



COMMUNITY-BASED SOLID WASTE MANAGEMENT AND WATER SUPPLY PROJECTS:

***PROBLEMS AND SOLUTIONS COMPARED
A survey of the literature***

**URBAN WASTE EXPERTISE PROGRAMME
Community Participation in Waste Management**

UWEP Working Document 2

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ABBREVIATIONS

AF	abbreviation of a solid waste management project in Africa
AMCAV	Association pour l'Amélioration et l'Aménagement de la Commune de Port Bouet (association for the improvement and arrangement of the municipality of Port Bouet, Ivory Coast)
AS	abbreviation of a solid waste management project in Asia
CACRETEM	Campaña de Amas de Casa para regenerar las Tierras Erosionadas de México (housewives' campaign to regenerate the eroded lands of Mexico)
CBO	community-based organization
CHF	Cooperative Housing Foundation
COFESFA	Coopérative des Femmes pour l'Education, la Santé Familiale et l'Assainissement (women's cooperative for education, family health and sanitation, Bamako, Mali)
COPRICOL	community-based primary collection
ESMLL	Empresa del Servicio de Municipalidad de Limpieza de Lima (municipal cleaning department of Lima, Peru)
GIE	groupe d'intérêt économique (cooperative enterprise, Bamako, Mali)
GRASP	Garbage Recycling and Separation Project (Pune, India)
GTZ	Gesellschaft für Technische Zusammenarbeit (German agency for technical cooperation)
HIC	Habitat International Coalition
KAWWS	Karachi Administration Women Welfare Society (Pakistan)
LA	abbreviation of a solid waste management project in Latin America
LIFE	Local Initiative Facility for Urban Environment
LKMD	Lembaga Keamanan Masyarakat Desa (social neighbourhood organization, Indonesia)
MEIP	Metropolitan Environmental Improvement Program (World Bank)
MUPROBA	Mujeres para el Progreso de Bayovar (women for the progress of Bayovar, Peru)
MYSA	Mathare Youth Sports Association (Kenya)
NGO	non-governmental organization
RT	Rukun Tetangga (administrative unit of ca. 30 households, Indonesia)
RW	Rukun Warga (administrative unit of ca. 150 households, or 5 RTs, Indonesia)
SIRDO	Sistema Integral de Reciclamiento de Desechos Orgánicos (integrated system for waste recycling, Mexico)
UWEP	Urban Waste Expertise Programme
WE	Women in Environment (Kathmandu, Nepal)
WEPCO	Women Environment Preservation Committee (Kathmandu, Nepal)
WHO	World Health Organization

SUMMARY

This literature review of community-based solid waste and water supply projects has been conducted on behalf of WASTE, Gouda, as part of their Urban Waste Expertise Programme. It is a preparatory study in the field of community participation in waste management.

Maintenance of established infrastructure and services is a major problem in developing countries nowadays. In the water supply sector, community participation and management have been identified as possible solutions to maintenance problems. A solid waste management system is in fact a continuous maintenance system, which always requires community participation.

The **objective** of this study has been to analyze experiences from community-based solid waste management projects and to link them up with experiences from community-based water supply projects. The focus is on social and management problems of both kinds of projects and ways to solve these. The main hypothesis has been that community participation and community management experiences from the water sector are relevant for the solid waste sector. Water supply projects provide an interesting comparison, because these have a longer history of operation, management and maintenance of systems by communities.

Community participation can comprise varying degrees of involvement of the local community. This can range from the contribution of cash and labour to consultation, adaptation of behaviour, involvement in administration, management and decision-making. With **community management** often the highest level of community participation is meant, i.e. involvement in decision-making. In this study community management is defined as a situation in which a community takes the responsibility for, obtains authority over and carries out control on operation, management and maintenance of a service benefitting its members. This does not mean that a community is responsible for every aspect of a service. Partnerships with governmental agencies and NGOs are possible.

Working method

For this study an inventory of community-based solid waste management projects was made. Based on this inventory, an overview of the social and management problems of this kind of solid waste management projects was made, including solutions for these problems. This overview of social and management problems was then used as a guideline for the literature on water supply projects. Solutions for the identified social and management problems were sought. Finally, these solutions were analyzed on their applicability to community-based solid waste management projects.

Chapter 1 explores the different roles of community members and local leaders in community-based solid waste services. Community members appear to be active in showing proper sanitary behaviour, in contributions in cash, kind or labour, in participation in consultation, and in administration and management. Local leaders -traditional leaders, formal governmental institutions and informal organizations- were either active in the management of the service or in contacts with the municipality or the community. Women and youths often perform special roles in community-based solid waste services. Women are involved as initiators, managers, operators, political activists, educators, and watchdogs of the community. Youths are mainly active as operators of solid waste services.

Chapter 2 covers varying organizational structures of community-based solid waste services. Different agents can work together, performing different tasks. Micro-enterprises, community-based organizations, governmental institutions and NGOs can be involved in areas like operation, supervision of operation, fee payment, education, recruitment and training. Crucial with regard to community management is the role of community members in supervision of the service.

Chapter 3 divides the social and management problems encountered by community-based solid waste management in five categories: low participation of households, management problems, social problems influencing operation, financial problems and failing cooperation with municipalities.

Low participation of households comprises issues such as low community priority for solid waste management, low willingness to participate in collection systems and in keeping public spaces clean, and low willingness to pay. Education, which is often considered the major solution to these problems, appears to be inadequate and inappropriate. More satisfying solutions are preliminary research and proper consultation of the community on the desired service, appropriate incentives for households and servants, and caretaking systems for streets and other public places.

Management problems relate to low willingness to manage, a lack of accountability to the community, and unrepresentative management. Solutions tried were procedures for performance control, sharing management with an NGO, adjust or by-pass an existing management committee, and incentives for managers such as training and exchange visits.

Operational problems with a social background focus on low motivation of operators, linked to low salaries, low status and bad working conditions, unreliability of the service, competition from private entrepreneurs and space problems. Solutions for motivational problems include involvement of operators in decision-making, the use of special group incentives, and exemption from municipal taxes. Official introduction of operators to households and provision of identity cards had to change the low status. To make a service more reliable, different payment or waste collection arrangements were tried. Private entrepreneurs were either integrated in the system, or support of households or municipalities was sought to fight against their opposition to the community-based service. Space problems were solved by consultation of local leaders, lobbying municipalities and media campaigns in the neighbourhood.

Major financial problems referred to several kinds of cost recovery problems, among others caused by inadequate fee collection and low ability to pay of households in low-income neighbourhoods. Solutions tried regarding fee collection were changes in the way of payment, incentives and sanctions for non-payment. Cost recovery problems were solved, depending on the nature of the problem, by offering additional services, tighter financial control, and by the use of socio-economic feasibility studies. Cross-subsidies were seen as an appropriate solution to ability-to-pay problems.

Problems with the cooperation with municipalities concern bad coordination of primary and secondary collection and a general lack of assistance from the municipality. These problems were solved by extending the service to include secondary collection, mobilising the community to lobby the municipality for assistance, involving the local authorities in a project from the beginning, and by structuring formal and informal cooperation.

Concluding, the most important social and management problems of community-based solid waste management appear to be motivational issues, concerning appropriate incentives for households, servants, operators and managers, and cooperation with the municipality, regarding operational coordination, solid waste management policy and communication. Managerial problems related to financial issues are important too, because they also endanger the long-term sustainability and reliability of the service.

Chapter 4 compares **community-based water supply projects and solid waste management projects**. The forms of community participation in both kinds of projects were found to be rather similar. Usually community-based water supply projects also work with a management committee composed of community members. Differences between water supply and solid waste management projects which constrain the applicability of solutions from the water sector, were also found: a solid waste service is a continuous maintenance system, while water supply projects include a construction phase; water supply is usually a greater felt need in low-income neighbourhoods than solid waste and it yields more tangible benefits; solid waste is a socially and culturally more complex issue than water supply. Due to these differences some problems experienced in the solid waste sector were not encountered in the water sector, such as the negative attitude of servants and watchmen, the low status of operators, and the low priority of the issue for municipalities and communities.

Chapter 5 lists the **solutions found in the water literature** for the problems encountered in the solid waste documentation. To create a community priority and to motivate households to participate, multi-purpose projects, serving different goals of a project and different interests in a community, are common in the water sector. Also demonstrations of new technologies or systems are used. Another option is the provision of physical improvements and tangible rewards. Low willingness to pay is solved through sanctions for non-payment, modification of basis, place or time of payment, the provision of incentives for prompt payment and by adapting systems to the needs and wishes of communities. Uncontrolled behaviour and the lack of responsibility for public spaces is counteracted with rules, regulations and sanctions for bad behaviour, education, caretaking arrangements, and lower scale user groups, increasing social control. Some major lessons from the water sector concern the ways and content of education. In comparison with conventional development projects, community-based projects need more funds for education, promotion and training. The content of

education should relate to benefits perceived and problems experienced by the target group. Communication channels should preferably be gender-specific.

Leadership of water supply projects often shifts to those most interested, usually informal leaders in a community. A lack of accountability to the community is solved by means of control of operators and managers such as record keeping, reports, and meetings. Training is an important aspect of improving accountability. A management committee not representing women can be adjusted, using guidelines for committees, procedures to involve women in decision-making and training, and functional representation of community-based organizations in the committee. This last solution holds also true for the representation of different ethnic groups. Another possibility is proportional representation of ethnic groups. Managers of water supply projects usually receive incentives such as training, recognition from the municipality, and sometimes an attendance allowance for meetings or another small material reward.

