The Urban Water and Sanitary Crisis

Water and sanitation supply in the slum context and the possible role of an emergency relief organisation like MSF

At Request of Médecins Sans Frontières Holland

Sandra Labree
Department of Irrigation and Water Engineering
Agricultural University
Wageningen

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Foreword

This paper is a MSc thesis for the Department of Irrigation and Water Engineering of the Agricultural University In Wageningen.
At request of Médecins Sans Frontières in Amsterdam, I described the slum context. I addressed social, management, technical and financial issues, considering the supply of water and sanitary facilities. Besides I expressed some thoughts about the potential role of an emergency relief organisation in the urban area.
I would like to thank Barbara van Koppen, my supervisor at the University and Denis Heydebroek of MSF-Holland for their useful comments. I also want to thank friends and family, especially Ilona, for their indispensable support.
I hope this report makes a useful contribution to the discussion within MSF whether to intervene in the slum context.

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Executive Summary

Due to the rapid urbanization, inadequate infrastructure and the exhaustion of water supplies, many cities will experience a water and sanitary crisis on the turn of the century. This jeopardizes the health situation. The urban poor are the most vulnerable. They do not have the financial and political resources to improve their living conditions. They often live at illegal settlements and they are ignored, or even treated with hostility, by municipal and national governments.
Public works are often inefficient organizations, which view investments in poor neighbourhoods as unattractive. Credit institutions are unwilling to make loans to the poor. Considering the coming crisis and the lack of support to the urban poor, there is a need for intervention. Gradually the existence of the settlements is recognized as well as the need for improvements.

In my opinion improvement projects should rise from the needs, aspirations and potentials of the slum dwellers. This may plead for community based organisations which operate and control the facilities. The need for the facilities is high and the poor are willing to invest time and money in the improvements.
The external agency acts as a facilitator. The problems, aspirations and potentials of the slum dwellers determine the intervention, the involvement of the community and the technolgy choice. Intervening involves selecting representative informants, investigating the capacity of existing institutions to control the facilities as well as selecting a target group. Community participation or community management probably requires managerial and technical training.
In my opinion (partial) cost-recovery is an important issue, since water and sanitation supply need long-term investments. This involves setting tariffs and setting up structures to collect revenues and make payments. A longer-term view also involves assessing the possible impacts of the intervention. Detrimental impacts of improvements can be densification or gentrification.

Slums are often situated at difficult sites, eg steep slopes, garbage dumps or flood plains. Conventional technology standards have proven inappropriate for the difficult sites. Internationally there is a demand for unconventional and affordable technologies. Another advantage is that more people can be reached by the same amount of investment.
The poor now pay exhorbitant prices for *water* of bad quality, supplied by trucks or private vendors. Technological solutions can imply on-site water sources (as ground- or rainwater), if available, or water can be supplied by pipes.
In urban areas, *sanitary facilities* are especially important. The lack of sanitary facilities in crowded areas jeopardizes the health situation. Latrines or connections to a sewerage system can resolve these problems.
Private facilities are often viewed as too expensive. However, in some cases public facilities are badly maintained and therefore not used. There is no blueprint for technological solutions. The technology choice should be the result of a process integrating social, environmental, cultural, economic and institutional dimensions.

What can be the role of an emergency relief organization in the slum context? The situation calls for long-term solutions. Does this also imply the long-term presence of MSF in slums? A longer term view is inhibited by the ad-hoc basis of funding and by the pressure on the organization to take immediate action.

MSF should be prepared for the water and sanitary crisis to happen. They could already start a few projects in the urban area to gain experience in this field. However, when intervening the agency should address the following issues:

Political Access to water and sanitary facilities is important to all. The escalating urban demand for water and depletion of water sources result in a power struggle. By giving the urban poor access to water, the external agency empowers the poor. However, also within the community, power issues are at stake. It is a heterogenous group.
Legal The legal situation of the settlements influences people's motivation to invest in improvements. Besides it may provide constraints in getting necessary authorizations.
Institutional There can be several institutions to be dealt with: the municipal or national government, public works, the private sector, community organizations, credit institutions. Their roles should be spelled out and clear.
Management The external agency is a facilitator. It helps the community defining their problems and possible solutions. The use of local knowledge and skills is part of it. The interdynamics of the social, political, economical and cultural context have to be taken into account in setting goals and objectives. Capacity building probably requires managerial and technical training.
Economic Donors show a short-term interest in providing money to relief projects. Besides, many people are experiencing this urban crisis. Since the objective is a sustainable project, this may plead for (partial) cost-recovery, involving the setting of tariffs and a financial organization to control revenues and payments.
Technical Sustainable solutions with possibilities for upgrading in the future, are to be considered. On the other hand, what is the relevance of sustainable solutions when the permanence of the settlements is threatened. Appropriate and affordable technologies are needed. The use of technology should be scrutinized on a.o. social impacts.
The most important challenge is to consider possible *impacts*. Thinking about the long-term consequences of intervention is becoming a priority. Exchange of information on successes and failures is essential in this learning experience.

The question to MSF is: Is the organization up to dealing with these issues?

Chapter 1 Introduction

In this paper I will address the need for intervention in the urban area, in particular in slums. Due to the rapid urbanization, inadequate infrastructure and the exhaustion of water supplies, some mega-cities will experience a sanitary crisis on the turn of the century. The poor are the most vulnerable. They live at illegal land on difficult sites, they do not have financial resources or political connections to mobilise resources. However, they just *need* water and a place to defecate (chapter 2).

Chapter 3 will show that the existing institutions -municipal governments, public works, credit institutions- are often inefficient and unwilling to provide services to the poor. In my opinion, improvement projects should rise from the needs and aspirations of the slum dwellers and be adjusted to local features. This may plead for community based organisations which operate and control the facilities. This raises many questions. Can we speak of a 'community'? What are their resources? Is there capacity for community management at the local level? And what does this approach involve? These questions will be addressed in chapter 4.

There is no blueprint to technical solutions concerning slum improvements. Settlements on hill sides, floodplains or garbage dumps require different approaches. There is a growing demand for unconventional, appropriate technologies. In chapter 5 some options will be mentioned.

This paper will be concluded by expressing some thoughts about the possible role of an emergency relief organisation in slums, in particular MSF-Holland. MSF is competent to give a swift and flexible response to emergency situations. Water and sanitation supply is often (a preventive) part of their emergency programme, to support (curative) medical activities.
Emergency relief is usually seen as a short-term intervention. How does this cope with the need for sustainable development-oriented activities in slums? What does this imply for funding, management, etc.?

Chapter 2 Problem statement

2.1 The urban area

Poverty, natural or man-made disasters and civil unrest drives people to the cities. Besides, population growth raises the numbers of those who live in the urban area. Due to this process of urbanization, large cities often encroach beyond their municipal or provincial boundaries. Other cities formerly seperated may merge into the main urban area. Result of the urban population explosion has been a tremendous increase in squatter settlements and of the urban poor.

Definitions of what constitutes an urban area may differ. When is a locality a large rural village or a small urban town? Does it depend on the number of inhabitants or on the form of the local government? Many fringe areas are as much an extension of the rural situation into the towns as an incursion of urban conditions into the countryside.
Three types of settlements have special difficulties (Pickford 1990).
Slums are city areas of poor living conditions and old unrepaired buildings. New buildings can rapidly become slums as a result of overcrowding and lack of maintenance.
Squatter settlements often start with a makeshift shelter. Wooden crates and cardboard boxes are used as base. Bamboo stakes, grass mattings and plastics are used for protection from the elements. Squatters occupied land for example alongside roads and railways or on city-centre redevelopment sites. They remain squatters unless they obtain some form of legal entitlement to the land.
Fringe sprawl is sort of peri-urban development by the squatters or by official organizations. This official housing may be intended for low-income people but often the standards and therefore the cost are too high and the properties are soon taken over by middle-income groups.
McGowan et al. (1992) give a description of peri-urban. Peri-urban refers to informal settlement areas, peripheral to urban centres, that are outside of the formal government service network. The residents face difficulties related to the water supply: quantity, access, quality, distribution (inequitable). Such difficulties often reflect the temporary and/or emergency nature of the communities themselves whose residents generally have neither political nor economic power, and therefore cannot obtain adequate services.
Other authors use the words shantytowns or shanties. The English Readers Dictionary describes this as poorly made houses or sheds.

2.2 Infrastructure

Cities are growing faster than the urban infrastructure. Reality seems to be moving to escalating environmental problems. The urban growth affected the water supply to a large extent. Water resources are being exhausted or degraded. According to Maggie Black (1994) some of the mega-cities will have exhausted their supply by the year 2000, a sanitary crisis is about to come.
Distribution systems are becoming not only inadequate for the growing numbers of inhabitants, but are also becoming obsolete. Old reservoirs are decaying. A lot of water

is disappearing unaccounted for, leaking away or tapped illegally[1]. At the same time consumption practices are frequently wasteful, despite of water policies. Sewage systems, if any, are not much better. Treatment of waste water is rare. Millions of people are being excluded from the water distribution system and have their ways of obtaining water which is often of poor quality. They are increasingly becoming exposed to health hazards (Anton 1993).
In short, this watercrisis is a result of consumption and management patterns. These encourage waste of resources, discrimination in access to water and marginalisation of increasing part of the population in peri-urban areas of mega-cities (UNCED 1994).
Without the necessary changes before the turn of the century, over one billion people in urbanised squalor will live in the permanent shadow of life-threatening diseases (Black 1994).

2.3 The urban poor

The communities of the poor are by far the most vulnerable sectors. They do not have the financial resources to buy bottled water, dig their own well, install a pump with its own generator, or to set up treatment systems. They can't move from the flood plains, the steep slopes or the garbage dumps. They breath polluted air, drink contaminated water, eat unsafe food and live among the garbage. They have less access to medical care and education, no money, no work. (Anton 1993) The poor do not have the power to mobilise political connections. They are ignored or even treated with hostility by local, national and international level.
It is extremely difficult to gather data about the urban poor (Solo 1993). They do not have an official address, they are not on employers payroles, they might pirate water and electricity, there are no health records, etc. The need for services is difficult to determine.
The communities of the poor should be seen as a resource. The urban poor are possible active partners in service delivery and management. Black (1994) emphasizes that slum dwellers play an important role as manufacturers and service providers in the urban economy in spite of the squalor they endure. The better-off depend on them for eg transport, labour, laundry.

2.4 The use of water

In communities not supplied by the municipal systems, considerable effort is required to bring water to the homes. People carry heavy containers from trucks, wells or streams. They walk the distance to the source. They have to wait in line. They use precious fuel to boil the water.
Water is used for health purposes, that is personal hygiene, cooking and washing. But domestic use goes beyond health purposes. Water is also used for home-production of sweets, snacks and ice-creams, and for growing vegetables for people's own use or for selling. Moreover, water use is not only limited to individual households. According to SIDA (1993), women collectivize their work to survive economically. They establish for example communal kitchens, laundrettes, bath houses and child care centres.

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[1] In Latin America 40% of the water disappears unaccounted for as a result of leaking pipes, the unreliable service which causes people tamper with it, the lack of functioning watermeters, and managerial inefficiency and corruption of public bodies responsible. (Black 1994)

Behavorial practices determine the demand for water. The demand for water is also affected by the climate, religuous or cultural practices, the availability of water, the existing infrastructure, metering and pricing policies, and technological efficiencies. The urban demand for water is growing because of the population growth.

