction costs and terms of repayment.
ii) Operating and maintenance costs.
iii) Contributions in kind allowed as substitutes for financial contributions.
iv) Availability, amount, duration and reliability of any grants or subsidies towards construction and operation and maintenance costs from outside the community to be served.
v) Procedures for billing and collecting capital repayments and operating costs, and measures to ensure timely payment.

## 3. Environmental Considerations

**a) General**

UES impacts at 4 levels: household; community; city; and region. Past environmental failures have been largely due to considering only one level, at the expense of others, and to preoccupation with short-term solutions rather than long-term damage.

**b) Household level**

Environmental sanitation deals with all aspects of providing a healthy environment. This includes affordable access to sustainable UES services, but these also have to be culturally acceptable and appreciated and used by all members of the household. The household must also understand and accept its role in community-level improvements.

**c) Community level**

Household priority is to "disappear the waste" - export it downstream. Then the other households in the community, or other communities, suffer. So community awareness needs to be created, and complete systems constructed (generation to final treatment and disposal or reuse). Where municipal authorities cannot or will not deal with these problems, communities themselves will need to mobilize to handle them as far as possible.

**d) City level**

Exporting problems from one community to the next or to the city at large is not acceptable. Wastewater, stormwater and MSW management all need to be fitted into a city-level environmental strategy. This should include measures such as:

i) Treating environmental concerns as important in UES planning.
ii) Introducing land use controls that assist environmental measures (e.g., no small industries mixed into residential areas or ground water recharge zones).
iii) Insisting on proper wastewater disposal as a condition of having water supply.
iv) Constructing storm water detention facilities (supported by proper MSW management) in upstream catchments.

Unfortunately, lower-income people, with least influence on city services, tend to be on the receiving end of the city's problems. Therefore:

v) Low-income communities' concerns need to be addressed in city-wide planning.
vi) Special attention needs to be paid to environmental problems often affecting such communities (e.g., landfill siting, with impacts through poor air quality, blown garbage, leachate pollution of shallow wells; MSW haulage routes; dumping of septage or untreated sewage into watercourses).

Major unresolved environmental/resource utilization issue: groundwater beneath cities. Uncontrolled industrial abstraction plus excessive municipal leads to aquifer depletion, ground settlement, intrusion of pollutants and seawater. At the same time, lack of sanitation and proper MSW landfills pollutes the resource. The economics of pollution control and aquifer recharge/remediation need to be compared to developing alternative sources (including reallocating peri-urban irrigation abstractions to municipal use and replacing them with recycled wastewater).

**e) Regional level**

Megacities in particular can have serious environmental impacts far beyond their boundaries. UES programs should aim to reduce (at a minimum, not increase) this impact within the city's "footprint". This entails:

i) Designing for environmental sustainability (Chapter 2).
ii) Careful mitigation of unavoidable environmental damage (e.g., use of land for MSW disposal; haulage routes and pipeline alignments; sewage treatment; storm water drainage canals, storage and treatment).

**f) Recycling opportunities**

Cities are huge consumers of resources (water, fertilizer, energy, raw materials of all sorts, etc.), and recycling opportunities are equally huge.

i) Cost-effective technologies (in both financial and economic terms) for recovery (e.g., water reuse and aquaculture; MSW sorting and recycling; biogas; humus replacing chemical fertilizers).
ii) Limits of recovery (e.g., at the margin, 100 per cent recycling may use more energy than it saves; recycling biosolids carelessly can lead to accumulation in soil and crops).
iii) Implications for UES (technologies, institutional framework, cost recovery, etc.)

## 4. Technological Options

**a) Basic technical alternatives**

i) Description of technical options, by UES service, in just enough detail to support the RG, and with maximum references to existing Sourcebooks and a few key documents.
ii) Selection algorithms, boundary conditions (e.g., population density)

**b) Costs**

Both capital and O&M (including local vs. foreign; suitability for community inputs, other factors relevant to shadow-pricing/policy decisions)

**c) Inter-relationships between services**

i) Interdependencies (e.g., water and on-site sanitation, MSW and drainage);
ii) Maximizing synergism (or, at a minimum, avoiding interference)

**d) Impacts**

Impacts of various alternatives, especially those impacts which differ markedly between alternatives (e.g., demands on water resources, health, potential for reuse, etc.)