Operators of water supply projects who are not motivated enough, are provided with different incentives to give them a clear identity, more status, economic benefits or more political leverage. To improve reliability of a service, some ways of performance control carried out by community members in water supply projects were: selection of operators, assessment of trainees, election of members of management committees, and feedback systems. The problem of inadequate fee collection was solved in water supply projects through training of bookkeepers and providing them with the right materials, by assisting the management committee to make a fee collection plan, and by keeping the community involved through meetings to ratify fees, to encourage fee payment. Gender-sensitive ways of payment and cross-subsidies were additional measures. Cost recovery was improved by applying different fund raising methods, by sharing capital costs and by involving the community in design and planning. Financing systems used in the water sector appeared to be partially applicable to the solid waste sector. Communal funds and inclusion of fees in local taxes were considered not very appropriate. But vending arrangements such as concessions, licenses, pay-and-use systems, and user charges seemed to include new possibilities for solid waste management projects. In water supply projects, low ability to pay is solved combining community services with income generating projects and through cross-subsidies.

Bad coordination of primary and secondary collection is also encountered in maintenance systems of many water supply projects. Solutions mentioned are a proper communication system, a service-oriented attitude of the governmental agency and an enabling management structure of this agency. Communication is improved through joint management committees of formal institutions, informal leaders and community members, or by the agency employing special communication workers.

A service-oriented attitude calls for sharing of information and knowledge by the agency and other partners involved. An appropriate management structure refers to adaptation and training of agency personnel, to the creation of separate socio-economic units within the agency, and to cooperation with socially oriented NGOs or governmental agencies specialised in community work. Lack of general assistance from municipalities was solved, among others, through forming voting blocks on the basis of water user groups. At agency level, an appropriate policy and legislative framework can back up community-based initiatives. Also

external support services, concentrating on technical, financial and/or research tasks can be performed by the governmental agency, but also by NGOs or the private sector.

The majority of social and management problems found in community-based solid waste management projects resemble more or less the problems experienced in community-based water supply projects. But not all solutions from the water sector are applicable to the solid waste sector. The organizational set-up of governmental agencies involved in the solid waste sector and water sector, for example, is quite different. Major lessons from the water sector concern incentive systems, the involvement of women, financial management, performance control and preparatory research.

Finally, **gaps in the documentation** on community-based solid waste management projects were identified. There appears to be a general lack of detailed descriptions of really community-based solid waste activities. Problems faced by community-based solid waste management projects, solutions to these problems and, in particular, effects of these solutions are often not described at all or only dealt with superficially.

Future research could thus focus on comparative exploratory studies of community-based solid waste management in low-income neighbourhoods in different cultural settings and physical conditions. Research topics that have hardly been studied to date, refer to initiatives for and continuity of the activity, ways to motivate the various persons involved, appropriate education, good financial management, the involvement of women, and cooperation mechanisms between formal, governmental agencies, the informal solid waste sector and different community groups.

CHAPTER 1 INTRODUCTION

This survey of the literature on community-based solid waste and water supply projects has been conducted on behalf of WASTE, Gouda. This study has been induced by some statements in the solid waste literature suggesting that experiences with community participation and community management from other service sectors, notably water supply and sanitation, would be relevant for solid waste management. Furthermore, WASTE was interested in the practical implications of community participation and community management with regard to solid waste management, as part of its **Urban Waste Expertise Programme** (UWEP). This literature search is a preparatory study under the umbrella of one of the UWEP activities: "community participation in waste management". The aim of this UWEP project is to avail experience and to develop instruments to enhance community participation in waste management, both solid and liquid, in low-income neighbourhoods. Further field documentation will be carried out in South Asia and West Africa.

The Urban Waste Expertise Programme has five core-issues, of which two are relevant for this study:

- Inadequate waste services for low-income communities
- Inequalities in the provision of waste services and employment

The first issue, inadequate waste services for low-income communities, involves collection and recycling of both solid and liquid waste. The focus of this study is on solid waste. Liquid or human waste is left out for several reasons, among others because the literature about liquid waste (often called 'sanitation') and community participation is limited. Furthermore, most of this literature is published together with literature on community participation in water supply projects.

This study concentrates on solid waste management in low-income neighbourhoods of cities in the South. These communities suffer most from inadequate solid waste services, as a result of physical conditions hampering access of conventional refuse collection vehicles, such as narrow lanes and unpaved roads, a lack of political power of low-income communities, caused by the unauthorized and unplanned character of their neighbourhoods, and lack of technical and financial means of local governments to serve low-income neighbourhoods. Some communities have managed to overcome these difficulties, be it temporarily, and have arranged for their own solid waste collection system, with or without assistance from the government.

How have they achieved this?

What are the problems they encounter?

Which solutions have they tried?

These are all important questions in this survey of the literature, but the focus is on social and management problems.

The second issue concerns the position of socio-cultural minority groups and the position of women. Socio-cultural minority groups are often involved in the operation of informal waste collection and recycling, which marks their isolated position and reinforces their low social status. Low-income areas are often the home base of these groups. Sorting and recycling

activities take place here. This often contributes to bad environmental conditions. Women perform particular roles in solid waste management, at home but also in a community. What is the role of socio-cultural minority groups and of women in community-based operation and management of solid waste management? Do they encounter specific problems in community management of solid waste management? Are they involved in decision-making through representation in management committees or in any other way?

The **objective** of this study is to analyze experiences from community-based solid waste management projects and to link them up with experiences from community-based water supply projects. The focus is on social and management problems of both kinds of projects and their specific ways of solving these problems. The main hypothesis is that community management experiences from the water sector are relevant for the solid waste sector.

1.1 History

The maintenance of established infrastructure and services has evolved as a major problem of development projects in the 1980s and 1990s. In the words of a major solid waste expert, Christine Furedy: "In general, self-help efforts have been more successful in producing a specific object, such as a school, a latrine system or a solid waste transfer depot, than in maintaining services in a routine way" (Furedy, 1989). A solid waste management system is in fact a continuous maintenance system. To keep the service running, continuous participation of the community receiving the service, is required, for example, to store the garbage in a specific bag or bin, to bring it to an agreed point, to separate it in dry and wet waste etc. This means that community participation is a rather crucial aspect of solid waste management, maybe even more important than in any other urban service. Only recently has the management of solid waste services by communities themselves received attention.

Water supply systems have a longer history of operation and management by communities. In the 1970s, community participation included only the contribution of labour in the construction of water supply systems, but in the 1980s and 1990s the role of communities has in many cases been enlarged to participation in administration, financial management, decision-making and planning. This development had been the result of changing approaches in development assistance, but also of practical circumstances such as the inability to maintain all installed water supply systems by the state or by international donors.

1.2 Definitions

Some terms used frequently in this study will be defined here to avoid confusion.

Solid waste: discarded non-liquid materials from households, industrial and commercial establishments, institutions, and streets, that do not have value any more in the eyes of the first generator or user.

A neighbourhood: a geographical and/or administrative entity, in which a community lives.

A community: a group of users of a service who live in the same area and have access to, and use, the same service. This is a practical definition of community, as it is applied in some water supply projects, which avoids getting caught up in the social and cultural meanings of the concept of community. Nevertheless, the writer of this study certainly recognises that it is

easier to stimulate the participation of people, when they share cultural and religious ideas, have similar socio-economic interests and have some form of organization, i.e. when there is some sense of 'community' among them.

Community participation may comprise varying degrees of involvement of the local community. It may range from the contribution of cash and labour to consultation, changes in behaviour, involvement in administration, management and decision-making.

With community management often the highest level of community participation is meant, i.e. involvement in decision-making. In this study a definition of community management coming from the water sector is used. It is defined as a situation, in which a community takes the responsibility for, gets authority over and carries out control on operation, management and maintenance of a service benefitting its members. Community management is often carried out by a smaller group within a community. It may be a newly established committee or association, or an existing community-based organization. This management committee is responsible for the financial situation and performance of the service. Ideally it defends the interests of different groups in a community. Its authority depends on its leadership qualities, its legitimacy in the eyes of the community and of outsiders, and on its legal status. Control means that the management committee takes decisions on what to do and how to do it, regarding objectives, daily work flow, personnel, and finance. Community management does not imply that all community members are responsible for all aspects of a service, nor that all work is done voluntarily, without any payment. On the contrary, partnerships with governmental agencies are necessary, since the latter is responsible for the overall solid waste management system in a city and has the means to provide at least legal, but often also operational and financial back-up to community-managed services. Micro-enterprises dealing with the collection and recycling of waste materials may also form part of a community solid waste system. But real community management means that community members, or their representatives, decide on what to do and how to do it.

Community-based projects refer to projects whose operation is limited to a particular neighbourhood.

Community-based solid waste management projects are activities carried out by members of communities to clean up their neighbourhood and/or to earn an income from solid waste. Examples are the collection of solid waste, the sale of recyclables, recycling and (vermi-)composting activities. The majority of the projects studied were community-based primary collection (COPRICOL) projects. These projects are concerned with the collection and transport of solid waste from the neighbourhood to a dumping site outside it. Secondary collection, i.e. transport of the waste to the final disposal site and operation of this site, is usually carried out by the municipality.

The types of water supply projects that were studied included hand pump and borehole systems, piped systems, improved indigenous sources, rainwater catchment tanks, etc.

Community-based water supply projects have in common a maintenance system that is operated and managed by community members.

Finally, it is necessary to answer the question why community management is desirable at all. Many reasons can be given. The first is ideological in that men and women take decisions regarding their own life, and most directly regarding issues that affect their daily life. The second, more practical reason is that the service will be more efficient and effective if it is in line with the local needs and conditions, and with the priorities and capacities of the men and

women concerned. Thirdly, the solid waste services will cover a larger population, if community, private as well as public resources are mobilised.

1.3 Working method

The literature on which this survey is based, comes from the libraries of WASTE, in Gouda, the International Water and Sanitation Centre (IRC), in The Hague, and the Institute for Housing and Urban Development Studies (IHS) in Rotterdam.

The study was carried out in the following way: first project documentation and descriptions of solid waste management and community participation were studied, then specific literature on water supply projects and community participation was explored. From the solid waste literature, an inventory of 55 community-based projects was deduced. These projects were mainly located in low-income neighbourhoods and were situated in Latin America, Africa and Asia. The Appendix gives the inventory of solid waste management projects containing a systematic listing of the main characteristics of these projects as derived from several sources. These sources are all listed under References, Section 1: Solid waste management.