> *According to Black (1994), the urban consumer uses 3-6 litres for drinking and cooking, 15-20 litres for washing and personal hygiene (excluding flush-toilets, baths and showers), 3-10 litres for cleaning the house. The total is 21-36 litres per day.*
> *The WHO calls five litres per person per day an absolute minimum. Such a situation can not last too long, because it threatens health. Ten litres is needed per person per day in emergency situations. Forty to sixty litres are used in a normal situation. In Europe, we use 150 litres per person per day.*

2.5 Internationally accepted principles

The Beijing Water Conference 1996 was based on the following internationally accepted principles and recommends their consistent application (UNHCS 1996).
'Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment. Water development and management should be based on a participatory approach involving users, planners and policy makers at all levels. Women play a central role in the provision, management and safeguarding of water. Water has an economic value in all its competing uses and should be recognized as an economic good. Mobilizing financial resources is critical to effective water resources management.'
These principles will play a central part in this paper.

2.6 MSF Holland

MSF is the abbreviation of Médecins Sans Frontières. In Dutch this is translated to Ártsen zonder Grenzen. MSF has departments all over the world. This research is carried out at request of the dutch department.
MSFs mission is to preserve life and alleviate suffering with a view to protect human dignity and restore people's ability to make their own choices. Emergency medical aid and advocacy are therefore inseparable (MSF 1996).
MSF provides immediate relief to people in distress. The prompt and swift way of working is specific to MSF. MSF is aimed at basic health care and offers help to people in war, in refugeecamps, to victims of natural disasters or epidemies. MSF offers medical help and food or nutritional aid, and MSF starts water and sanitation projects.
Often, water and sanitation supply (or WatSan) is part of a package of activities undertaken by MSF. An emergency aid programme can, for example, consist of providing food, shelter, water and medical care.
The main objective of water and sanitation interventions is to reduce morbidity and mortality caused by WatSan related infections and to promote health by improving WatSan conditions and/or facilities. Besides, improving the water supply and sanitary facilities will also increase the effectiveness of medical and nutritional project activities. The WatSan and the medical project activities are linked to and supportive of each other (TSG 1996).

2.7 MSF-Holland and the urban area

The problems of the urban area are calling for attention.
Within Médecins Sans Frontières Holland (MSF-H) the discussion whether to intervene in the urban area is still not determined. MSF has a lot of experience in refugee camps. Their priority is to provide health care. The provision of safe water and sanitary facilities is often part of the intervention. The reason behind this is to act not only curative, but also preventive.
MSF considers the slums as a different field to work in, because the precarious situation is more permanent in character. The organization may not be capable to do this job. MSF may need other core competences and perhaps even another organisational structure.
However, in the light of the coming sanitary crisis, there may be an urgent need for an emergency relief organisation as MSF. Sofar, MSF has hardly carried out projects in the urban area and lacks knowledge about the requirements and consequences of interventions in urban slums. By defining possible constraints and successes concerning slum improvements, I hope to raise new arguments in this discussion.
In this paper I will describe the urban setting and lessons learned from slum improvement projects. MSF might then be able to decide whether they are competent to intervene in slums and whether changes within the organisation are needed.

2.8 Objective and main question

The scientific interest of this study is to broaden the knowledge on water supply and sanitary facilities in slums with durable positive effects on health and social relations.

The main objective of this research is to contribute to the formulation of the MSF strategy for water and sanitation projects in the peri-urban environment.
The sub-objective is to make an overview of possible constraints to water and sanitation projects in slums.

To reach these objectives the following questions will be answered. What are possible constraints to water and sanitation activities in slums? Which factors influence the success of water and sanitation projects in slums, which intend to improve the living conditions? What issues shoul be considered in the decision whether to intervene in slums?

2.9 Some remarks

This paper deals with the provision of water and sanitation facilities to the urban poor. There are many ways to look at the issue. One can, for example, make an overview of the possible technological interventions. Slums and squatter settlements are situated on difficult sites. Often this requires unconventional technologies.
One could also look at the different steps in the water distribution process. This means describing for example problems at the intake, the treatment, the distribution and the effluent. This would be a rather technical approach.

Since the urban environment is unfamiliar to MSF, I chose to give a broader view on the issue. I chose to describe the slum context, the different parties involved as well as their

views on slum improvement. This paper raises social, management, technical and financial issues to be considered when intervening. These issues are linked and therefore hard to discuss seperately. Financial issues are addressed in all chapters. This paper concludes by expressing some thoughts about the way MSF fits within this context. I focussed only on water and sanitation activities, although MSF undertakes more activities, especially health care.

Another research might for example address urban vector control. The failure to maintain drains, irregular household refuse, and the improper disposal of solid wastes and night soil, result in widespread environmental pollution, the formation of pools of stagnant and waste water and the accumulation of heaps of refuse (WHO 1987). Because of the lack of piped water supply, toilets and household refuse disposal facilities, the squatter settlements are the most unhygienic and insanitary pockets wihin the urban environment. The problem of urban vectors and pests could be defined as well as effective control programmes.
Another topic for research may be the indicators MSF uses to assess the situation. The use of these indicators is considered as a 'fact'. Different projects could be compared and conclusions drawn whether the indicators used are value-free or neutral or which assumptions are implied.

I am aware that I give a picture of 'the' urban context. Of course this is a very theoretical approach. Except for some examples, I did not consider differences between cities and countries and their political situation, their social structure, their economic situation. I wanted to create a general view on slums, to show the need for changes and to raise some issues considering intervention. Therefore, I used literature which depicted 'general' trends and lessons of slum intervention. It merits further research to gain more detailed insights in the influence of cultural, political, economic and social features on the success of interventions.

Another potential shortfall is that this paper is based on the lessons learned from development-oriented slum improvement projects. There is no literature on emergency projects in the urban environment. I recommend further research of slum improvement projects by other emergency relief organizations in order to build a data-base on constraints and possibilities of interventions in the urban area. The best lessons are learned from practice.

Chapter 3 The context: Opinions and biases

3.1 Introduction

In this chapter the urban context is described. MSF may start working on the provision of water supply and sanitary facilities in slums. Therefore, the technology standards applied by engineers as well as biases and policies prevailing at national and municipal level are discussed. Possible partners in slum upgrading projects are set out: the municipal government, public works, the private sector and credit institutions. Their views on the urban poor are reflected in their policies and way of working.
This chapter is concluded with a paragraph on current trends that show a gradual change in attitude towards the solutions to slum problems.

1980 to 1990
1980 to 1990 was the International Drinking Water Supply and Sanitation Decade. The assessment in 1990 showed much progress in the urban sector. The number of people who have access to water raised with 313 million. Concerning sanitation the number is raised with 287 million inhabitants. However, there is no reason to be satisfied. These figures did not show the disparity between slum dwellers and the inhabitants of the formal housing sector (WEDC 1991). Besides, these figures do not express the degree of success of the interventions. Moreover, the urban population growth is not considered.

3.2 Standards of technology

Engineers relied too much on conventional systems that meet the standards and practices of rich industrialized countries. Improvements to physical infrastructure in urban slums and shanties often followed these conventional standards[2]. Such high levels of services are not appropriate for the difficult sites and make it therefore extremely costly in both investment and maintenance.
WEDC annotates in 1991 that there is little evidence to the use of lower standards. Lower standards are more appropriate and affordable to the urban poor. In 1990, low cost technology only constituted 4% of the estimated total annual external sector funding for water supply and sanitation. Affordable technology usually requires more user involvement, and is therefore ignored by engineers, who are ignorant and distrusting about alternative systems (Solo 1993).
According to UNICEF, the current level of investment would allow 80% of the world's population to be reached by 2000 if the unserved poor were the focus and low standard technolgy was used (Black 1994).

However, the paragraph about current trends, §3.8, will show that at international level there is a demand for different technological and operational criteria and for new forms of service provision and management.

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2 This typically include household water connection, wide fully serviced roads, regular solid waste collection from the door, piped stormwater drainage (Black 1994).

3.3 National and municipal biases and the need for decentralization

The greatest bottleneck to getting services to the poor is bias. The problems are so overwhelming and their sprawling presence so frightening that there are practical reasons in addition to emotional ones, for trying to blot their existence out of the municipal and national consciousness (Solo 1993). Most governments prefer slum clearance to improvement. Their logic is that improvement will lead to the creation of more slums. As long as the bias against the urban poor exists, new constraints will appear after old one's are done away with.

Resources and decisionmaking authorities are concentrated in centralized agencies and services. Local or private-sector roles or capabilities are either limited or not even considered. Consequently the distribution of funds between the central urban area and the peri-urban areas is uneven, the local authorities are restricted in terms of decision-making and executive powers, and institutional capacities for mobilizing resources are unnecessarily restrained (World Bank 1989). Technical and financial support to the slums as well as decentralization of funds and decision-making powers are needed. Decentralization and democratization may give informal settlements greater leverage. But it will take time and structural reforms to encourage working with the settlements.
The UNCED (1994) mentions that the dialogue between the slum dwellers and the authorities is hampered. The social categories represented among the authorities and within the underprivileged areas are not the same. Their norms, practices and resources are different. The possibilities of a dialogue is a prerequisite for mutual recognition.

3.4 Biased urban planning policies

3.4.1 Neglect of the poor

Informal settlements are seldom included in development plans. Cities are defined according to the fully serviced areas. Even the growth of the population and the informal settlements are not considered in defining city limits.
As mentioned above, technical and financial resources are allocated to the central urban area at the expense of peri-urban and rural areas. Another impediment is that often no cadastral database exists for these informal settlements. Besides, northern concepts requiring a garden and parking space, inhibit the development and recognition of lowcost communities.

3.4.2 Planning by zoning

Zoning essentially defines what is *not* allowed. Zoning practices and land use planning turn legal land into a scarce commodity which becomes more expensive, causing illegal land to fall in price. Low-income families move precisely where they should not. Instead, planners should encourage people to settle on legitimate and ultimately serviceable land.

Expropriation of land takes a lot of time. A solution exists to overcome this time-constraint. In Tijyana, Mexico, the Secretariat for Human Settlements and Public Works started a process to expropriate land in the city for the poor families. Meanwhile they sold ***'options to buy with permission to occupy'****. This was a success, no one moved back to dangerous riverbanks (Solo 1993).*

Planning codes cause complications as well. The residences of the urban poor are illegal by the land-use definition. Before the poor can get urban service, their land must be reclassified as urban. Planning codes refuse to admit the sale, subdivision and occupation of land that has not won planners' previous approval. Administrative procedures can take to twenty years before permits are granted (Solo 1993).
Access to water must not be conditioned on urban zoning regulations. The right to wholesome water and safe sanitation systems must be guaranteed for all. All societies have a duty to provide access to water at an acceptable cost (UNCED 1994).

3.4.3 Legalization

Many of the problems of water and sanitation come back to the lack of legal tenure for the slum and squatter settlers. Until a neighbourhood is legalized, it cannot get water and sanitation infrastructure. But for legalization it is required that water and sanitation are already installed.
Required procedures can include complicated title searches. (For example, when the property is described by a tree which is no longer present.) All previous uses have to be registered. Former owners have to be tracked down and paid, even though they already have been paid. Expropriation procedures also involve the approval of the government. The costs of these procedures are often the most burdensome and make the infrastructure unaffordable to the poor (Solo 1993).
In Africa the urban poor are mostly renters. The benefits of their efforts to legalise and improve the slum properties can all accrue to the landlords, who just raise the rents (Solo 1993).