## 5. Planning

**a) General**

i) UES is concerned with provision of sustainable service, not of specific technology. Therefore planning is concerned with creating institutional frameworks and financing methods to achieve sustainability, matched to users' expressed interest in services.
ii) Decision-makers and other responsible for UES services therefore need to consider not just a single service in isolation, but a much broader spectrum of activities designed to better people's lives, improve conditions in the city, and benefit the nation as a whole.

**b) Planning processes**

i) Strategic planning (including SSA; planning under uncertainty, rapid urbanization, and dynamic conditions).
ii) Integrated infrastructure planning (including broad-based urban upgrading projects).
iii) Maximizing synergies, ensuring balanced development.
iv) Maximizing cost-effectiveness (contrasting financial and economic optimal solutions).
v) Planning institutional development and transitional processes.
vi) Costs and duration of planning approaches involving beneficiaries, compared to "top-down" solutions.

**c) Demand-responsive approaches**

i) DRA principles.
ii) Determination of "effective demand" or other means of determining WTP.
iii) Planning for "second best" solutions with subsequent upgrading.
iv) Application of DRA to more than one UES service.
v) Reconciliation of DRA findings with externalities.
vi) Comparative costs and inputs, DRA vs. conventional planning.
vii) Ex-post evaluations of reliability of effective demand assessments.

**d) "Learning by doing"**

i) Determining what elements can and must go ahead immediately, what has to be piloted, what has to be demonstrated; implications for project design, and for ESA involvement.
ii) Pilot activities: design, duration, evaluation and cost.
iii) Demonstration activities: promotion and delivery (vs. false expectations).
iv) Issues of "going to scale".

**e) Planning tools**

(excluding specialized or commercial design programs, CAD, etc., left to technical Sourcebooks)

i) Algorithms (technology selection; others).
ii) Packaged computer programs (design; selection between technical alternatives; "expert systems"; others).
iii) Financial analysis tools
iv) Economic analysis tools

**f) Special considerations: unplanned settlements**

i) Planning for rapidly-evolving unplanned settlements (complications include: lack of land use control; mixed-land use, including small or cottage industries; uneven development and corresponding uneven demand for services and ability to pay; unpredictable future patterns of development).
ii) Illegal settlements (to be included or excluded? Treatment of legal title-holders).
iii) Landlord-tenant problems (who pays for improvements? Subsequent security of tenure?).

**g) "Economics"**

i) Methods of estimating and valuing externalities as a basis for planning decisions (e.g., health; environment; shadow pricing of inputs; resource recovery)
ii) Issues raised by "engineering economics" and similar approaches (e.g., high discount rates "eliminate" O&M costs, favor high energy content, lower concessional capital financing, and hence rely more on long-term tariff increases; high discount rates favor multi-stage implementation, increasing transaction costs and funding uncertainty; shadow prices favor labor-intensive, minimal foreign exchange options, but financial prices do not).

## 6. Institutional and Regulatory Framework

**a) Government Responsibilities**

*The need to establish clear roles and responsibilities for:*

i) establishing objectives and defining policies.
ii) regulating agencies and setting standards.
iii) formulating strategic plans.
iv) financing investments and operations.
v) providing services.
vi) coordinating inter-sectoral activities and establishing priorities.

**b) Decentralization**

The implications of government moving from provider to enabler and facilitator, including:

i) devolving responsibilities to second- and third-tier government.
ii) establishing regulatory and monitoring mechanisms and legal framework .
iii) creating the institutions necessary to develop and implement regulations and monitor the performance of sector organizations.
iv) creating the institutional framework to support and encourage participation by local communities and the private sector, including the establishment of public and private environmental sanitation service providers.
v) providing capacity-building support at the level of government assuming responsibility for service provision.

**c) Private Sector Participation**

Assessment of the benefits and problems of private sector participation in the different sub-sectors, in single- or multiple-sector organizations, and the creation of the

environment for successful private sector participation or efficient public sector service provision: Key topics include:

i) Options for private sector participation.
ii) Community management of UES services.
iii) Reconciling private sector profit motive and the government/community imperative of equitable access by all.
iv) Encouraging the establishment and monitoring the relationship between the user community (however defined), local government and private sector service providers.
v) Incentives for community management of infrastructure services, including the establishment of support service organizations (public or private).
vi) The role of small entrepreneurs .