Based on this inventory, an overview of the social and management problems of community-based solid waste management projects was made, which were divided into five categories. Also solutions for these problems found in the solid waste literature, were examined. Then this overview of social and management problems was used to guide the search in the water literature. Literature about community-based water supply projects, urban as well as rural, was studied, including the latter because there is more experience with community participation in rural than in urban water supply projects and experiences were often found to be combined in one report. Of course some rural experiences will not have relevance in the urban context; if this relevance is doubtful, it will be indicated in the text.

Finally, ways to solve social and management problems of community-based water supply projects were analyzed on their applicability to community-based solid waste management projects. In the scope of this study, it was not thought necessary to add a separate appendix with community-based water supply projects. In the reports studied for this study, many experiences from community-based water supply projects had already been combined. Furthermore, the emphasis in the water literature was more on solutions for specific social and management problems than on all aspects and conditions of community participation, as was the case with the solid waste literature.

1.4 Structure of the report

Chapter 1 examines the role of community members and of local leaders in community-based solid waste management, showing a variety of contributions. Extra attention is given to the role of women and youths. Chapter 2 gives some examples of organizational structures of community-based solid waste management, and the various partnerships and divisions of responsibilities that are possible. Chapter 3 covers the social and management problems of community-based solid waste management projects, which are subdivided into five categories. Three of these categories are directly related to project implementation:

management, operation and finance. The other two focus on the relations with agencies touched by the project: households and municipalities.

The emphasis of this study is on the comparison of community-based solid waste and water supply projects. Chapter 4 elaborates on this comparison. Next to that differences and similarities between the two types of projects are explored to give more insight into constraints of the applicability of solutions.

The Conclusions comprise a summary of the main findings. Also gaps in the existing documentation will be indicated. This will lead to the identification of needs for future research.

CHAPTER 2 THE ROLE OF COMMUNITY MEMBERS AND LOCAL LEADERS IN COMMUNITY-BASED SOLID WASTE MANAGEMENT

2.1 The role of community members: from behaving well to decision-making

Community members and local leaders in urban communities play different roles in solid waste management. These roles correspond to different levels of community participation as derived from the water literature and adjusted for solid waste management. Community members can participate in solid waste management by showing proper sanitation behaviour, by contributions in cash, kind or labour, by participation in consultation and by participation in administration and management of solid waste services.

Proper sanitation behaviour is behaviour that facilitates solid waste management systems. It may include:

- * Adapt daily habits to agreed solid waste system (rules, schedules, e.g. to offer it at the right time and place to the collection team)
- * Bring garbage to communal collection point for transfer
- * Store garbage in a plastic bag, a special bin etc.
- * Cooperate in clean-up campaigns
- * Keep house and immediate environment clean (drains, streets in front of the house)
- * Separate waste in organic and non-organic, wet and dry, keep plastic, paper etc. apart
- * Compost the organic fraction in own backyard

Some projects try to influence and change the sanitation behaviour of households via education, awareness campaigns, etc. The effectiveness of these campaigns depends on the influence of the persons who carry out education and on the degree of social control within a neighbourhood.

Contributions in cash, kind or labour are more direct contributions to the operation of solid waste management projects. They usually involve:

- * Regular fee payment for collection
- * Donate or lend equipment to the collection team
- * Contribute in labour with collection (voluntary or paid)

Money is needed to cover capital costs (to buy or rent equipment) and to cover daily expenses through collection fees. These fees sometimes cover both primary and secondary collection, but mostly community-based solid waste management projects are only involved in fees for primary collection. The ways of payment differ. Contributions in kind are less common; they include the grant of local materials and equipment by neighbourhood residents. Labour inputs, on the contrary, are more current: voluntary contributions like helping with construction and arrangement of disposal sites, or with loading garbage in municipal vehicles. But salaried employment in the operation of a collection scheme, in a sorting and recycling centre or at a composting plant, is more common.

Participation in consultation may take place during a needs assessment study or some other form of preliminary research, such as home visits and meetings organized by CBOs to talk about the needs and problems regarding solid waste management. It may include:

- * Answer preparatory research questions
- * Attend meetings
- * Elect leaders, representatives who manage waste collection
- * Elect members of micro-enterprises
- * Give feedback about collection system/waste services to operating team or management

Consultation may concern only the representatives of the community, or all sections of the community. This last option also includes minorities and disadvantaged groups such as youths, women, etc. The way of consultation determines the outcome, that is whose needs are assessed, who will be the beneficiaries, etc. In solid waste management projects that require changes in behaviour, such as cleaning, separation at source, recycling, and composting, preliminary studies are especially useful.

Participation in administration and management is the highest level of community participation in solid waste management. To this end, community members may:

- * Take part in committees
- * Become member of a CBO involved in waste collection, environmental education, etc.
- * Participate in decision-making during meetings

Real community management, involving all three aspects of responsibility, authority and control, as mentioned in the Introduction, is not very common in solid waste management. Using one criterium, control by a neighbourhood committee, one can conclude that one third to half of the solid waste management projects studied are managed by the community. Only a small segment of the community is really active in the management of a garbage collection scheme, a recycling centre or a composting plant. Their tasks will be described in the next paragraph.

2.2 The role of local leaders: intermediaries between communities and municipalities

Local leaders can be divided into traditional, formal and informal leaders. Traditional leaders derive their authority from hereditary rights and from their status in the local culture. Formal leaders are appointed by the government or elected as local representatives of the government. Informal leaders are influential members of a community on the basis of their personal status or of their activities in community-based organizations such as political parties, churches, youth and women's organizations, neighbourhood committees, etc. All three types of local leaders may have different roles in solid waste management. Usually formal and informal leaders are more involved in solid waste management than traditional leaders. Involvement in management of solid waste services includes participation in the management of solid waste services and keeping in contact both with the municipality and the community.

Management of solid waste services can be carried out by existing community-based organizations or by new committees particularly established for this purpose. Members of

CBOs may also participate in the management committee of a solid waste service. The tasks of this management committee can be defined as follows:

- * Performance control of services
- * Administration of activities
- * Engage personnel for operation
- * Manage fee collection
- * Keep treasury
- * Decision-making on operation

The management committee has the responsibility for the administration of activities, monitoring the work flow, managing manpower and means, and matching the objectives with the means. It has decision-making power and controls the operation of the service. The community member or members who were responsible for taking the initiative, are often involved in management. But an NGO or governmental agency starting a solid waste management project, may also ask community members to be engaged in the management committee. A local leader such as the president of a community-based organization, can also exercise supervision on a higher level, controlling the management committee.

Keeping in contact with the municipality may take different forms:

- * Communicate about the coordination of primary and secondary collection systems
- * Exercise political pressure on the municipality
- * Forward complaints about performance service

A community-based organization may contact the responsible municipal agency to integrate primary and secondary collection. When no service is delivered to the area, or when certain equipment is needed, it can exercise political pressure on the municipality, the mayor, etc. Complaints on the secondary collection from households can be forwarded jointly by them to the municipality, or to the management committee when the complaints concern the primary collection system.

Regarding **contacts with the community**, local leaders may:

- * Carry out education and awareness raising
- * Control of behaviour households (watchdog function)
- * Mobilise the community

A community-based organization may design and implement education campaigns, even if it is not directly involved in waste collection or treatment. Thus it can support collection services and change the behaviour of households. It may also have a watchdog function, to control that the behaviour of households conforms to the agreed rules and schedules. Traditional leaders are often involved in the mobilisation of the community for clean-up campaigns.

2.3 Women and youths: special roles in community-based solid waste management

2.3.1 Women

Women's cooperation is essential for the long-term success of any project concerning urban services. In many cultures, women are responsible for keeping the home and its immediate environment clean. So disposal of waste is one of their daily tasks. Furthermore, women are

the first and foremost users of urban services such as water supply, sanitation, waste collection. This role of women makes them ideal beneficiaries of solid waste management projects. They usually give improvement of services a higher priority than men. But their voice is seldom heard and their participation in community decision-making is minimal. But women may not only be interested in solid waste management projects as a provision of a service. Also its employment and income generating aspects may interest them. What experiences appear in the literature on community-based solid waste management projects? What is the role of women there? What are their specific problems?

Not all community-based solid waste management projects included in this survey, mention the involvement of women. However, 16 out of the 53 studied projects do. In these projects women play an essential part. Women's participation can take the following forms:

1. Women are often the initiators of a solid waste management project or of general improvement in solid waste management. Examples are famous women's associations such as the Women's Balikatan Movement in the Philippines, AS 19 and KAWWS in Pakistan, AS 17. In India the Women's Department of a university has developed a recycling project for women waste pickers (GRASP, AS 3).
2. They carry out education campaigns on sanitation behaviour, preventive health, environmental problems, etc. Examples are the Ivory Coast case (AF 6), Nepal (AS 16), MUPROBA in Peru (LA 15). Sometimes operation of a waste collection scheme is combined with education as is the case in Mali (COFESFA, AF 10), Mexico, (LA 14), Nepal (WEPCO, AS 15).
3. They are sometimes involved in the management of the system. In Indonesia (AS 13) the system is run by the wife of the local administrative leader. In Mexico 90 % of women in the community are active in the SIRDO recycling systems. Most are run cooperatively by them (LA 13).
4. They operate and manage a solid waste service as members of a micro-enterprise. Micro-enterprises for waste collection, street sweeping, etc. are often dominated by women. This is known from Latin American countries such as Bolivia (LA 3), Costa Rica (LA 9), Peru and Colombia. COFESFA (Mali, AF 10) can be regarded as a women micro-enterprise too. In Ivory Coast (AF 8) young women are employed as collectors too, called 'amazones'.
5. They exercise political pressure on local governments. MUPROBA (Peru, LA 15) is a case in point, an organization that took action for the implementation of certain services in their neighbourhood. The Women's Balikatan Movement (the Philippines, AS 19) and KAWWS (Pakistan, AS 17) are also active in this field.
6. They act as watchdogs of the community. Examples are WEPCO (Nepal, AS 15) and KAWWS (Pakistan, AS 17) who control that households keep to agreed rules of behaviour.