Possible detrimental effects of slum improvement (Stevens and Harpham 1991).
Debt burdens
People have to pay for either the improvements to be done, or they have to pay for the improved situation, e.g. rents are rising since more facilities are available. This means the disposable income of these families is diminished. They have less money to buy food, so the nutritional status gets worse. This is the opposite effect of what was intended in the first place. Another effect may be an increase in child labour to pay for the increased rents.
Densification
Improving a slum means creating a well serviced area which comes to be demanded. New families move to the improved area. Relatives move in with their family already living in the slum. Improvement of single slums jeopardizes health through increased density.
Gentrification
As rents are increasing, the possibility exists that poor people move away. The poor are displaced by the richer households. This process is called gentrification.

3.5 Public works

The previous paragraphs expressed the difficulties within city administrations and policies. In this paragraph I want to present the findings of several authors about the functioning of public works. Improvement projects may involve the existing infrastructure. Or the facilities may have to be connected to the existing infrastructure in the long term.

3.5.1 Organizational disfunctioning

Many public work systems are plagued with government interference, poor leadership and management, lack of autonomy and a policy environment that hinders their development. Services are frequently managed by several companies or by one company with multiple functions. In both cases responsibilities are dilluted. The potential exists for creating confusion and tension within the community. A multiplicity of agencies make effective coordination much harder to achieve (Solo 1993).

Inefficient municipal administration in Bangalore

The Bangalore slums fall under the responsibility of three different government departments which hardly cooperate. The establishment of slum committees often is a proces of months. Tenure is not arranged for. Therefore, the residents hardly put time and money in the improvements of their dwellings (Vereecken 1996).

Installing infrastructure in low-income communities requires public relations, social work, and more on-site engineering than most companies are able to offer. The past shows that NGOs have served a useful bridging role between communities and municipal utilities (Black 1994).

3.5.2 Human resource

Another problem of publicly owned organizations is that employees are often paid less than their colleagues in private owned agencies. They have limited carreer opportunities. In addition, the rigid and bureaucratic manner in which civil services operate leads to the dampening of the morale and creativity of the staff (WEDC 1991).
Providing services for multiple ethnic or otherwise diverse groups, is not easy. For example staff may have dissimilar ethnic linguistic or religuous backgrounds in comparance to the target population. In other words, socio-economic and cross-cultural barriers to a successful cooperation exist (Stevens and Harpham 1991).

3.5.3 Financial disfunctioning

The existing tariff systems often are inadequate. The service agencies are little cost-conscious and have little autonomy to set tariffs. In paragraph 3.10 it is explained how tariffs can be set.
WEDC (1991) explains the vicious cycle. Low revenue leads to shortage of chemicals and equipment and to low remuneration of staff. This leads to poor standards of services. This results in even lower collection rates for tariffs and stronger resistance to tariff increases.
In recent years financial discipline of public works has been emphasized. Increasing charges and collection of payment (pricing policies) combined with a profit motive (to work efficient) may raise revenues significantly. But this profit motive also has a reverse side. It tends to view investment in poor neighbourhoods as increasingly unattractive (see also paragraph 2.8.2) (Solo 1993).

3.5.4 Corruption

Public works in any country can be highly susceptible to corruption and politicization. Interest in bringing services to the poor plummets, when the objectives of the company change to concentrating on maximizing employment and the possibilities of payoffs (Solo 1993).

3.6 The private sector

The private sector is not under government control.
As state institutions prove incapable of supplying facilities, small scale private enterprises have often emerged to fill in the gap. The privatisation of services sometimes is considered to have adverse distributional effects in the marginal urban areas. In fact the opposite occurred. Many of the suppliers of these services are homeless and relatively poor. The state provision of urban services has often tended to reinforce political and class divisions (WEDC 1991).

One can distinguish the formal and the informal private sector. For example, contractors, building companies, private water kiosks,... But also manufacturers of handpumps, carpenters, black smiths, technicians, night soil carriers,... These businesses can be contracted to carry out part of the project.

The use of the private sector has a number of advantages (Reed 1995). Competition for work between companies tends to reduce unit costs. The drive for larger profits speeds up work, getting jobs completed faster. The implementing agency may be able to reduce their labour force resulting in savings in salaries and management. Contractors are usually less affected by political interference, producing a swift and flexible response to problems.
However, the drive for profits may lead to the use of untrained staff and the taking of short-cuts. This results in unsatisfactory standards of work. By making contributions to officials, contractors may corrupt the selection process. Therefore the contractor selection processes must be open to public scrutiny.

3.7 Financial support

Traditionally urban upgrading has been highly subsidized. The serviced areas, and thus the higher income families, have already profited. Today, local governments and international donors attempt to recover the capital costs. According to Solo (1993), this 'injustice' is met by significant resistance by the urban poor. This resistance to cost-recovery makes lending agencies reluctant to invest in infrastructure for the urban poor.

3.7.1 Credit institutions

Low-income families do neither have the money to invest in infrastructure, nor the support of others who could lend it to them. Local financial institutions are seldom willing to make loans to low-income families and to collect revenues. Even if credit unions are willing to make loans to lower-income members, they are reluctant to finance infrastructure, because no one can claim a piece of pipe to back up a loan.
Even if credit institutions do agree to finance infrastructure, the right conditions for financing do not exist. For example loans must be made to an association that has no legal existence and no equity. Or they are made to individuals who are hardly deemed credit worthy.

3.7.2 Economic rates of return

Another reason for the lack of interest in financing infrastructure for the poor are the poor economic rates of return.
Any investment undergoes cost-benefit analyses. Solo (1993) distinguishes two methods. One method (FIRR) is based on expected sales of water in other words the

service company revenues. The other method (EIRR)[3] is based on increase in land values. Both methods make investment in services for the poor less attractive than the same investment for the upper or middle class. The latter are apt to consume more water, because their earnings are greater. Their property values are likely to increase more quickly, because of the location and because it is not jeopardized by poor neighbours.
Seeing that water is essential to life and since many examples show that the poor pay, it is odd that institutions are not interested in providing water to the poor. It shows that they do not think commercially, due to the fact that this sector always has been subsidized. The poor are not seen as clients, although they greatly support the city's economy with their cheap labour. Relatively small investments would already make a big difference. Provision of water and sanitary facilities to the urban poor can be seen as a shortfall in the market.

Initial funding by an NGO in Bangladesh
In Dhaka, Bangladesh, slum dwellers possess no title to land. Therefore, they are ineligible for legal piped water-connection. The NGO Dustha Shasthya Kendra (DSK) guaranteed the security deposit and guaranteed to be liable for the monthly payments. On that account, DWASA (Dhaka's Water and Sewerage Authority) bypassed the official legislation and sanctioned two waterpoints (Singha 1996).
The local slum headman became responsible for overseeing the O&M of the waterpoint. Two caretakers collect fees at the waterpoint and keep it clean. The slum headman and his deputy, however, did deals with the meter-man to note low-readings. They charged the community the real costs and kept the profit.
Despite this setback, concrete achievements can be seen. The squatters have easy access to a legal connection, their spending on water has been reduced by 50 per cent, they pay regularly for the costs, and the incidence of water-borne diseases has been reduced by 50 per cent. In the following settlement DSK realized that the process of planning and handling the finance needed to be more open and involve more people. They recognized the importance of credit centres as community organizations.
The lesson learned is that government agencies and organizations can be more effective as facilitators than as providers of services for the poor. Given the proper enabling environment and incentives the poor are able and willing to maintain and manage services provided to them. There are no alternatives for water, the poor are willing to pay for access to legal drinking water as we will see in the next chapter.

3.8 General trends

The general trends emerging from an analysis of literature on water and sanitation practices in urban environments (CERFE 1995) show a change in attitude towards the solutions to slum problems.
Local socio-cultural, technological and economic features are taken into account. These features are recognized as a priority in order to identify satisfactory solutions. Technology standards are refused and different flexible and step-by-step approaches are used. Research is carried out to define problems and opportunities. Illegal situations are recognized as facts to be dealt with.

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3 FIRR is the financial internal rate of return, EIRR is the economic internal rate of return

Governments are increasingly understood to have responsibilities in promoting development action and in setting up an enabling environment. Decentralization is strongly emphasized.
The role of international and national agencies change to that of facilitators[4], promotors, technical advisers, organizers, but above all providers of information since there are no ready-made solutions.
The most controversial issue is that of the actual providers of services. One orientation emphasizes the role of private firms, the other the role of self-reliant community-based organisations. These are not necessarily imcompatible, although each tends to stress particular solutions.
Integration of the roles of the actors involved, is a new theme as well. The increasing number of actors can create a higher level of effectiveness and quality, but it might also be a source of new conflicts.

An unconventional government approach in Honduras

Paul Friedlander (1990) tells a success story about the supply of safe water to the urban marginal areas of Tegucigalpa in Honduras. These areas are marginal in both the physical and economic sense. There is little infrastructure or services and they are located on steep hillsides or along unstable river embankments. People buy expensive water from vendors. Ironically the amount they pay, would often have been sufficient to provide and sustain a piped distribution system.
It sounds like a familiar story: the city supply network is overloaded and the cost of extending it to the marginal areas would be enormous. Systems supplied from boreholes would be preferable but impossible in many areas because of the limited groundwater resources.
Recognizing the need for unconventional solutions, the authorities have established the UEBM. The UEBM is a permanent government unit responsible exclusively for providing services to the poor. This unit works closely with community organizations. This wasn't always easy. The intense individualism generated by the struggle to survive, often inhibits the development of a sense of community. Furthermore, community organizations have little experience in the necessary organization and management.
The initiative for improvements always comes from the community organizations. The primary criteria for determining feasibility are an adequate water source and the motivation and organization of the community. A socio-economic survey is basis for planning. All terms are to be agreed upon and spelled out in specific contracts before construction begins.
The community*'s responsibility include all non-skilled labour in the construction of the system, the purchase of some materials and the operation and maintenance of the system after completion. The* UEBM *designs the system in consultation with the community, develops the water source and supervises construction.* Unicef *supplies water pipes, pumps and other construction materials. The* private sector *gives technical training to members of the community.*

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4 Facilitation means to support others to develop their skills and capacities in ways other than direct training and teaching in the context of every day work (Dawson 1990).

3.9 Conclusions of this chapter

Resources are allocated inequitably in favor of central urban area and at the expense of the peri-urban and rural area.
Existing institutions, that is city administrations and public work companies, have proven unwilling and incapable of management and maintenance of the slum improvement projects. Many cities are plagued with these inefficient and corrupt institutions. According to Solo (1993) the biases to the poor are the greatest impediment to providing services to the poor.
Design criteria and standards used in the provision of infrastructure for low-income settlements have not been appropriate. Legislative instruments, such as codes, regulations and standards, suggest the use of unnecessary high standards and technologies. These instruments have, as a result, prevented the use of cheap and relevant technologies. Low-cost technology is needed, together with the development of an appropriate institutional and legal model.
The urban poor lack financial support. Urban upgrading is nowadays hardly subsidized. Lending agencies are reluctant to invest in the urban poor.
Gradually the existence of slums is recognized, as well as the need for improvement of the living conditions. Local features and local agents are recognized as a priority in defining solutions. Appropriate technologies are demanded. Although opinions are slowly changing, changes in practices and in the legal framework take more time.
In short, the evolutionary urban context is characterized by greater decentralization and increased responsibilities for the local agents. These agents are municipalities, service providers and small and large public and private firms, community leaders, both men and women, as well as NGOs.