## 7. Financing and Cost Recovery

### a) General

i) Sustainability and replicability require full coverage of all capital and O&M costs. But "demand-driven" approaches to UES may come up short if they only reflect users' perceptions, since externalities are so important.
ii) Hence the need for analysis of all costs and consequences (e.g., a water connection requires wastewater collection and disposal) to permit informed judgements by all stakeholders.
iii) There is a corresponding need for analysis of all benefits, so that anyone other than immediate beneficiaries who derives benefits also contributes to costs.

### b) Capital financing

i) Options include: ESA loans and grants; loans and grants from national, state/province or municipal revenues; revolving funds; and user contributions.
ii) Issues include: grant dependency, reducing sustainability; over-complex and protracted procedures for obtaining ESA funds; communities'/users' lack of access to credit; inequity between high- and low-income areas (e.g., subsidized sewers vs. all-cash latrines).

### c) O&M financing mechanisms

i) Options include: agency funding from revenues; user direct contributions; ESA support.
ii) Issues include: equity and sustainability (do the poor pay more, or contribute more inputs, than the rich?); political commitment to adjust tariffs in line with costs and inflation; distortions (O&M supported by revenues from the "wrong" source, encouraging initial choice of inappropriate non-sustainable systems).

### d) Cost recovery approaches

i) Cost recovery targets (what is to be recovered from whom? Transparent identification of external costs and benefits).

ii) Cost recovery options (betterment levies; fees and charges; repayment of improvement loans; general property taxes; usage- or consumption-based charges; special approaches for external benefits).
iii) Cost recovery mechanisms (municipal and private billing and collection; community-based cost recovery, e.g., "wholesale-retail" arrangements; enforcement and sanctions).
iv) Equity issues (charges, collections and sanctions reflecting costs and benefits received, and neutral between different consumer classes).

**e) Subsidies**

i) Justifications for subsidies (social policy, employment generation, health, import substitution, water resources protection, tourism promotion, etc.).
ii) Extent and allocation of subsidies (economic and/or financial costs and benefits, and parties meeting costs or receiving benefits).
iii) Recipients of subsidies (intended vs. unintended).
iv) Impacts/implications of subsidies (long-term dependability and impact on sustainability; "wrong signals" - may encourage and support non-optimal solutions; social and equity impacts, such as "wrong" beneficiaries, or effective informal sector displaced by subsidized public sector).

## 8. Monitoring and Evaluation

**a) General**

i) Vital but least effective part of the project cycle. Should be Monitoring & Evaluation & Feedback, MEF; there is no point in finding out what went wrong if nothing is done about it.
ii) All agencies should at least follow the Minimum Evaluation Procedure: Was it done? Did it work? Is it used? Ideally, more complete and specific targets and indicators, with a fully-funded implementation mechanism, should have been developed during project planning and design.

**b) Program/project performance and sustainability**

This is the basic issue to be addressed (for factors to be considered see Chapter 2):

i) Environmental aspects.
ii) Technical aspects.
iii) Economic aspects.
iv) Institutional aspects.
v) Social aspects.
vi) Financial aspects.

**c) Coverage/replication**

i) Many projects and programs are limited in scope, essentially pilot or demonstration activities (in comparison with the UES shortfall). MEF should therefore assess

whether improved sustainable programs have subsequently been developed and extended to other areas.

ii) The extent of "graduation" from dependence on ESA or other external support.

**d) Planning sustainability**

Planning, especially SSA, has to be a dynamic approach, responding to changing circumstances and to feedback from MEF. Relevant monitoring questions include

i) Actual vs. intended outcomes?
ii) Deviations reflected in updated plans?
iii) Planning process itself modified to work better in future?

## 9. Unresolved issues and recommendations

**a) Unresolved issues already being studied**

**b) Unresolved issues awaiting further investigation**

**c) Gaps Study status**

**d) UESNET status**

**e) Recommendations for additional follow-up**

## ANNEXES

### 1. Acronyms

[Or inside cover]

### 2. Glossary

### 3. Bibliography

Principal references (taken from chapter-end lists)

### 4. Sources of information

Recommended search tools
Suggested keywords
Major relevant Internet networks, discussion groups, etc.

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