Reported problems encountered by women in community-based solid waste services concentrate on under representation in management committees and work in operation that is

physically heavy. In the Ivory Coast projects (AF 6, 7 and 8) it was a problem that fees are monthly and too high to be paid by women alone. Husbands do not always want to contribute.

2.3.2 *Youths*

In some cases, young people play a special part in solid waste management too. Children often help their mother with her daily tasks such as bringing waste to the communal collection point. Unemployed adolescents discover the income-generating potential of solid waste services. In seven out of 53 projects special roles of youths in solid waste management are mentioned. In Mali (AF 11) groups of unemployed young graduates operate micro-enterprises, called 'groupes d'intérêt économique'. In Indonesia (AS 8 and 9), a youth organization operates a waste collection scheme and is responsible for fee collection. In Ivory Coast (AF 8), youth groups are involved in management and environmental education. A special case is Curitiba, Brazil (LA 7), where a school exists for children making toys from waste materials. Waste Wise (India, AS 1), runs a project with waste picking children who are trained for regular door-to-door waste collection. In a large low-income neighbourhood in Nairobi, Kenya (AF 8), youths engaged in a sports league are active with their sports team in neighbourhood cleaning activities during the weekends. They can earn extra points in the sports league with these activities. One problem related with the involvement of young people in community-based solid waste services is mentioned in various of the projects: the youths want a material reward for their participation or management efforts.

CHAPTER 3 DIFFERENT ORGANIZATIONAL STRUCTURES OF COMMUNITY-BASED SOLID WASTE MANAGEMENT

Many different configurations of community-based solid waste management organization exist in Southern cities. This chapter describes three common organizational structures.

3.1 Micro-enterprises and CBOs working together

Cooperation between micro-enterprises and community-based organizations is not uncommon. **Micro-enterprises** are cooperative enterprises with eight to twenty-five members who share responsibilities and income and who operate together a waste collection scheme, street sweeping, etc. Sometimes members of a micro-enterprise live in the neighbourhood where they operate a service, but this is not always the case. They are included as part of community management only, when the service is somehow controlled by community members. **Community-based organizations (CBOs)** are organizations that derive their members from and operate in a specific neighbourhood (or village, in a rural context).

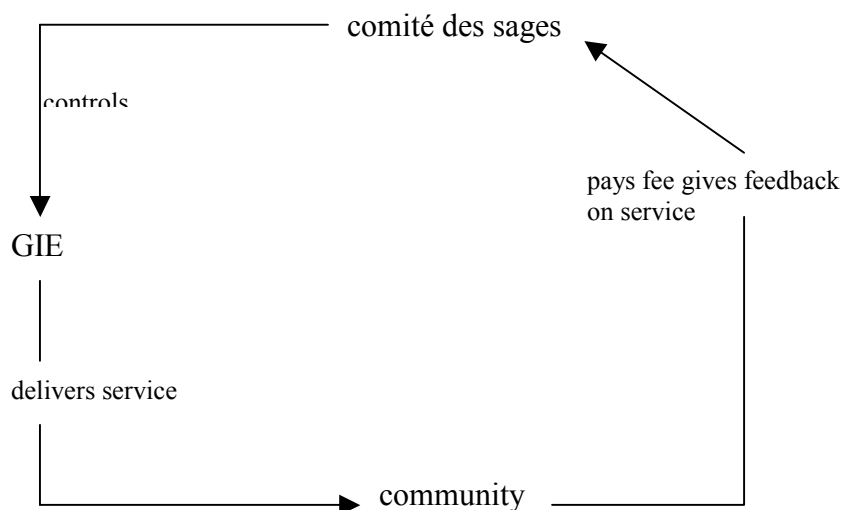
These two groups of people may work together to manage and operate a solid waste service in a neighbourhood, sometimes with separate objectives. A CBO usually works more from the perspective of a clean neighbourhood, a micro-enterprise will generally focus more on its income generating aspects. Generally the CBO has management and supervision tasks, while the micro-enterprise is responsible for operating the service.

An example of micro-enterprises and CBOs working together is the cooperation between GIE - 'groupes d'intérêt économique'- and neighbourhood committees in Bamako, Mali (AF 11), shown in Box 2.A.

Box 2.A Micro-enterprise and CBO cooperation in Bamako, Mali.

The GIE Gigui was set up by an unemployed graduate as a micro-enterprise for composting and city greening in 1991. The municipality gave it a concession to collect garbage in Hamdallaye, a peri-urban neighbourhood of Bamako, Mali. GIE Gigui has grown out to a community-based initiative, active in solid waste collection, installation of soak pits, composting and tree nursery. The GIE discussed its plans for solid waste collection during six months with the community in Hamdallaye. So-called 'comités des sages', neighbourhood committees of elderly and other respected people, were established to create a forum to complain about the operation of the service, to propose modifications and to indicate new needs. Through these discussions, also in weekly meetings and debates in concessions, the strategy was changed. Gradually the 'comités des sages' obtained more responsibilities. They now officially supervise the operation. Furthermore, they have become involved in the organization of meetings, in the distribution of information, in negotiations with financial partners, and in contacts with the municipality. More and more decisions are being taken together by the GIE and these 'comités'. In future the 'comités' will be given the whole supervision of the programme including credit and saving facilities.

Figure 2.1 Organizational structure micro-enterprise CBO cooperation in Bamako, Mali (AF 11).



3.2 Governmental institutions assisting CBOs

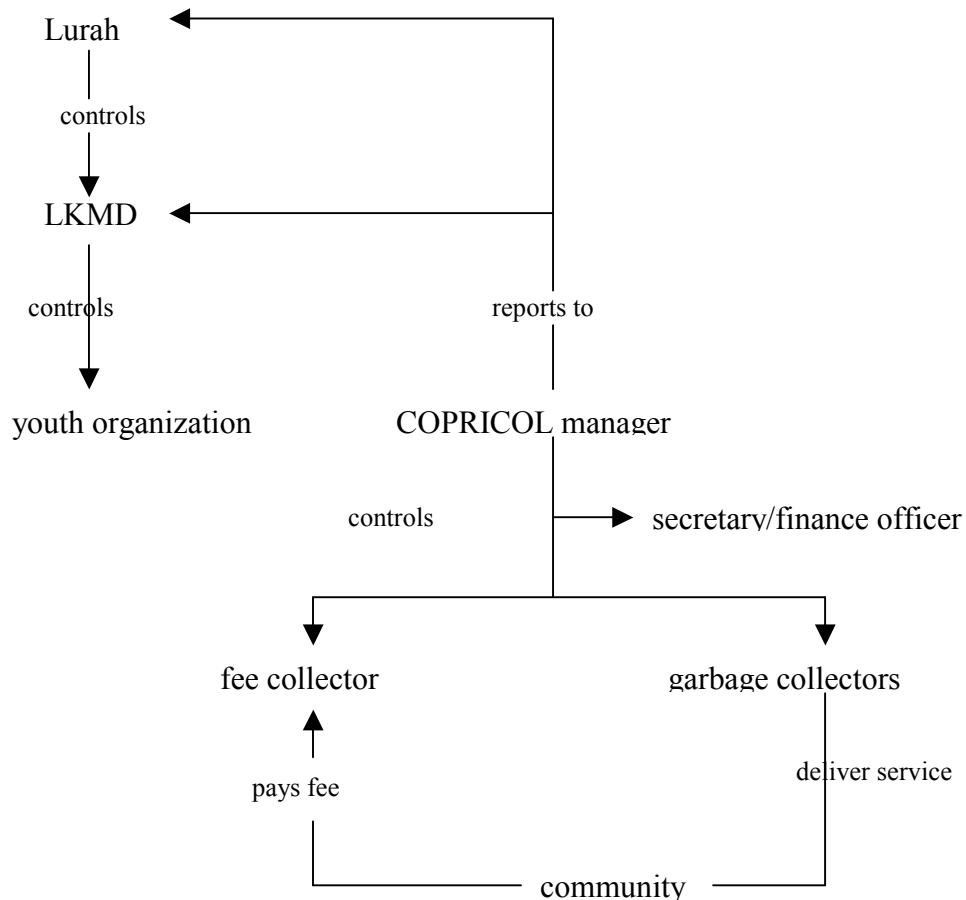
Another possible organizational structure of a community-based solid waste service is the involvement of governmental institutions assisting CBOs. These institutions may be the governmental agency responsible for solid waste management or, which is more common, the local governmental authorities, either administrative bodies or government-led development committees. Usually these governmental institutions have relatively much autonomy towards the central government and their motivation comes from their need to control all community services. They are usually involved in the overall supervision of the solid waste service, but in some cases their participation extends to financial control or technical support, e.g. the provision of a refuse collection vehicle. In this organizational structure, operation and management of the service are carried out by several CBOs, either motivated by the generation of income or by the interest in a clean neighbourhood.

This type of cooperation is quite common in Indonesia, where local administrative bodies often manage community-based primary collection (COPRICOL). The example of the neighbourhood Lapai in Padang, on the island of Sumatra (AS 9), is given in Box 2.B.

Box 2.B Cooperation between a CBO and governmental institution in Padang, Indonesia.

An example from the neighbourhood Lapai in Padang (AS 9) shows different levels of decision-making and different organizations involved. In this case the head of the kelurahan (neighbourhood), the Lurah, has final responsibility for the service. The LKMD, a semi-governmental body implementing development projects at neighbourhood level, took the initiative together with the Lurah. The Lurah appointed certain members of the local youth organization for the management of the service. One of them acts as COPRICOL manager and is involved in day-to-day management and supervision of a secretary, a fee collector, four garbage collectors and two drivers. The youth organization reports about financial matters to the LKMD and the Lurah. Twice a year a meeting with all parties involved takes place.