Chapter 4 Social and management aspects

4.1 Introduction

The previous chapters described the urban context. The existing institutions are inefficient and unwilling to provide services to the urban poor. In my opinion improvement projects should rise from the needs and aspirations and potentials of the slum dwellers. This may plead for community based organisations which operate and control the facilities. The intervening external agency like MSF can facilitate improvements. This requires a cultural understanding. Besides, a social, economic and political analysis is needed.
Intervention in urban slums raises many social and management issues. Informants have to be selected to gain insight in the community composition and the resources of the community and to understand for example women's role. Existing local institutions that could manage the water supplies or waste systems, have to be investigated or new organizational structures have to be set up. A target group or slum has to be selected. Technical and managerial training of the people involved, is often needed. Tariffs may be set to meet the costs. Last but not least, the impact of the project should be assessed. This requires clear objectives which can be tested. In this chapter all of these aspects will be discussed.

4.2 Water as a power resource

Water is not just a vital element people need for life, but a power instrument as well. It can lead to economic resources. Water is a commodity. Besides, it is essential to many productive activities.
Water is scarce and supply strategies are lacking or biased. Consequently, access to water involves a power struggle. In the context of exhaustion of supplies, the danger exists that -without planned strategies- the gap between the (relatively) rich and the poor widens. Power issues place vulnerable groups in a very disadvantaged position. Women, particularly single-female headed households often form the most vulnerable sector of the urban poor. Their limited access to power reduces their negotiation capacity to get water supply systems. Power issues prevail not only along the lines of gender, but also ethnicity, class and age.
The supply of water and facilities is a means of empowering the poor. It enhances the control of the poor on water. Intervention may change the position and status of different groups. By recognizing water as a power resource, agencies and projects may develop strategies to reduce power consequences on the conditions and positions of vulnerable groups (SIDA 1993).

4.3 Informants

For a sustainable intervention the needs and aspirations of the residents have to be assessed. This is particularly important when the project is carried out by the community.As the World Bank (1989) states: 'It is essential that the adoption of technical decisions be preceded by sufficient analysis and debate by political

representatives of the community'. Communication skills and cultural understanding are crucial. You have to understand what to attach importance to or to ignore (Dawson 1990).

This issue raises questions of representation within the community. Who are chosen to be informants to identify the problems and possible solutions in the urban area? The informants should not be chosen on the effectiveness of contacts. The danger exists that these are male and powerfull. This results in a one-sided view on the problems of slums. The responsibility for water supply and sanitation generally falls to women. When men are choosen to be representatives, women may even loose decision-making power in this area or they may not gain rights to facilities or land in the proces of registration.

According to the WHO (1990) ***key informants*** *can be government officials; social and health service personnel as well as traditional healers; teachers; community leaders; owners of local shops and entertainment establishments; members of NGOs. I would like to add women or womens organizations; small-scale enterprises; and different ethnic groups.*

4.4 The community and her resources

4.4.1 Some general remarks

The legal status of the residents, in other words the security of permanence, influences their motivation to improve their living conditions. Besides, in some cases, the government makes promises to provide resources, funding and services to the poor. This is a political strategy to gain votes. As a result, the community is not eager to invest their own time and money in improvements.
One thing is certain, slum dwellers just *need* the facilities. They need water to drink and a place to defecate. There are no alternatives for water. It's essential to life. The inhabitants will tap water illegally or defecate in the open field, if they don't get legal access to water and sanitation.

4.4.2 Ability and willingness to pay

Unemployment and marginalization of citizens result in insecure income. However, it is a misunderstanding that the poor wouldn't be willing to pay for improved infrastructure. On the contrary, they are already paying exorbitant prices for water and for fuel to boil it.
For example, the poor buy buckets of water from water vendors at enormous costs. If one calculates the expenses the slum dwellers make in the long run, one finds that they pay far more than the higher-income families who have a household water connection and private latrines (WEDC 1991).
The misunderstanding about willingness to pay stems from many failing projects. However, the cause of these failures is not unwillingness, but rather a wrong approach and technology choice.

The extraneous costs to water consumption and sanitation should not be overlooked when determining the feasibility of a project. They may be significant and not affordable to the beneficiaries (Solo 1993). In chapter two the costs of land legalization and regularization are already addressed. Other extraneous costs are for example external delivery costs. These can include off-site trunk lines to bring water to a neighbourhood or to take waste water away. It can include reservoirs or a sewage treatment plant.

Factors influencing ***willingness to pay*** *are believed to be: perceived health benefits, convenience, amenity, time savings and economic benefits, level of service, existence of alternative sources, income, price, different uses, different determinants, value of women's time, family size (Whittington 1987)*[5].

4.4.3 Ability and willingness to provide labour

Since the need for the facilities is very high, the poor are willing to invest, not only by money, but also by labour.
Residents, in particular women, are spending a lot of time on water hauling. Improving water supply and sanitary facilities may mean a reduction in time spent on these activities. The residents will figure out what they will gain by providing labour to the construction and installation of the improvements.
On the other hand, as Tabibzadeh (1989) annotates, voluntary help may be difficult to obtain. Single-parent households, often headed by women, are frequent. They are crucially dependent on cash income. The need to work is pressing and even children must contribute to the family income.

4.4.4 Ability and willingness to organize

The social structure common in the rural areas is lost in the migration process and is difficult to rebuild. The extended family with its protective structure is replaced by the nuclear family unit and single headed households (Tabibzadeh 1989).
Compared with rural areas, many urban areas lack homogeneity. Urban slums and shanties can be complex communities having wide ranging needs and aspirations. In many cities this has proved to be a major obstacle to urban development. Ethnic, cultural, religious, political and economic heterogeneity restrains the real involvement of the population in improvement projects. More generally, individualism -which is a consequence of the struggle to survive- tends to be high in urban areas and a sense of collective responsibility correspondingly low (Tabibzadeh 1989).
Despite this lack of homogeneity, there are possibilities to have the residents organized. They share the same interests. Long-term participation can be achieved if the community realize or are made to realize that a problem exists and that there are advantages to be gained by dealing with it (WHO 1987). Many examples have shown that the poorest slum communities are willing to organise themselves to provide labour and pay for the improvements (Black 1994).

4.5 Existing institutions

It is important to investigate the pre-existing arrangments in the community. Are there any existing local or municipal institutions for managing, regulating or maintaining water supplies or waste systems? It might be more effective to build on these institutions instead of creating new ones. On condition that they are acceptable in character and mode of operation. They should not be dominated by particular ethnic groups, political parties or genders.
The next question concerns the intended scope of responsibility of these institutions. They could be responsible for the long-term management and maintenance of the project infra-structure or even become the conduits through which dialogue between the project

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[5] Mentioned by Richard Franceys (1990)

staff and the community takes place (Good 1996). Anyways, when starting a project, responsibilities have to be carefully allocated. See also the Friedlander case in chapter 3.

4.6 Target group selection

It is often suggested that the target group should be selected on the basis of demonstrated willingness and ability to participate. This demonstration may be by expression of genuine popular demand or by willingness to contribute cash, labour or materials. However, this may result in projects which tend to benefit those who make the most significant contributions, in other words the better-off (WEDC 1991) .
The interviews with informants and observations will create a picture of the needs and priorities of slum dwellers. The residents could for instance mention child morbidity and mortality as a huge problem. In this case, children could be for example the target group and the provision of safe water and sanitary facilities to schools, combined with health and hygiene education could be the objective.
Selecting a single slum to improve water supply and sanitation, is another possibility. This could involve, for instance, providing individual household connections, public standposts or public latrines. The slum selected can be an example to create a demand for improvements in other slums.

4.7 Organizing the community

4.7.1 Local initiative

An initiative by external agencies often has nothing to do with the perceived needs of the community. Therefore, attempts to mobilise the subsequent participation of the beneficiary groups have little effect (IHE 1991). Community involvement occurs more naturally when projects are small-scale and localized. It allows the users to choose *what* is the most appropriate form of assistance and *how* it should be delivered (Dawson 1990).
Even if the initiative is taken by local men and women, they seldom play a decisive role in the planning and designing of projects. Usually they are dependent on external water technicians from public or private sectors who have other interests and priorities than the community members (SIDA 1993).

Initiatives for improvements in India

The urban poor in Lucknow in common with other cities in Asia are marginalised, poorly served by infrastructure and social services in comparison to middle and high income groups and tend to live at environmental stress points in the urban fabric. Most of the government schemes avoided slum areas through a deliberate policy decision to treat them as illegal encroachments and therefore not to be encouraged through permanent infrastructure provision.
Government initiatives for infrastructural improvements have been top-down in nature. NGO initiatives are often sector specific and under-resourced. NGO activity is often viewed as charity oriented rather than a development activity. This leads to an approach with limited community participation or genuine empowerment. Community Based Organizations are often excluded from formal decision making processes and don't have the means to improve their environment. Stakeholder participation projects are likely to be more effective, but participation does not occur without support (Cook et al. 1996).

4.7.2 Community participation

Community participation -often a euphemism for unpaid labour- is not enough. It is based on a model that external agency values and community values coincide and that the latter, given the necessary motivation through education and skills training, will voluntarily participate in externally-induced environmental and social engineering (WEDC 1991).

The great variety in forms of participation make generally-applicable recommendations difficult. A structure has to be developed which guarantees the project to survive as well as genuine involvement. Community participation should not mean the participation of the community in an externally-induced project. It should mean the participation of an external agency in a community project.

Criticism of using community labour

Critics suggest that self-help schemes using community labour take extra time and are more expensive. For example, at harvest season nobody turns up. Poor construction by unskilled labourers may lead to frequent breakdowns. Another objection is that it changes women's role. On the other hand, contract work in Karachi for example, is four times more expensive than community labour due to overheads, profits and other 'costs'. Besides, bureaucratic procedures may also cause delays and volunteers usually work harder than municipal employees (WEDC 1991).

4.7.3 Community management

Community management goes beyond participation. It aims to empower and equip communities to own and control their own resources. Community management may involve setting up local structures to provide financial support (for example revolving funds) and to collect revenues.

When adopting the objective of community management, the external agency has to discourage dependence and to delegate authority. The agency acts as a facilitator. It enables the community to define their problems and possible solutions themselves. The community will become more assertive and self-confident.

Community means the full community, not just the leaders, but especially those whose daily support is needed. In water and sanitation this often means women.

The responsibility for water supply generally falls to women because of social and religious considerations. Women are the most directly concerned about water in communities and have great interest in reliable and good quality service. They also have more management experience in services at the neighbourhood level related to health and food. The Delft Declaration (IHE 1991) states that 'continued attention needs to be given to the pivotal role of women in water related activities and their proven capabilities to fulfil managerial tasks at all levels'.

> *In Luanda, Angola, in 88% of the cases the woman fetches the water and in 5.7% children fetch water (Cain and Gonzales, IRC 1996).*

4.8 Training

According to IHE (1991) capacity building activities (at all levels involved) are essential to the long term sustainability of the projects. Therefore, capacity building calls for a long term strategy and is of equal importance as financial, econmic, technical, environmental and health aspects. Familiarization with the cultural environment within which skills transfer takes place, is important (Dawson 1990).

The people involved in the project are likely to need training in managerial or technical skills. What skills do people need in order to manage and maintain the water supply and sanitation systems? The answer partly depends on whether local communities are expected to carry out their own maintenance. Managing maintenance and repair independently, also involves the availability and affordability of spare parts and tool kits.

Management training *can include (Davis et al.1993): administrative training, including the keeping of records; keeping accounts (recording revenue and expenditure); spare parts management; managing the operation and maintenance of the system, which involves employing and training staff, providing tools and equipment, spare parts supply; the organisation of hygiene education; planning for the future expansion of the system.*

Other types of training needed are for example, health and hygiene education; technical training to construct, maintain and repair standpipes; or training of promotors of eg latrines.

Behavorial practices may have to change in order to improve the health situation. The supply of qualitative water as well as improved sanitary facilities, is an important step towards a healthier situation. However, users often tend to focus on the convenience aspects of the infrastructure. For example, the safety, privacy and comfort of a latrine will be more decisive for using it, than the possible health risks. ***Health education*** *will contribute to the acceptance of the facilities.*
Good (1996) mentions for example, that in South India levels of awareness of the links between sanitation, hygiene and health were poor. The consequent lack of interest in sanitation measures constituted a major constraint to the WaterAid South India Pogramme. Good therefore recommends that health education strategies reflect the acknowledged concerns of the beneficiaries, rather than merely the priorities of the project staff.

It also needs to be decided how community management institutions will deal with conflicts and what kind of training therefore is needed.

Conflicts *can arise from people misusing water infrastructure or from people failing to discharge their maintenance responsibilities. According to Good (1996), possible remedial measures might include mobilizing community pressure; offering increased work incentives; mounting public awareness campaigns; introducing disincentives for misuse such as requiring all local residents to contribute towards the costs of repairs; or offering more advanced maintenance skills training to a wider range of people.*

4.9 Setting tariffs

Water and sanitation supply need long term investments. At least, if the permanence of the facilities is not threatened by bulldozering, natural disasters like flooding and landslides, or for example chemical disasters of industries nearby. The long term investments involve operation and maintenance and possible extension in the future.
The question rises 'who is going to pay for the facilities?' and 'how is this organised?' In serviced areas the capital costs are already payed for. In the informal settlements additional infrastructure is needed. The costs are much higher for the poor than for higher-income families, because of the difficult terrains and because today it's more expensive than twenty years ago (Solo 1993). In chapter two I already mentioned the

lack of financial support to the urban poor. In this paragraph I will discuss the setting of tariffs, which implicates that the users pay (part of) the costs. In chapter 5, I will be more specific about setting tariffs at standposts and for individual connections.

> *Poor urban women in, among others, Kenya, Brazil, Mexico, united by their needs for both water and income, helped organize their own water supply or financed a connection to the municipal network. Water is used for income generation from beer brewing, teashops and a laundrette (SIDA 1993).*

4.9.1 Objectives

To meet the apparently conflicting demands of consumer and water utility, four principal objectives of tariffs may be described. Tariffs must be adequate to meet the costs and future investments. They must be fair to the members of the community. The tariff should be simple to administer and easy to understand, and enforceable, which means there has to be a political willingness to accept disconnections when bills are not paid. Tariffs should be water conserving, consumers satisfy their needs without being wasteful. (Franceys 1990)

4.9.2 Approaches

Sometimes a commitment fee is required before e.g. pumps are installed. This indicates both the willingness of the community to pay such costs and their ability to collect the fees (Good 1996).
Various approaches to set tariffs can be considered (Franceys 1990). If tariffs are already applied, they can modestly be increased in line with inflation.
The aim of setting tariffs can be full recovery of the operation and maintenance costs. Donor gifts could be used to cover the capital costs. If not, these costs also have to be recovered, that is paying back the loans including interest.
The tariff can also be set to generate a surplus above cash requirements in order to provide a contribution to future investment. For example to extend the system and provide additional services to meet increased demand. However, this appears to lead to very high tariffs and may therefore be politically unacceptable. A compromise solution is to charge the initial consumption at a lower rate (increasing block rates, see §4.9.3).

4.9.3 Spreading the costs

Partial subsidy may prove necessary in the underprivileged areas. Cost-sharing or cross-subsidy could be proposed for. This allows for contributions by other beneficiaries. Payment in kind, for example labour, can be a form of cost-sharing.
A recommendation can be to install increasing block rates. The people who use little water, pay less. All medium and high volume consumers could be metered.
If connection charges are not paid for by donors, they could be spread over many years. In this way, the poor may be able to afford a connection.
Charges for standposts could be paid by the local government. However, this could result in wastage of water (Franceys 1990).
If user charges pose a problem for the poor households, cheaper alternatives or special financial arrangements (like revolving funds) could ease the burden (Good 1996).

Community managed standpipes in Angola

In Luanda, Angola, the residents of the unplanned settlements pay up to US$ 17.00 per cubic meter untreated (trucked in) water. In the city proper, residents pay US$ 0.002 per

cubic meter piped water. Sanitation services, solid waste removal, excreta and waste water and sewage removal are non-existent in the peri-urban area. Large heaps of rubbish and overflowing sceptic tanks pose life-threatening environmental problems. The Sambizanga Upgrading Programme's objectives are to improve access to basic services of water supply, sanitation and primary health care and to mobilize the community to actively participate in the improvement of environmental and public health conditions. 'Activistas' or promoters of latrines and preventive health care, initially provide the main link between the project and the community.
A system for community management of the water supply standpipes is being tested. Standpipe users have an identification card. A flat water tariff (US$ 0.25) is collected and serves to pay the operation and maintenance costs and a small salary for the standpipe caretaker who also collects user fees.
Regarding sanitation each family who participates in the programme gets -as a project subsidy- one latrine slab, 100 building blocks and two sacs of cement. In return, the family is required to supply or pay for the labour of pit digging, pay a mason to do the blockwork and make the cabin (superstructure) (Cain and Gonzales, IRC 1996).

4.10 Impact assessment

Proper impact assessment can only be done when clear objectives have been formulated. For example, if the project meant to increase women's condition and status, this formulation of objectives provides criteria to measure this.
Other objectives may be the reduction of *people's investments* in money or time on water and sanitary facilities. It should be assessed how much the residents invested before and after the intervention.
The objective can be to reduce the incidence of *water and sanitation related* diseases.
Indicators for physical *infrastructure* are easy to devise, e.g. the number of pumps that are in use. Although access to and control over the infrastructure may be more difficult to assess.
Measuring *community participation* is less common. Quantitative indicators are relatively easy to devise and include for example the number of people involved also seen in terms of gender, caste, etc.. Qualitative indicators are even more commonly absent. Factors to assess are likely to include group leadership, decision-making processes, participants contributions. These indicators may, for example, express a change in gender roles and status.
In determining the impact of health, hygiene and sanitation *education* one can distinguish between knowledge and awareness on the one hand and behaviour on the other. The first can be determined through questioning, the latter through observation.

Examples of possible impacts

Positive effects
The stakeholders of Wateraid's South India Programme identified certain positive impacts (Good 1996): the provision of safe water compared to earlier dependence on contaminated sources; savings of time and workload thanks to greater proximity of the supply; increased school attendance thanks to a reduction in sickness among children; improved availability of water for bathing and clothes washing; and greater food security and income thanks to their increased ability to grow crops and vegetables and to water their cattle.

Slum improvement projects have been noted for their positive effects for women (Stevens and Harpham 1991). Womens interest is not only practical (improving conditions), but also strategic (status). The improving effects can include: a decrease in physical and household workload; a decrease in physical dangers to children from poor infrastructure, this is particularly appreciated by women; more opportunities for employment and education; improved access to health care, including for example immunization, family planning and nutrition; opportunities to increase personal status through land tenure, involvement in slum management committees and through project employment.

Detrimental effects

Debt burdens, densification and gentrification are already mentioned in chapter 3. Detrimental effects of slum improvement will have a severe impact upon women. Debt burdens will increase women's participation in low status occupations. As women are less economic secure, they may not be able to resist the pressures to sell off their newly improved homes, so called gentrification (Stevens and Harpham 1991).

The UNHCS (1989) also notes negative impacts on women in domestic water supply projects. Certain categories of women are excluded from access, e.g. poor women, minority groups, female headed households; The gap between rich and poor is widening, because greater benefits and development opportunities go to women from wealthier households; The workload of women is increased by the need to provide voluntary labour for construction, or by the loss of assistance in water collection; Poor women and/or their husbands have lost employment or resources in water distribution; Women have no control over the income from increased availability of water for economic purposes; Several needs of women are not met: laundry and bathing facilities, service operating hours, privacy; The involvement of women has been confined to health education or special projects; Improved facilities have led to reduction of traditional spheres of influence, organizational skills, social status.

4.11 Conclusions of this chapter

The involvement of the community in decision-making and planning will enhance the acceptance of the facilities by the users. The needs and aspirations of the community are important. A thorough social, political, economic, cultural analysis is crucial for the sustainability of the intervention. The urban slums often are complex communities.

The need for improvements is high and the poor are willing to invest time, labour and money in improved infrastructure. A great variety in forms of community participation exists, which makes generally-applicable recommendations difficult. The following issues should be addressed when intervening.

Who are going to be informants, to whose benefit is the project, who is going to be responsible for the management? Community management aims to empower and equip communities to accept responsibility for and control over their own system. It involves prominent roles in planning and resource mobilization. Managerial and technical training are probably needed. And since water supply and sanitation need long-term investments, the question of (partial) cost-recovery is addressed in this chapter.

The formulation of clear objectives is important in order to be able to assess the impacts of the project. Slum improvement projects have been noted for their positive effects. However, there are many examples of 'unintended' detrimental effects which could have been foreseen if payed attention to.

Chapter 5 Physical and technical aspects

5.1 Introduction

In the previous chapter I discussed social and management aspects of interventions in slums. In this chapter the physical and technical aspects are addressed. It is not possible to give a blueprint of technical solutions which go with the physical lay out of the slums. Settlements on hillsides, flood plains or garbage dumps require different approaches. Environmental factors such as water source availability, the climate, soil conditions, geology will influence the technology choice. Several ways of supplying water are mentioned in this chapter.
In chapter 2 I already mentioned the growing demand for unconventional and affordable technologies. Although house connections for water supply and sewerage systems are usually seen as inappropriate and too expensive, these technologies will be addressed as well. In some cases, public standposts or public latrines will not do for physical or managerial reasons.
In this chapter the issue of paying for water at standposts and for individual connections is also discussed in order to link financial aspects to technology choice.

5.2 Location

On site solutions are in many cases complicated. Most of the time it concerns private land or the land is in poor physical condition (UMP 1992). Few squatter settlements have proper roads and pathways. This limits the accessibility needed to construct water collection points or for water tankers to enter the settlements (UNCHS 1989). Several city slums are on steep slopes at a higher elevation than the storage reservoirs. On flood plains the installation of drainage systems and water mains is difficult and costly (Anton 1993).
In case of *relocation*, housing might be improved. But one should not loose sight of possible changes in access to health care, public transport, or even loss of income.
If site lay-outs are complicated, relocation of some of the families might be required to provide infrastructure. This has a social impact. For example, in crowded areas laying pipes may require the relocation of families. Sometimes a new neighbourhood must be built for this purpose. These costs are part of providing water and sanitation facilities. Relocation is socially seen very costly if houses are patterned according to family formation (Solo 1993).

5.3 Water supply

As we have seen in chapter 1 most cities in development countries experience water supply problems. Excessive lowering of water tables is taking place in many cities where pumping is intensive. In some cases overpumping has led to saline encroachment. Except for the availability of water resources and the characteristics of the environment, the water supply problems result also from legal, administrative, political and behavorial issues. Drainage and treatment of water are frequently ignored, as is solid waste disposal (Black 1994). This exacerbates the pressure on water supplies.