Figure 2.2 Organizational structure government-CBO cooperation in Indonesia (AS 9).



3.3 Combined NGO-CBO efforts

Community-based solid waste services can also be managed by a cooperation of non-governmental organizations (NGOs) and community based organizations (CBOs). The clearest difference with CBOs is that NGOs usually operate on a larger geographical scale, at city, regional, national or even international level. NGOs usually set up community-based solid waste management as a development project and only in operating and managing these services they work together with CBOs. The role of NGOs is confined to overall supervision, but very frequently it also includes financial assistance and control, training and recruitment of management committee members and of operators, and other technical support. CBOs play several roles in operation and management, such as in the cooperation with governmental institutions. Examples of this kind of cooperation come from Chad (AF 3) and Ivory Coast (AF 6) and are shown in Boxes 2.C and 2.D.

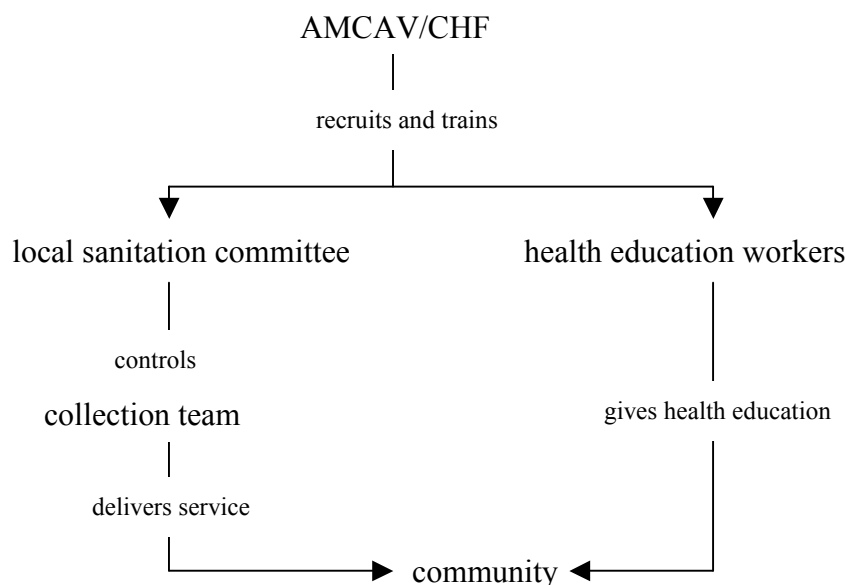
Box 2.C Combined CBO - NGO efforts in Chad.

In Chad (AF 3), Oxfam, a British NGO, initiated and funded a community-based solid waste collection project in N'Djamena. It started with a pilot project in the neighbourhood Ambassatna with solid waste collection per concession (a group of households). For each square (circa 80 concessions) a sanitation committee was established. This committee organized garbage collection, fee collection, upkeep and renewal of materials, recruitment and payment of waste collectors, and awareness raising of the community. This pilot project was not very successful, but the idea was picked up by other neighbourhoods, which started to establish sanitation committees. The role of Oxfam gradually changed to more assisting functions. Recently it has delegated promotion activities and monitoring of the sanitation committees to local NGOs. Oxfam itself concentrated on training members of sanitation committees and organizing exchange visits.

Box 2.D Combined CBO - NGO efforts in Ivory Coast.

The Ivory Coast project (AF 6) was initiated and funded by the Cooperative Housing Foundation (CHF), a foreign NGO, in Alladian, a neighbourhood of Abidjan. CHF worked together in planning and implementation with AMCAV, a local CBO. AMCAV was involved in the establishment of a local sanitation committee and arranged for a collection team. The sanitation committee supervised operation and was responsible for financial decisions. AMCAV shared financial management with this sanitation committee to overcome local political power constraints. AMCAV and CHF together recruited and trained the collection team as well as local health education workers.

Figure 2.III Organizational structure NGO-CBO cooperation in Ivory Coast (AF 6).



CHAPTER 4 SOCIAL AND MANAGEMENT PROBLEMS OF COMMUNITY-BASED SOLID WASTE MANAGEMENT

This chapter gives an overview of the social and management problems encountered in the literature on community-based solid waste management projects (see the Appendix). The problems have been classified into five categories: low participation of households, management problems, social operation problems, financial problems and failing cooperation with municipalities. Each category has been divided in two to five subcategories, which correspond to more detailed descriptions of the social and management problem of community-based solid waste projects. At the end of each paragraph an overview is given summarizing problems and solutions of that category.

4.1 Low participation of households

4.1.1 *Low community priority for solid waste management*

It is not uncommon that low-income neighbourhoods often face considerable problems. Inadequate solid waste management is just one of them and its improvement may not have priority for a community. If solid waste management is not a felt need, this will have consequences for their participation in the service and their willingness to pay. The following paragraphs provide a more detailed elaboration of low participation of households in solid waste management.

From the Indonesian experiences (AS 5-13) it has become clear that a felt need is a prerequisite for successful implementation of a community-based solid waste management project. Usually a real need for an improved solid waste collection exists in neighbourhoods, where population density is high, where little space for storage of garbage is available and where dumping sites are far away. Furthermore, the chance that solid waste management is a high ranking community problem will be higher, when the initiative for a solid waste management project comes from the community itself.

A possible solution to the problem of lack of community priority for solid waste management is education. This solution was tried in Kathmandu, Nepal (AS 16). A women's organization tried to convince people of the need of proper solid waste handling via lectures, but it finally achieved a change of behaviour through the provision of buckets and a competition among households for the cleanest environment. So the provision of appropriate incentives appears to be important. This issue will be elaborated on in Paragraph 3.1.2. Other examples proved also that education alone is not enough to make people change their minds and priorities.

Another solution involves consultation with the community on its problems and priorities. Ivory Coast (AF 8) is an example: a local sanitation committee discussed the main problems of solid waste collection and decided on solutions. But no attention was paid to willingness and capability to pay, so this project ran into financial difficulties. Also in Cameroon (AF 2), a management committee was established in each quarter to determine needs and to rank priorities. A more thorough approach was adopted in Mali (AF 11). During six months the waste collection enterprise GIE Beseya discussed the collection system they wanted to establish in a neighbourhood, with the community via debates in concessions and weekly

meetings in the community. Their tasks, responsibilities and fees were clarified. A change of project objectives and strategy was the result. But this approach had also a conscientizing effect; so-called 'comités des sages' (committees of elderly people) were installed to supervise the functioning of the GIE. This committee developed into a platform where community concerns and problems were discussed. Gradually these committees obtained more responsibilities: to organize meetings, to distribute information, to deal with financial partners, to keep contact with the municipality.

A more comprehensive community needs assessment study may also lead to a better designed project. The Panaji project proposal (India, AS 4) is an example. This included a preliminary study into community perception of major issues concerning solid waste management, such as the present collection system, current practices of waste storage and community-level disposal, willingness to pay, preferences for certain systems and practices such as separation at source, etc. But this is a project proposal; results of this approach are thus unknown. A practical example is Ivory Coast (AF 6), where a survey on community concerns and priorities was conducted beforehand. This changed the view of the donor (CHF), who thought water supply would have priority. Its success is proven by the fact that the resulting community-based solid waste management project is now self-supporting.

4.1.2 Low willingness to participate in collection and recycling

Households often behave contrary to schedules and rules of effective solid waste management. Sometimes this is caused by a lack of facilities; if a transfer point or dumping site is more than 100 metres away from their house, people tend to throw their waste much more often in streets, open spaces and rivers (Panaji, India, AS 4). More often, however, it is due to households lacking knowledge and incentives to keep to the rules of the collection system, and operators lacking sanctions and authority.

In Sri Lanka (AS 21), people go to the main road with their bags of garbage to put it directly into the municipal truck instead of bringing it to communal containers. When the truck is not in time, they just leave their garbage bags in the street. There is little social control in the neighbourhood and the collecting crew lacks a certain understanding of the system. In Ivory Coast (AF 8), something similar happened after a change in the municipal system. People used to bring their garbage to communal bins at a distance of less than 30 m from their house, for which they had to pay a fee. With the new system, a compactor truck that passed through the main road and then gave a signal, they had to walk to the main road and deliver their garbage to the truck for free. Due to this practice, the community-based solid waste collection through the communal bins collapsed. Later on people also stopped bringing their garbage to the truck, because it was too time consuming for them. This had negative consequences for the cleanliness of the neighbourhood. In San José, Costa Rica (LA 9), the micro-enterprise that collected waste, was confronted with uncontrolled behaviour of households who left their garbage everywhere and not in the containers as agreed upon.

Low willingness of households to participate in collection and recycling also depends on the perceived benefits and costs of the system. In India (AS 4), 70 % of the people were against separation of waste at source, because it was considered inconvenient. In the GRASP project (India, AS 3) some households do not want to participate in separation, because they say it is time consuming and dirty work. In some countries, notably in Asia, servants, caretakers and

watchmen are important agents in waste handling: they bring the waste to communal bins, keep certain items apart, and so forth. These servants are known to be unwilling to cooperate in separation at source, either because they know the value of the recyclables and do not want to sell them to waste collectors (India, AS 3), or because they do not like the extra work (India, AS 1).

A solution for this problem was tried in the Philippines (San Antonio Valley, AS 20). Servants and/or watchmen were given a certain benefit and thus integrated into the system. The implementing NGO, a women's organization, tried to encourage housemaids to engage in recycling by giving them proceeds of the sales of recyclable materials. This is just one example of the provision of appropriate incentives to increase the participation of community members in a solid waste management system.