A wide range of technology exists to provide the means for attaining the objectives. WEDC (1991) mentions the use of piped supply, on-site groundwater and rainwater. In this paragraph I add purchasing water from vendors.

5.3.1 Water trucking and vendors

In the urban marginal areas, the most common practice is purchasing water from private vendors or city-managed water trucks. SIDA (1993) calls this the least appropriate way of water supply management. The reasons are high costs, a low service level with irregular routes and supply schedules, very poor water quality and high intake from illegal connections with grounds for user exploitation in periods of water scarcity.
Water trucking to communal reservoirs might be a solution, if piped supply or wells are no option. This is for example the case in Honduras as told by Paul Friedlander (1990)[6]. In some areas water trucking is the most viable solution. Water will be trucked to a cistern below the community and pumped into smaller tanks located above. From here it will flow by gravity. Although it's expensive, this type of system should still result in substantial savings to the community over the current cost of unsafe water, while providing a dependable supply of clean water.

5.3.2 Piped supply

In these cases the water source is off-site. For example water is extracted from surface water as rivers or lakes, or groundwater volumes outside the area are used.
The accessibility of water is influenced by the way it is supplied. Many distribution systems are becoming inadequate and obsolete. Pipes are leaking. A piped system may have low pressure and intermittent supply, with more risks of contamination. When service is interrupted (might be because of consumption control) the pressure in the pipes become negative and contami-nated water is drawn from the lines surrounding the soils. This risk to health is aggrevated by poor disinfection.
A preferential supply to the privileged sections of the city also affects the accessibility. This may provoke illegal tapping. Illegal connections might affect the water supply.
Another problem of this method of water supply is clogging of pipes. Pipes might be blocked by various deposits. These could be waste matters, dirt, grease, etc.

5.3.3 On-site groundwater

In these cases water is supplied by wells or pumps.
According to Anton (1993), using groundwater volumes close to the urban areas, provides means to obtain much better quality water at much lower cost. (This water can also be distributed by pipes.) Groundwater volumes are normally much higher than surface water volumes. It is less vulnerable to contamination and initial investment is only a fraction of what is needed to develop analoguous surface water resources. However the critical measure is not the availability of ground water sources, but their renewability.
Groundwater availability and urban distribution do not always coincide. There are large aquifers in sparsely populated areas and the other way around.

5.3.4 Rainwater

Rainwater utilization is a truly sustainable approach (Gould 1995). However, many governments consider it as an option of last resort. Several failures, some technical and some of a socio-economic nature also hampered the official recognition of rainwater technologies in many countries.

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[6] This case is described in chapter 3.

Technical failures are, for example, the failure of bamboo, basketwork, and other organic reinforcement in cement tanks. Socio-economic failures are due to a failure to involve the local community in design and implementation.
Even in mega-cities people are beginning to realize the benefits: fewer flooding problems; reduced water demand; cooling the city by evaporation; restoring the urban hydrological cycle (evaporation forms clouds which produce rain).
The provision for domestic supply is particularly significant for women, who often shoulder the burden of transporting the family's water.

> *Concepcion, Chile, averages 300 rainy days a year - enough pure potable water to supply New York City. Yet planners and engineers completely discarded rainwater catchment as 'backward', even though such a solution can service any area, including hillsides, at low cost (Solo 1993).*

5.4 Water distribution

In addition to the different ways of supplying water, one can distinguish different stages in water distribution and the attended problems
First of all there is the site of *extraction*. When surface water is used, the river volume might be reduced. The installation of wells for ground water use might cause a drawdown of water levels.
The availability of qualitative water can also be influenced during *conduction and storage*. Leakage of pipes, tanks, canals and sewers can be sources of contamination.
At the *disposal end* of the system, the quality can be affected by the discharge of sewage.

5.5 Paying for water

Individual connections are not by definition less appropriate than community taps. WEDC (1991) mentions a USAID project in Thailand, where low-cost handpumps and community taps fell in disrepair, because no one felt responsible for the maintenance. When yard taps were provided with much higher charges to householders, the whole system functioned reliably with all the bills paid after five years. In this paragraph paying for both ways of supply is discussed.

5.5.1 Tariffs at standposts

At standposts water is paid for in different ways. Tariffs can be based upon a flat rate charged on all surrounding households. If governmental institutions are involved, the water rate can be charged as an addition to local council taxation or as a percentage of the ground/property rent. The government can pay an agreed water rate to the water utility as a social service. A meter can be placed, but this leaves difficulties deciding who organizes the share out of the costs in the community. Access can be controlled by a water kiosk, where the water is sold at fixed rates.
A community association could take up full responsibility for the distribution of water in a defined area. They can make their own arrangements for collecting a suitable tariff and paying the local council for water delivery. The utility gains by not having to manage the many leaks and connection problems. Besides they only have to collect the money from a single customer. The community gains by having much greater control over their own water supply and its extension.

Water tariffs in Tegucigalpa

The IRC (1996) mentions that the poor urban communities in Tegucigalpa in Honduras lack basic infrastructure. That is water supply, sanitation system, rainwater drains and garbage collection. To 80 % of these families the costs of water represent 11 to 20 % of their monthly income.

The National Water and Sewerage Sevice (SANAA) promoted water source options. These are direct sale form the main network through master meters; community wells with electric pumps, leading the water to a communal tank; and water trucks to fill up the communal tanks. The community pays for the bulk delivery and distributes the water further. They contribute non-skilled labour and local materials. They also take part in investment costs and run the administration, operation and maintenance through a local water board.

Women take an active part in the project. With the project the water is cheaper, the burden of water collection decreases and hygiene improves. Their reasons are also strategic (self-esteem, recognition, new skills).

Customers with a yard connection pay $6 a month, which is equal to $0.10 to $0.20 per barrel, opposed to $1.75 per barrel when they buy it from water vendors. At water kiosks they pay about $0.30 per barrel. The monthly water tariff is adjusted to recover capital costs as well as expenses for operation and maintenance. This includes salaries for tap attendants, electricity to run the pumps and repairs. Part of the water tariff is also deposited in a fund used for other community development projects. The water charge is more than other customers of the municipal system pay. However, it ensures them of service and leads to increased property value and better environmental and living conditions.

5.5.2 Tariffs for individual connections

Tariffs for household or individual connections have been set in different ways. They are charged according to the size of the connection pipe. In this case different flat rate charges are used for domestic, institutional, commercial and industrial users. Tariffs can also be set according to property values. Or they are charged according to property characteristics, that is the number of taps, basins, showers or baths. However, this does not seem to apply in the slum context.

Many believe that the use of household meters which measure the amount of water used, best fits the four objectives of tariffs. Some studies in the UK suggest however that the installation, reading and maintenance of meters is a very expensive exercise with few benefits gained from reduced water usage. Countries such as Indonesia have used flat rates with flow restrictors in the connection lines in order to limit water wastage.

The La Sirena project in Colombia

Mariela Garcia describes the La Sirena project in Cali, Colombia (IRC 1996). The community took the initiative to improve the water quality. They raised and controlled the financial resources for water treatment and the construction of house connections. At present they attempt to raise the funds needed to extend the system, reduce the waste of water and strenghten its organization. Larger repairs and enlargement of the system require external financial support due to the precarious financial situation of the users.

The provision of good quality and low cost water directly to the houses has liberated women and children from investing time in fetching water. Especially women benefited as they no longer have to walk to the rivers to wash clothes. Furthermore, the availability of drinking water has increased domestic businesses, as such as the sales of icecreams and refreshments.

5.6 The importance of urban sanitation

Sanitary improvements often appear as an add on to water supply. In rural areas the need for water supplies is greater than the need for improved sanitation. In urban areas because of lack of space and high population densities, both are fundamentally important. Pit latrines fill up leaving no space available to dig a new one, and wells become polluted by nearby sceptic tanks (Tabibzadeh 1989).
According to Reed (1995), sanitation is usually considered to include the disposal of excreta, liquids from domestic and personal activities and solid waste.
Proper sanitation is needed to prevent surface or groundwater pollution. The lack of sanitary facilities also means a lack of privacy. This is particularly seen as a problem by women.

> *In Africa 90% of the households is not connected to a sewerage system. In Asia this is 70% and in Latin America 40% (Vereecken 1996).*

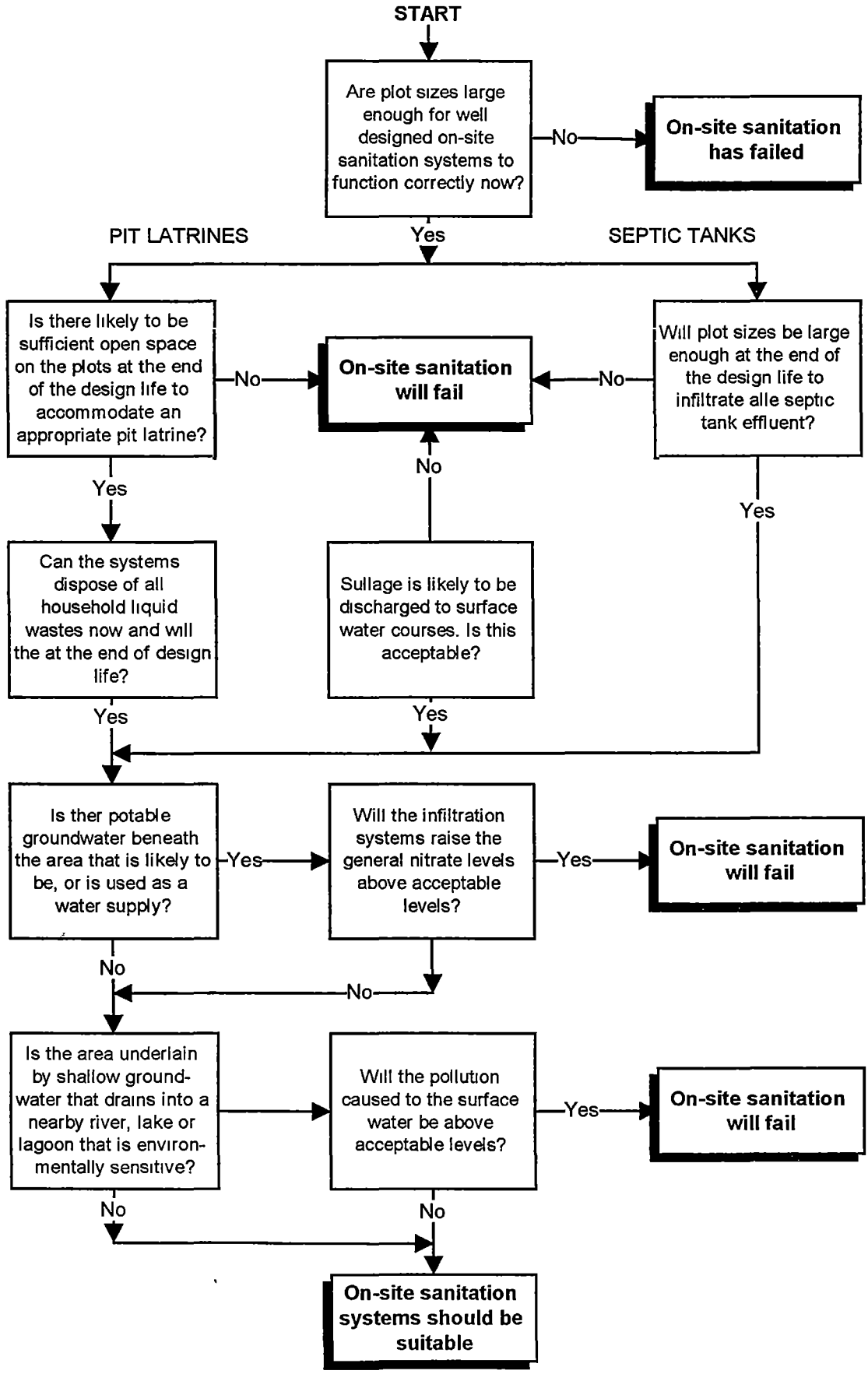
5.7 On-plot and off-plot sanitation

On-plot sanitation facilities are for example VIP or pour-flush latrines. Off-plot facilities can be sewerage and sewage treatment or communal toilets.

> *In Kumasi, Ghana, local officials conducted a willingness to pay survey concerning sanitation services among more than 2000 residents. They found that families on average were willing to pay about the same amount for sanitation as they paid for rent, electricity or water. They also found that the poorest people who used public latrines, were spending more for sanitation than those with household systems (CERFE 1995).*

Sewerage systems requires the involvement of a major institution for construction, operation and maintenance. Sewerage systems may be impossible because of soil texture and slope. They are far more expensive to construct and maintain than on-site systems. According to Black (1996) conventional mains and drains are inappropriate and unaffordable.
Therefore, many authors encourage on plot latrines. Responsibility for operation and maintenance of these latrines is clearly vested within the household. Reed (1995), however, mentions several reasons for the failure of on-site sanitation (see flow charge figure at the next page). The only satisfactory alternative to on-site sanitation is sewerage: a series of underground pipes collecting and transporting water-borne excreta and sullage from homes to natural water courses.

Figure 1: Predicting the likelihood of on-site sanitation failure (Reed 1995)



5.8 Non-conventional sewerage systems

Reed (1995) discussess non-conventional sewerage systems. These can be divided in three broad sewerage groups.
Simplified sewerage adjusts conventional design and construction practices to reflect the environment and affordability of recipient communities.

> The costs of simplified sewerage have been reduced by the following design features: reducing the minimum pipe size for collector sewers to 100mm; reducing the minimum collector sewer gradients to 1:220 or less; replacing conventional access points with ones of smaller diameter or with rodding eyes or underground chambers; increasing the space between access points; postponing the construction of treatment plants.

Condominial sewerage (also described as shallow sewerage or back-service connections) is typified by the laying of collector sewers at the rear of properties, close to the point of waste generation. It is about half the cost of conventional sewerage and one and a half to two times the cost of on-site sanitation.

> Construction costs of condominial sewerage have been reduced by: adopting a back-service collector sewer layout, thus reducing the length of house sewers and minimizing the sewer depth; constructing localized systems to minimize pumping stations and trunk sewers; making use of under-utilized municipal resources during construction.
> Institutional costs have been reduced by transferring the responsibility for maintenance to the block residents. Some members are pressured into participating, but there is also evidence of informal cross-subsidy between the rich and the poor of the block.

Interceptor tank systems (or small-bore sewerage) rely on some form of settlement tank close to the house to remove some or all of the suspended solids in the effluent and to dampen peak flows. This allows savings in capital and operating costs of the downstream sewer network (flat gradient, small pipes, reduced amount of treatment required). They require less water, since the distance that solids have to be transported is much reduced. However, the emptying of tanks have proved to be a problem. This mainly revolves around the question of responsibility. An approach can be that the maintenance authorities take the responsibility and charge the residents for the service. Or legal and institutional powers are enacted to ensure that householders empty their tanks when requested. In Brotas this has been calculated to be 78% cheaper than a conventional sewerage scheme.

5.9 Some examples of sanitation

5.9.1 An example of latrine building in Mozambique

In 1976 the Ministry of Health of Mozambique started a national campaign for latrine building in peri-urban areas. The main element of this latrine is a concave SAN-plat made of concrete. The type of latrine can be adapted to the characteristic of the construction site, especially the stability of the ground and the depth of the water table. Having a volume of 2 m3 it can serve a 6 people family for 8 to 10 years. The programme is successful, but not sustainable financially without donor funding. Donors contribute

cement, transport and technical assistance. Sustainability is increased by decentralization of activities, private sector involvement, mobile production units, community promotion and education, training of residents for maintenance, and the stratification of subsidies. The project has institutionalized local capacity for construction and promotion and over half the costs are locally financed.

5.9.2 An example of pit emptying and private sector involvement

In Dar es Salaam, Tanzania, the traditional method consists of scooping out the latrine sludge and burying it in a new hole on the residential plot. The DSSD (the Dar es Salaam Sewerage and Sanitation Department) provides the other type of service with vacuum tankers. However, many roads inside the low-income areas are inaccessible; poor people cannot afford the price of US$ 10 per emptied pit; tankers are out of service for a long time due to maintenance and repair.

Muller and Kirango (IRC 1996) tell a success story about micro-enterprises, the MAPET teams, which provide employment and respond to a demand for service that the public sector cannot satisfy.

The DSSD supports the MAPET teams in leasing or lending the equipment to them, and in carrying out the major repairs. In addition, they provide training and licensing of the MAPET emptiers; they promote MAPET and public health education; and they monitor the performance of the teams.

The residents mention several advantages. The booking office is at walking distance. (This is particular an advantage for women, since they are responsible for keeping the family latrine in a clean condition. Emptying is not women's work.) Customers can have direct influence on service provision through their own negotiations, through supervision and through involving the community leaders in case of disagreement. Finally, the service is consistent with the income and expenditure patterns of low-income households. A household that has a small amount of cash available, may prefer to pay removing only one tank of sludge in order to have its latrine functioning again (IRC 1996).

5.9.3 An example of sewerage schemes in Pakistan

Kevin Taylor (1990) writes a rather technical paper about sewerage schemes involving local people and on-plot improvements in Pakistan (although community involvement is not elaborated in this article).

The depth and cover of the sewers as well as the chambers have to meet certain standards. Concrete pipes can be laid to shallow depths (500 mm) under roads carrying only light vehicular traffic. The minimum gradient appears to merit further research. It should function as a sewer and not as a long septic tank, because of the danger that hydrogen sulphide produced in the sewer causes deterioration of the concrete. Shallow sewers do not require large manholes or chambers. Framed covers are expensive. Besides they are easily lifted. This is a disadvantage, because people tend to deposit solid waste in sewers! This problem should be tackled by education and improved waste collection services. Heavier covers without the angle-iron frame tend to break at the corners.

In Lahore on-plot improvements did not parallel the upgrading of the public services. Once construction had started, it was found that most drains had to be rebuilt completely because either the existing drain was in bad condition or it had an inadequate slope. The most important lesson is that there is no short-cut to improved sanitation.

5.10 Technology choice

The technology choice is determined by the *physical* lay-out of the settlements. Besides *environmental* factors -as e.g. water source availability and soil conditions- will influence the technology choice.
Another aspect is the local availability and affordability of *tools and spare parts*. This may in many cases have to take priority over technical quality (Good 1996), to prevent dependence on external agencies. In case of, community management, it is particularly important that the technology *reliable and user-friendly* in installation and operation and maintenance.

Economic, *institutional* and *social* factors are important as well. Is it affordable, who is paying, who is responsible for operation and management and what are possible impacts? In the example of Bangladesh in chapter 3, we saw the local headman who was in control of the waterpoint, misusing his power to his own profit.
In chapter 4, several possible effects of improvements are already mentioned, such as densification. Some impacts are more directly linked to the technology choice. For example, simple technology such as bucket flushes in sanitary provisions might cause extra workload for women who are in charge of water gathering.
Therefore, the use of technology should be scrutinized in terms of access and control and in terms of changes in tasks for different household members.
Cultural traditions and beliefs may influence the acceptance of the facilities, and should therefore be taken into account.

5.11 Conclusions of this chapter

There is no blueprint solution in the provision of water and sanitation services to peri-urban areas. Informal settlements are often located at difficult sites with a limited accessibility. A wide range of technical solutions exists. Rainwater catchment can be a solution or water can for example be trucked in or supplied by pipes or pumps. The supply can be to public standposts, water kiosks or individual households. Sanitary facilities can involve sewerage and public or private latrines. The technical solution should not be considered as a starting point but as the result of a process integrating other social, environmental, cultural, economic and institutional dimensions.
Although household water supply or sewerage are often considered to be inappropriate and unaffordable, in some cases it may be the most viable and sustainable solution. Therefore, tariffs for household connections and unconventional sewerage systems have also been addressed in this chapter.

Chapter 6 Emergency relief and the urban environment

6.1 Introduction

Part of the information in the previous chapters is based on lessons learned from development oriented projects. In this chapter I want to express some thoughts about the role an emergency relief agency -like MSF Holland- can play in urban environments.
It raises questions about the duration and extent of the intervention. Awareness is needed about the aspects influencing the choice whether and how to intervene. Besides, awareness is needed about the possible consequences of interventions.

6.2 Short-term or long-term

One could look at slum improvement in two different ways. A slum improvement project is *short-term*, not necessarily maintainable by (or bureaucratically acceptable to) a local government. It is a targeted package of activities outside the normal channels of service delivery and infrastructure.
Or, a slum improvement project is *development-oriented*. It is supposed to create long-term improvements and the long-term presence of an organization or organizational structure is desirable.
A short term intervention which creates possibilities for upgrading in the future, could bridge these two views.

Experience proves that emergencies are no short-term events, in particular in urban areas. A longer term view is needed. The proposed interventions have to be appropriate, sustainable and capable of future development.
The transition from emergency relief to development is inhibited by the ad-hoc basis of funding and by the pressure on NGOs to take immediate action. Funding should be moved to a longer term footing. (Smout 1996)

6.3 MSF and slum improvements

Normally MSF acts in cases of extreme disruption like war or natural disasters. MSF is very competent in providing emergency relief.
The situation in slums could be comparable to MSFs current field of work, eg if the country is in war and many refugees are driven to the cities. Or when the residents are suffering from an acute emergency, like a cholera epidemic or an earthquake. The decision to intervene, is rapidly made. MSF provides swift action to safe numerous lives. Thinking about the longer term consequences is not a priority. The need for primary health care, safe water and adequate sanitary facilities is urgent.
However, the situation in slums is often not that explosive. The situation in slums always was and will be precarious. MSF starts to doubt about their capacity concerning intervention in the urban area, when there is no 'acute' emergency in this area, when there is no international spotlight. The emphasis in thinking about possible solutions in the urban area, then shifts from alleviating the problems to finding the perfect solution.

Intervening in the urban area raises many questions. Is there a reason for MSF to intervene? Does slum improvement with the attended long-term goals, fit within the prompt and swift way MSF works? Shouldn't this be the kind of project which might be advocated or initiated by MSF, but carried out by an organization that has more experience in the field? On the other hand, the extent of the problems is enormous and development projects are only few, sometimes slow and do not always reach the target group (eg gentrification).

6.4 MSF and the sanitary crisis

National or local governments often are unable to cope with the scale and rate of urbanization and with the consequent demand on infrastructure and services. Many cities will have exhausted their supplies on the turn of the century. Black (1994) refers to this situation as 'the coming sanitary crisis'. Seeing that the existing institutions are inefficient and often unwilling to provide resources and services to the poor, there may be a need for external agencies to intervene.