Other examples are:

In Asia city competitions are widespread. Every year the cleanest city or town in many countries is awarded a special prize, shown on television and visited by high-level government officials. Competitions between households to win a prize for the cleanest house and immediate environment, was organized in Nepal (AS 16) by WE, a women's organization, when mere education failed. In China a system of points for cleanliness to be earned by households is used in some cities too.

Another option is to pay households for their participation or to provide them with discounts on certain valuable items, depending on their degree of participation. In the Philippines (AS 19) households receive a small amount of money from the waste collectors, depending on volume and quality of the garbage. In the SIRDO recycling projects in Mexico (LA 13), participating members of households are paid according to work done and time spent. In one of those projects food-making women are involved: they separate their waste and, in turn, receive a discount when they buy vegetables. These vegetables are produced with the bio-fertilizer made from their wastes. Evaluation of these Mexican projects showed that economic benefits from a solid waste management system had more influence on proper behaviour of households (separation) than environmental education. According to their experience, education accounted only for 10 to 30% of change in user habits.

In Curitiba, Brazil (LA 7), some interesting solutions are tried to encourage low-income households to participate in solid waste collection. First a massive education campaign, involving all media, promoted the separation of garbage at source (the "Garbage that isn't garbage" program). This program obtained a participation rate of 70% of all households, which can be qualified as quite successful. Another programme, the "Garbage purchase" project, was especially designed for unserved low-income areas. This programme was based on the exchange of garbage against free bus tickets and food parcels. A similar project, the "Green exchange" project, accepted only recyclable garbage in exchange for food bags. This exchange took place at supermarkets, schools, factories and through neighbourhood associations.

4.1.3 *Low willingness to keep public spaces clean*

In several cases (Indonesia, Cameroon, Chad) it is mentioned that residents of a neighbourhood have a sense of responsibility for their home and immediate environment, but that public spaces such as streets and drains are considered the responsibility of the state. Often municipalities lack the money and/or manpower to fulfil this task and sometimes they think the neighbourhoods are responsible for this. This has negative consequences for the cleanliness of public spaces, and for the willingness to pay and the behaviour of households. Periodical clean-ups may have a temporary positive effect on the cleanliness of streets and public spaces. With a lack of social cohesion and control in a neighbourhood, this is not a sustainable solution. Especially in low-income neighbourhoods cooperation may be difficult, because of the high mobility of households and the large amount of renting people. Moreover, urban problems are known to be personal and coping strategies individualistic. In Nepal (AS 14), GTZ organized a clean-up campaign for courtyards. The behaviour of the households did not change; afterwards they just put their waste in these courtyards again. But with the help of a large education campaign and the installation of small shrines in the courtyards, the project management achieved the necessary switch in the perception and behaviour of the people. The involvement of local administrative bodies (town Panchayats) in organization and education was responsible for this.

In Pakistan (AS 17), the local women's organization KAWWS had difficulties in persuading people to pay for street sweeping. A possible solution was to contract street sweepers as part of the solid waste collection system, but there was not enough money to implement this. In India experience exists with street-based organizations (Civic Exnora units, AS 2) which organize regular street sweeping and clean-ups. They started with involvement of higher income communities who hired waste collectors and street sweepers to clean the streets. Later on activities were extended to the low-income areas, from where those waste pickers came.

A rather frequently returning problem is the fact that people throw the garbage next to the communal container or bin, causing an unhygienic situation. In Mali (AF 11) waste transfer stations are owned by the District. They are kept in a bad condition. In Ujung Pandang, Indonesia (AS 11), they developed a solution for this problem: a guard was employed by the local administrative body (RW) to keep the communal bins and their surroundings tidy.

Shared caretaking systems are known from a low-income neighbourhood in Bangkok, Thailand. Residents living around a community kindergarten share the responsibility for keeping school surroundings clean with school teachers. In the same neighbourhood four women homeworkers have a schedule for keeping their street clean. Alternatively two of them feel responsible during two weeks for removal of litter, clearing of walkways, problems with stagnant water, noise and malodour. If they cannot solve these problems themselves, they report them to the community leader (Douglass & Zoghlin, 1994).

4.1.4 *Low willingness to pay*

Willingness to pay is a rather central point, because it is important for the success of a community-based solid waste management project and it is related to many other aspects such as the motivation of operators and households and the reliability of the service. Community perception of fees and of the waste collection service is essential for its willingness to pay. If residents think they already pay for collection through taxes, or if they do not trust the service,

they refuse to pay. For example in India (AS 1) some households are not willing to pay, because they think property rates should cover solid waste collection.

The service must be reliable to sustain willingness to pay. Payment according to achievement may be a solution, because households receive an observable benefit. In Ambassatna, Chad (AF 3), willingness to pay declined, because garbage collection became irregular. Residents had to pay per month, but they started to pay per collection round.

A project in Ivory Coast (AF 8) also suffered from declining willingness to pay, because the service was offered to everybody, and because there were no sanctions in case of non-payment and no legal obligations to pay. They tried to increase cost recovery through offering additional services such as toilet and bathroom cleaning. But this did not increase willingness to pay of the community.

A change in the way of payment might improve willingness to pay. In Sudan (AF 14) different ways of payment were studied beforehand, one was selected -collection fees on top of the sugar price- and agreed upon by the community. In Bolivia (LA 3) the community was not consulted nor informed properly about a new system of collecting garbage fees with electricity bills, so it failed. In a project in Ujung Pandang, Indonesia (AS 10), only 20% of households were willing to pay the sanitation fees. These fees were collected by officials from the RW (a local administrative body). Because of these payment problems the system was changed, so that fee collection became the responsibility of the municipal cleansing department. They started to collect fees via water bills, but it is unknown whether this was more successful than the old system. Another example from Surabaya, Indonesia (AS 12 and 13), shows waste collection fees that are part of a lump sum for social welfare activities, collected during social meetings. This system is rather successful, because people there prefer to pay a big sum now and then, instead of many times a small amount. It can be concluded that willingness to pay has to be studied beforehand to conceive acceptable ways of payment and affordable fees.

Education about the benefits of the service and the financial obligations of the households may help to increase willingness to pay. But education alone is not enough to increase willingness to pay, as was experienced by COFESFA in Mali, AF 10. A women's organization, COFESFA, started health and sanitation education campaigns with the idea of changing the view of households. They wanted to make them aware of the dangers of the absence of a garbage collection system, so that they would be willing to pay the fees. This was not successful, because people were too poor to afford the fees they asked. They had to obtain their funds from other sources: the municipality -they received a concession contract for a certain area- and the sale of self-made garbage bins.

As is pointed out by several projects, education campaigns as part of community-based solid waste management are both inadequate and inappropriate. Inadequate in the sense that before and during operation of the service education campaigns are often absent. Inappropriate, because the contents of educational material is often not suited to the interests and priorities of the community. In Indonesia (AS 5-13), for example, too much emphasis in education was given to health and environmental benefits, while the people used the solid waste collection service because of its convenience, its time and energy saving character (Yayasan Dian Desa, 1993). The SIRDO projects in Mexico (LA 13) indicate gender-specific interests. In these

cases women appeared to be more interested in improvement of their physical environment than in economic benefits.

The experiences also prove that education is needed to maintain community participation, to establish a 'spirit of responsibility' towards environmental problems and the most suitable ways of dealing with them (Guatemala, LA 11). Moreover, it is necessary to inform households about the benefits and practice of separation at source, the benefits and schedule of collection, the tasks and responsibilities of households (time and place to deliver the garbage) and the ways of payment.

4.1.5 Overview of participation problems

PROBLEMS	SOLUTIONS	EFFECTS
low community priority for solid waste management	<ul style="list-style-type: none"> - education - provision of appropriate incentives - consultation with the community - give community a role in planning - community needs assessment study 	<ul style="list-style-type: none"> - on its own inadequate to change priorities and needs - more appropriate system, based on real priorities and needs
low willingness to participate in collection and recycling	<ul style="list-style-type: none"> - household and city competitions - pay households for their participation - exchange garbage for free bus tickets or food parcels - give proceeds of recyclables to servants - education 	<ul style="list-style-type: none"> - effective - effective - effective - on its own inadequate to change behaviour
low willingness to keep public spaces clean	<ul style="list-style-type: none"> - periodical clean-ups - education and make site valued - integrate street sweepers in solid waste management system - guard at transfer station - shared caretaking systems 	<ul style="list-style-type: none"> - effective
low willingness to pay	<ul style="list-style-type: none"> - change way of payment - education 	<ul style="list-style-type: none"> - way of payment: <ul style="list-style-type: none"> *with water bills: success unknown *with electricity bills: failed *as a lump sum: successful - on its own inadequate to change willingness to pay

4.2 Management problems

4.2.1 *Low willingness to manage*

Management of community-based solid waste services is often a voluntary activity, mostly carried out by the more affluent residents, who are motivated by community benefits such as a cleaner environment, a better health of neighbourhood residents, status of the job, etc. Voluntary management is not necessarily a problem, as is shown in a successful project in Padang, Indonesia (AS 8). In the long run, however, continuity of the service may not be secured. Also the area covered by the project may remain small. In Pakistan (AS 17) the women's organization KAWWS, for example, did not have enough staff to increase its area of operation.

In some projects, an individual from the neighbourhood had taken the initiative for a community-based solid waste collection system. In many cases this person also becomes the manager of the system. While motivated management is one of the success factors of community-based solid waste management projects (see the examples from Pakistan, AS 18, and Indonesia, AS 7), exclusive dependence on one person who manages the operation of a solid waste service, is considered undesirable, because accountability to the community and the continuity of the service may not be secured any more. Examples are the projects in Yogyakarta, Indonesia (AS 6 and 7), and in Surabaya, Indonesia (AS 13). In the last case the wife of the RW (local administrative body) head financed the collection equipment herself, she is responsible for everything and she need not report to any person besides herself. On the other hand, she is able to use her personal influence to have rich people make extra contributions in case of maintenance problems.