The context of slum improvements - essentially the coming sanitary crisis and the lack of support to the urban poor who have limited resources at disposal - may call for an emergency preparedness programme. MSF could prepare themselves for this crisis, which is going to happen at a large scale. The organization could invest time in the slum context as a learning experience. These urban programmes call for a development oriented approach or a long term view. Having a longer term view is, in my opinion, not incompatible with interventions by emergency relief organizations.

MSF is not capable of preventing this crisis from happening. Fundamental changes in international and national politics and in funding of 'development' activities are required, which go beyond MSF's control. As long as this has not changed, projects are just plasters on wounds. When intervening one should try to assess the (social) impacts beforehand, to prevent this wound from suppurating (§6.7).

6.5 Assessment

To assess the complexity of the situation MSF uses the Manual Exploratory Missions and Rapid Assessments. The objective is to understand the situation now and forecast future developments and to assess initial needs and hard situation-data.

MSFs exploratory mission is collecting background information and data relevant for MSF. General data: geographic, population, weather, political situation (a.o. ethnic conflicts), economic data; Medical data: facilities, health situation, nutrition; Food security: agriculture, market, food distribution; Water and Sanitation; Housing; Logistics; Security.

According to IHE (1991) a rapid assessment involves assessing: water resources, needs for water supply and sanitation, facilities available, policy climate, institutional resources at national and local level, human resources, legal and regulatory tools and constraints, financial situation with regard to capital and operation and maintenance requirements including the potential for cost recovery.

An assessment will show if intervention is necessary. Yves Chartier (1996) even developed guidelines for the assessment of the urban environment. Therefore, I do not want to reiterate the situational indicators *whether* to intervene. I want to add some considerations concerning intervention by presenting constraints and possibilities *when* intervening.

6.6 Awareness needed

6.6.1 Political

Water supply interventions commonly leave unchallenged or even reinforce the existing unequal power relations. However, with the escalating demand for water and the continuing depletion of water resources, water supply interventions will increasingly challenge powerful interest groups and hence almost inevitably result in conflict. The key policy question to NGO's in the water sector is whether they are ideologically and financially equipped to face this challenge (Barret 1996).
Smout (1996) presents the results of a discussion about NGO work in the urban water sector. Some participants felt that NGOs lacked experience in this sector, but others commented that the urban area was too complex to work in and that they preferred to concentrate on empowering people to demand the services from the local government. Thus in many cases the city NGOs were seen to be far more political as their rural counterparts.

> *The evidence that a lack of resources is not in itself the main problem, since several countries have demonstrated that - if there is sufficient political will - much can be achieved with little financing (World Bank 1989).*

6.6.2 Legal

The legal situation of the squatter settlements has to be recognized as a fact to be dealt with. Not only it influences people's motivation to invest in improvements. It also may provide constraints in getting necessary authorizations or cadastral data. This probably depends on the extent to which national development programmes reflect the intended activities.
The insecurity of permanence of the settlements is a constraint to development-oriented projects. Legalization procedures which are required for the installation of services, are complicated and time-consuming. As mentioned in paragraph 3.4.3, for legalization it is required that water and sanitation are already installed. MSF can supply these facilities as emergency relief. This may open possibilities for development activities. It may help in gaining formal recognition and legal tenure.

6.6.3 Institutional

In her policy document MSF mentions that the main constraints to be reckoned with when dealing with governmental institutions, are of a financial, political and bureaucratic order. MSF has experience in negotiating with governments. I cannot conclude that negotiations about interventions in urban areas are different from MSF's usual practice.

This would requires more insight in current MSF procedures. Besides, situations in different countries will be different and generalizing impossible.
New to MSF is that they may have to cooperate with public works. Improvements may involve the existing networks or the possibilities for upgrading the facilities in slums in the future have to be considered. Experience will learn how successful these contacts can be. MSF may be more effective than community organizations in contacting public works.
Another actor in the field of water supply and sanitation is the private sector as local contractors or companies. This sector may be hired to carry out part of the project. They may have special skills or be more efficient or cheaper.
Since it is my opinion that cost recovery is an important issue, credit institutions may be involved in the project or MSF could set up structures to collect payments and control expenditure.
Community organizations or local NGOs may be the organizations to hand over the project to. Local NGOs have local knowledge. Sometimes they just need modest support from MSF. This may help them to get back on their feet. I think that community organization as a partner in slum upgrading is new to MSF.
MSF mentions as possible partners UN agencies who frequently act as coordinating bodies between the different international relief agencies.
When intervening in the urban area, the roles and responsibilities of the different actors should be spelled out and clear.

6.6.4 Management

Sustainability is a key-concept in providing services. Not only the physical aspects of providing services to the marginal settlements determine the sustainability, organizational and managerial aspects are important as well.
If the long term solution is in the hands of the community, the expatriate's task is to develop the community's skills and build their capacity (Dawson 1990). A social, political, cultural and economic analysis is essential. The work must arise from the needs and aspirations of the community. The expatriate motivated by the desire to do, should be *doing* less and *facilitating* others to do more.
It involves investigating or initiating local institutions which can manage the facilities. The use of local knowledge and skills is part of it. Training is probably needed. The external agency should be able to transfer skills in an efficient manner, which requires cultural understanding.

According to Smout (1996), the setting of goals and objectives in project design requires careful thought and consideration. In some circumstances it might be better to allow for flexibility the first six months, so that a more detailed understanding of the area and the needs can be gained. The interdynamics of the social, political, economical and cultural context have to be taken into account. Representatives and informants have to be selected and interviewed.

MSF may want to be a facilitator, but has to recognize that the organisation is a 'do'-er at the moment. The question may arise whether setting up community structures take too much time. However, when gaining experience in the urban environment, projects could become more like a routine, like interventions in refugeecamps, and take less time. Long-term projects does not by definition mean long-term MSF presence, but long-term community involvement or management.

6.6.5 Economic

Considering the fact that the poor hardly get financial support to improve their living conditions, donor funding can play an important role. Donors may finance or provide materials and technologies, which would otherwise be unaffordable to the poor.
Emergency relief organisations are dependent on donor fundings. Donors show a short term interest in providing money to relief projects. Therefore, emergency relief organizations cannot afford to subsidise the life-long existence of the facilities. Besides, many cities are experiencing the sanitary crisis. Donor funding is a drop in the ocean of money needed.
This conclusion might plead for (partial) cost-recovery. For example, the intervening agency pays for the installation of the services and the community pays for the operation and maintenance. In other words, the beneficiaries pay for the water they receive. This reduces their dependence on the involvement of external agencies. As mentioned in paragraph 4.9.3 there are a few ways to spread the costs of improvements. In short, when intervening this issue of financing has to be considered. It may involve setting up local structures to collect revenues and control expenditure. This is new to MSF.
It merits further research to gather information about the actual costs of the different solutions to slum problems.

Friedlander (1990) explains that funding from Unicef can meet the needs of but a fraction of the population. It has become clear that for these efforts to continue, a cost-recovery system is necessary. It should go beyond securing operation and maintenance and aim at a full or partial recovery of the initial costs.

6.6.6 Physical and technical

This paper has emphasized the importance of sustainable solutions. However, what is the relevance of the sustainability of services on sites of which the permanence is threatened continuously?
Site and technology
Topography, soil condition, water source, and access, determine the technology choice and feasibility of the improvement. MSF is used to work with complicated site lay-outs. As in refugeecamps, many people in squatter settlements live close together, hardly leaving space available for facilities. Besides, the urban poor often live on difficult terrains such as flood plains, steep slopes or garbage dumps. The problems these particular sites raise may be new to MSF. However, the types of unconventional technologies suggested in chapter 5 and MSF expertise seem to coincide. Technology should be low-cost and easy to apply. MSF is not the type of organization to use conventional high-standard technology. Some technical "do's and don'ts" are mentioned in the Box below. A new issue to MSF might be to adjust technology choice, so it can be upgraded in the future.
Materials
MSF prefers good quality and long lasting materials. Usually part of their supply comes from abroad, which may lead to delays. In case of handover, it is important that spare parts are locally available. This reduces the dependence of the local agents on the external agency.

***Technical 'Do's and don'ts'** (TSG 1996)*

Water source:

Rain water catchments, surface extraction, spring tapping and shallow well constructions are all acceptable. Mechanically drilled boreholes only after TSG consent.

Water piping:

Layout of gravity flow piped schemes with a maximum distance of up to one kilometre and minor repair/rehabilitation of piped schemes are acceptable. Other systems require TSG input and consent.

Water trucking:

Small trucking operations which are limited to the supply of water to MSF-H facilities are acceptable. Vaste operations need management approval.

Water treatment:

That is storage, sedimentation, flocculation/coagulation, filtration and chlorination. Other processes and rehabilitation require TSG input.

Excreta disposal:

All low-cost options are conceivable. Water borne sewers are mostly excluded.

Solid waste:

Small scale collection systems with basic disposal and elimination facilities are acceptable. Large incinerators or mechanical systems are excluded.

6.7 Impacts

In emergency situations the priority is to provide relief. The aim is to provide solutions at a very short notice. Thinking about long-term consequences for the community structure is not at issue. However, in the slum context, which has a more permanent character, solutions scrutinized on long-term impacts, are required. In chapter 4 possible impacts are mentioned.

It is important to be aware of the fact that the needs, priorities and potentials of the community are crucial to the sustainability of the intervention. It is important to recognise that the community is not a homogeneous group and that power issues are at stake. Not thinking about how to involve all population groups, implies exclusion of some of them. It would be a denial of power relations.

There is a need for information exchange about the possible impacts of slum improvement. Successes and failures should be documented. It is a task for the external agency to inform the different parties involved about the possible effects.

According to Smout (1996), a tendency exists to reinvent the wheel with each new emergency. Evaluation should provide a base for constructive preparatory work, predominantly through the development of relevant training programmes. There are significant complications in addressing water and sanitation problems in new unfamiliar complex emergencies, as for example in the urban areas. Dealing with these factors will raise new contradictions and possibly conflicts of interest. Smout therefore says that a forum for the exchange of information would be of use. Black (1994) also recommends the establishment of an international body to monitor international investments and review Country Plans. This body also would help to build an international knowledge base about 'best practice' -technological, financial and managerial- consistent with the new policy directions. A database as suggested by these authors can be very useful for MSF. Regarding the high turn-over of staff within MSF, MSF could consider to create a database of successful and failing interventions.

6.8 Conclusive remarks

The slum environment causing mental and physical distress, the hazardous site concerning epidemics, malnutrition, it is all in accordance with the MSF logic of intervention, as well as the exclusion of certain population groups (the urban poor) considering basic services.
In this paper I addressed many issues to consider when intervening. The decision whether to intervene in a particular slum is up to MSF. The environmental and political, social and economic situation in slums differ from country to country, even within cities. These conditions should be specified. Therefore this question may not be answered by a general 'yes' or a general 'no'.
All the ingredients for a sanitary crisis exist, eg inadequate water supply and sanitation, housing, high population density. MSF has to foresee that a crisis is to come. MSF could already start a few urban programmes as a learning experience. They can compare these projects for the possible impacts. Then MSF can draw the conclusion if they are capable to do this kind of projects.
I want to conclude this report by posing the following questions to MSF. Is MSF capable of dealing with the aspects of the urban environments which are described? Does it fit within her ideology? Does MSF have the manpower, the materials, the logistical capacity, the financial resources? Is MSF willing and able to perform as technical and social organizer, as manager, to play her role in the political field? This means a.o. the capacity to deal with all other actors involved.

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