It is not easy to find the right kind of remuneration to motivate managers of a community-based solid waste service system. In a SIRDO project in Mexico (LA 13) equal remuneration led to a declining motivation of the people working hardest. In Chad (AF 3), young unpaid members of a sanitation committee preferred some kind of material benefit; better environmental conditions were not sufficient to sustain their motivation.

Experience from Chad (AF 3) shows that it is better to gather the most motivated volunteers in one committee instead of having ten less motivated committees. Sanitation committees were restructured after the Ambassatna pilot project. New committees that came into existence subsequently, had to prove their viability for one year before they received assistance from Oxfam, the implementing NGO. Another lesson from the same project in Chad was that training and exchange visits for management committees are highly positive in stimulating their motivation.

Another way to motivate managers is the explicit assistance (financial, technical) and moral support from the municipality. An interesting example is a composting project in Ecuador (LA 10), where the municipality doubles the sales of recyclables to invest in local projects which are selected by the community.

4.2.2 *Lack of accountability to the community*

Lack of accountability to the community depends on the management structure, the way of supervision and the links with the community. This is characteristic for the Indonesian

projects AS 6 and AS 13, which are based on trust, with little financial control and little performance control, which may result in an unreliable service.

A way to improve accountability to the community in general is to write down agreements on rights, responsibilities and obligations of the waste services system. Some micro-enterprises in Latin America are, for example, contracted by the community or a community organization, and can be controlled in that way. One-man contracts are used in South Africa (AF 13). Written down rights and responsibilities are common practice in Sri Lanka (AS 21), in the contacts of the National Housing Authority with communities in slum upgrading projects. Another way to improve accountability to the community, particularly with regard to financial matters, is to define procedures of control. These may involve the obligation to report regularly to the neighbourhood committee (Indonesia, AS 7) or to community members (Indonesia, AS 12), a bulletin board about financial affairs (Ivory Coast, AF 6), meetings with neighbourhood committees about the quality of the service (Costa Rica, LA 9). Yet another solution is used in Ivory Coast (AF 6). The implementing NGO, AMCAV, decided to share financial management to overcome political power constraints within the community.

4.2.3 *Unrepresentative management*

The accountability to the community of the managers of a solid waste service also depends on the composition of the management committee. Whether it is an elected body or appointed by the local government, whether it consists of traditional leaders or modern community organizations, or of influential individuals. This determines the degree of representation of different community interests in the management committee and its responsiveness to community needs. Representation of the interests of under-privileged groups or minorities is particularly important for women, youths and certain cultural or ethnic groups.

In Chad (AF 3), for example, sanitation committees responsible for waste collection and management, which were set up by Oxfam, the implementing NGO, had become mere figure heads. They consisted of influential persons who were not used to consulting the population and were only interested in the honourable position. Both women and youths were under represented in the management committees. Oxfam had encountered a lot of difficulties in finding appropriate women's groups to work with. In the project area women were used to operate on their own, for example in small beverages production, or on the basis of personal relationships. They did not trust Oxfam, because they associated them with the government who had always refused to give them small loans. Only the quarter heads were really interested in participation in the management committee, because it reinforced their position.

From Sri Lanka (AS 21) it was also reported that community representatives, who were involved in all kinds of meetings with the municipality and other state agencies, got a feeling of officialdom, which was not always beneficial for the representation of community needs and problems. A possible solution used in Ivory Coast (AF 6) was the intervention of the implementing agency, a local NGO (AMCAV), against an unequal ethnic and gender representation in the local sanitation committee. Only men of the same tribal background were proposed as candidates for the management committee. AMCAV rejected these candidates and succeeded in having the composition of the committee changed.

In Egypt (AF 4) a similar problem arose. The local development committee, the Gameyya, which had to supervise various activities aimed at improving the living conditions of the Zabbaleen, the informal waste collectors of Cairo, proved to be unrepresentative of the community of beneficiaries. The leading board members were non-Zabbaleen and they exhibited a paternalistic attitude towards the Zabbaleen. The degree of democracy in decision-making was very low, the poorest groups were neglected. The solution used here was to by-pass the existing committee and to design a new income generation/credit project for poor Zabbaleen women. A far higher degree of participation of the community of beneficiaries was reached in this way.

4.2.4 Overview of management problems

PROBLEMS	SOLUTIONS	EFFECTS
low willingness to manage	<ul style="list-style-type: none"> - restructure management committees - training and exchange visits for management committees - technical/financial/moral support from the municipality 	
lack of accountability	<ul style="list-style-type: none"> - define rights, responsibilities and obligations - establish procedures of control 	<ul style="list-style-type: none"> - only successful if effectively enforced
unrepresentative management	<ul style="list-style-type: none"> - intervention of implementing agency to adjust composition of committee - by-pass existing committee/work directly with beneficiaries 	<ul style="list-style-type: none"> - may adjust composition of committee - more effective participation

4.3 Social operation problems

4.3.1 Low salary of operators

There is a difference between remuneration of operation and of management of community-based solid waste management projects. Operational activities (collection of waste, sorting, recycling) are almost entirely done on the basis of profit, i.e. a personal salary, because work is hard and status is low. In Ghana (AF 5) workers of a composting plant were first given 'food for work', but later on they received a salary, because otherwise the project staff could not attract enough workers.

The salary of operators of waste collection services is often low, because waste collectors derive their income from waste collection fees and from the sale of recyclables. Both do not

yield much revenue in low-income neighbourhoods. Fee collection is not high, because households in low-income neighbourhoods are not able to pay high fees. The waste that remains to be collected, is often worthless due to its high organic content. Another reason for the low salary of operators of waste collection services is the size of coverage areas, which is often too small to earn an adequate income.

Some projects have 'solved' the problem of low salaries by employing people part time (e.g. Cameroon, AF 2; Indonesia, AS 12; Ghana, AF 5). This leads, however, to a weak bargaining position for the manager(s) and to a less reliable service, because waste collection as a side job will no longer be a priority for the people operating the service. On the other hand, it is clearly an incentive for operators that they can use their equipment and time for other activities.

Another possible solution, which is practised in some Indonesian projects, are cross-subsidies, either by serving different income groups or by serving different generators of waste (households, industries, commercial business, institutions). Different groups can be asked different fees. This increase in the coverage area and in the number of customers can provide the operators with extra income.

Recently the position of Zabbaleen women (Egypt, AF 4) was improved and their economic independence increased through income-generating recycling projects such as rag weaving and patchwork manufacturing. In Mexico several productive activities evolved out of the SIRDO recycling systems, such as flower production for export, horticulture, and plastic recycling. These economic benefits had a positive effect on the separation behaviour of participating households, who cooperatively operate most systems.

Another incentive may be to provide a group of operators with a strong internal solidarity with special benefits. In Kenya (AF 8) a special system exists: youth sports teams can earn points in the league with neighbourhood cleaning activities. The whole operation is managed by neighbourhood officials and youth leaders together. This is a benefit that accrues to the team, but which is quite effective in stimulating young individuals. Another example comes from Indonesia (AS 9) where a youth group is involved in garbage collection. The profit of the waste collection service is used for youth group activities. An indirect measure is to decrease the costs of the service for operators. In Senegal (AF 11), micro-enterprises involved in waste collection received an incentive from the municipality, namely the exemption from certain municipal taxes.

4.3.2 Low status and bad working conditions

The low status of waste collectors may be caused by their low salary, by the nature of their work and sometimes by their waste-picker background. Low salaries were already explained above. The nature of their work is often considered unpleasant and filthy, not only collection but also activities such as sorting of garbage at a composting plant. Especially in India some richer households have problems with waste collectors who have formerly been waste pickers. They are suspicious of them, sometimes accuse them of theft and do not agree that they have a legitimate role in their neighbourhood.

Solutions for the problem of low status tried in the GRASP project (India AS 3), are: education of households by volunteers from the area, promotion campaigns, a letter of authority from the municipality to the households, identity cards for collectors signed by GRASP which are given to the waste collectors. In the Waste Wise project (India, AS 1), the waste collectors were also provided with identity cards and they were officially introduced to the residents by the NGO. Besides, meetings with the community were organized to educate the residents. It was not clear from the literature whether this had the required results.

Another option is to improve the working conditions of operators by providing them with facilities, as experiences from the Philippines and Senegal show. To involve the informal sector in solid waste collection in the Philippines (AS 19), the following incentives were used: provision of food, drink and free accommodation by junk dealers, and provision with a painted push cart and T-shirt by the implementing NGO. The local health committee, managing a solid waste management project in Senegal (AF 11), provides operators and their families with medical assistance free of charge.

4.3.3 *Unreliable service*

An unreliable service, which does not arrive in time or is not carried out according to the expectations of the community, has consequences for the trust of the community, for their participation and willingness to pay for the service. It may be caused by a lack of performance control, a lack of priority of the service, when waste collection is carried out as a part time job. If operators have formerly been waste-pickers, they may cause additional reliability problems. These people, used to the freedom of the street, are sometimes difficult to train to perform a reliable service (India, AS 1).

Involvement in decision-making appears to be an incentive for operators to perform better. In Bolivia (LA 3), for example, members of micro-enterprises have a higher labour productivity and morale than the employees of municipal services, who collected garbage before, because they are owners-operators of the system and because they are paid according to achievement. A solution born out of necessity to improve the reliability of the service is to relate payment of operators more strictly to performance. This was applied in Chad (AF 3), where households started to pay waste collector per round instead of per month. In Indonesia (AS 12) the problem of reliability was solved by a different division of collection areas and responsibilities. First one old waste collector had to operate the service under the supervision of the RW, a local administrative body. He could not perform a reliable service, because the collection area was too large. It was then decided to split up the collection area in nine smaller areas and to make the RTs, lower level administrative bodies, responsible for management of the service. These areas, however, appeared to be too small to be financially viable, so the motivation of the collectors declined.

4.3.4 *Competition from private entrepreneurs*

Some projects in India working with ex-waste pickers suffer from problems with their former employers, waste traders (AS 1), and with private waste collectors (AS 3). In Pakistan (AS 17 and 18), the new community-based waste collection system disrupted the sweeping areas of municipal sweepers who used to collect valuable garbage there in their leisure time. In Metro Manila, the Philippines, in the late 1970s a project was started by the government that totally

by-passed the existing informal waste collection and recycling system. This project became a complete failure.

In the GRASP project in India (AS 3) private collectors prevented waste pickers from collecting garbage. Private vermi-composters tried to drive them away from their vermi-composting plot. It was tried to integrate the waste pickers in the existing activities of vermi-composters, but this was not successful. An attempt was made to solve the conflicts with private collectors via consultation with the municipal solid waste management agency, but this agency refused to intervene, probably because of political reasons. Then the project staff tried to convince households through education to deliver their waste only to 'official' waste collectors appointed by the project.

Integration into the project was successfully applied in the Philippines by the Women's Balikatan Movement. They involved junk dealers and waste pickers in their waste collection and recycling system (AS 19).

4.3.5 *Space problems*

Space is an important constraint for all composting and sorting/recycling projects. A project in Vila Reis, Brazil (LA 4), has temporarily stopped its activities, because it has to arrange for a deposit site for recyclables in order to gather enough quantity to sell it. In some quarters there is no space for communal bins because of the high population density (Pakistan, AS 17).

Consultation with local NGOs and opinion leaders to find sites for sorting and composting appeared to be an effective solution in Ghana (AF 5) and Cameroon (AF 2). Next to negotiations with quarter heads, a massive media campaign with the help of local youth groups was used in Cameroon to solve this problem. In Mali (AF 11) delegates from the neighbourhood went to the municipality to lobby for space for a depot. The results are unknown.

4.3.6 Overview of social operation problems

PROBLEMS	SOLUTIONS	EFFECTS
low salary of operators	<ul style="list-style-type: none"> - part time employment - cross-subsidies - add income generating recycling projects - provide group benefits - provide exemption from certain municipal taxes 	<ul style="list-style-type: none"> - less reliable service/poor bargaining position management - effective - effective
low status and bad working conditions	<ul style="list-style-type: none"> - education/promotion campaigns - identity cards for collectors - municipal letter of authority - official introduction of collectors by NGO - provide operators with facilities 	
unreliable service	<ul style="list-style-type: none"> - involve operators in decision-making - relate payment to performance - different division of collection areas and responsibilities 	<ul style="list-style-type: none"> - too small areas/too small returns
competition of private entrepreneurs	<ul style="list-style-type: none"> - consultation with municipality/governmental agency - education of households - integrate private entrepreneurs into the project 	<ul style="list-style-type: none"> - no willingness to intervene - mixed results
space problems	<ul style="list-style-type: none"> - consultation with local NGOs and opinion leaders - start a media campaign with the help of local youth groups - delegates from neighbourhood lobby municipality for space 	<ul style="list-style-type: none"> - effective - effective

4.4 Financial problems

4.4.1 Cost recovery problems

Cost recovery problems refer to a lack of funds to cover capital and recurrent costs of solid waste activities. Lack of funds can be caused by inadequate fee collection, too low fee rates, failing fund raising methods, low loan repayment, difficult access to credit, and marketing problems. Inadequate fee collection will be dealt with separately in Paragraph 3.4.2, because

it is the most common problem. Here the other cost recovery problems will be described. In many cases, fees for community-based waste services do not cover costs, because they are fixed by the government and do not take into account costs and taxes that have to be paid by the community service. This is the case with COFESFA in Mali (AF 10). Sometimes finding additional resources is a problem: both the successful MYSA project in Kenya (AF 9) and the Balikatan project in the Philippines (AS 19) suffer from financial constraints which hamper expansion. Other projects have problems with loans that are not paid back in time so that the fund cannot become revolving (examples from Cameroon, AF 2, Egypt, AF 4 and Sudan, AF 14). Other, especially recycling initiatives suffer from a lack of credit. In Mexico SIRDO systems want to enlarge the operation of their organic waste recycling activities, but they use communally owned land that is not accepted as collateral (Mexico, LA 13). Marketing problems mainly refer to composting and other recycling projects (examples Ghana, AF 5 and Cameroon, AF 2).

Cost recovery may be improved by offering additional services. In Ivory Coast (AF 8) the solid waste collection service ran into financial difficulties because of low willingness to pay. They started offering extra services such as cleaning bathrooms and toilets. A possible solution to the repayment problem is tighter financial control, which includes effective book-keeping practices. Some sense of responsibility towards the communal fund has to be established and some kind of sanction has to be thought of. In Egypt (AF 3), for example, small credit groups of women who are responsible for repayment of each member of the group, give a high repayment rate through social control.

Marketing problems can be avoided by conducting a socio-economic feasibility study before implementing the project. In Mali, AF 10, micro-enterprises involved in solid waste collection have experience with this kind of studies.

4.4.2 *Inadequate fee collection*

Fee collection for solid waste services appears to be influenced by willingness to pay, by the way of payment, by the availability of sanctions and by the persons collecting fees. If willingness to pay is low, fee collection will be low too. Solutions for this problem can be found in Paragraph 3.2.4. Lack of sanctions and a lack of legal obligations to pay are often the cause of fee collection problems (Ivory Coast, AF 8, Bolivia, LA 3). The way of payment, i.e. the way fees are collected, differs: sometimes garbage collection fees are paid once a month or a week, sometimes per round. Fees can be collected by special persons, fee collectors, or by the garbage collectors, or during social meetings. Not only the type of persons collecting fees is important but also the way they are motivated for their job, their incentives. In Mali (AF 10), fees are collected as part of taxes by the government which in turn pays the micro-enterprise COFESFA. The disadvantage of this system is the dependence on the efficiency of tax collection by the government, that determines the payment of the micro-enterprise. The micro-enterprise itself cannot influence it and government officials may not have enough incentive to carry out fee collection effectively. A similar problem is known from micro-enterprises in Bolivia (LA 3) who were not paid for months, because the municipality had no financial resources.

Inadequate fee collection can have negative consequences for the motivation of garbage collectors and thus for the reliability of the service, if they depend directly on these fees for

their income. Low reliability of the service can lead to low willingness to pay of households. It thus may become a vicious circle. One way to improve fee collection is to change the way of payment. In Gedaref, Sudan (AF 14), garbage fees are paid on top of the sugar price, and are collected through sugar distribution. The community has been consulted upon and agreed with this way of payment. In La Paz, Bolivia (LA 3), the municipality tried to collect garbage fees with electricity bills. This was not successful, because the people were not informed properly. It even came to boycott actions. Garbage fee collection together with water bills was tried in Ujung Pandang, Indonesia (AS 10 and 11). Results are still unknown. In Surabaya, Indonesia (AS 12 and 13), a minimum fee was set during a meeting with residents. This fee covers all social welfare activities in the neighbourhood, and it is collected during monthly social meetings. This system is rather effective because people prefer to pay one lump sum instead of many small amounts. Because success of a certain way of payment usually depends on the local context, community preferences have to be assessed. Another way to improve fee collection is to give fee collectors more personal benefit. In Padang, Indonesia (AS 8), the young people collecting garbage fees receive 10% of the collected fees. In Surabaya, Indonesia (AS 12), local administrative bodies (RTs and RWs) receive 15% of the collected city-sanitation fee. In Ivory Coast (AF 6), collection team members receive 80% of the fees they themselves collect. First everybody received 80% of what the whole team collected, but that appeared to be not a high enough incentive.

A subject that is often neglected by community-based solid waste management projects is the possibility of sanctions for non-payment to increase fee collection. In Padang, Indonesia (AS 9), it is practice to pay the solid waste fee directly to the garbage collectors in the beginning of the month. Otherwise one's garbage is not collected. In other Indonesian projects in Surabaya (AS 12 and 13) the following sanctions were applied: denial of official documents, letters of approval, licenses, etc. These sanctions are possible as these projects are implemented by local administrative bodies.

As was made clear above, the persons collecting fees may influence the rate of fee collection. Fee collection by operators rather than government officials appears to be more effective. A different but equally effective option is fee collection by respected community members, as applied in Mali (AF 11). Respected senior persons from each concession (group of households) hand over the money to the collection crew.

4.4.3 *Low ability to pay*

Low-income communities are often assumed to have a low ability to pay for services. Not all service levels are affordable and high fees cannot be charged. In Mali, COFESFA (AF 10) experienced this, when this micro-enterprise wanted to collect cost covering fees from households. It appeared that they could not afford the required fees. In Panaji, India (AS 4), they solved this problem by introducing different fees and different collection systems for different generators of waste. Households pay a low fee and bring their garbage to communal bins, which are inexpensive to empty. Clinics, restaurants and hotels, etc. were charged a higher, cost covering fee for door-to-door collection. This is just a project proposal; no practical results from this system are known. But it underlines the fact that it is necessary to study willingness to pay beforehand, as well as which system and rate of fees the community prefers.

Next to variable fees, cross-subsidies are a way of dealing with difficulties with ability to pay. In some Indonesian projects (AS 6, 8 and 10) fees are based on the amount of garbage and/or on the income level of the household. Cross-subsidies can be established by defining waste collection areas that are mixed in terms of income levels and/or waste generators. This may be a way to avoid political problems.

4.4.4 Overview of financial problems

PROBLEMS	SOLUTIONS	EFFECTS
cost recovery problems	<ul style="list-style-type: none"> - improve financial control - offer additional services - carry out a socio-economic feasibility study 	
inadequate fee collection	<ul style="list-style-type: none"> - change way of payment - give fee collectors more personal benefit - establish/enforce sanctions for non-payment - fee collection by operators rather than government officials - fee collection by respected community members 	<ul style="list-style-type: none"> - mixed results - effective - effective - effective
low ability to pay	<ul style="list-style-type: none"> - different fees for different waste generators and levels of service - base fees on income level and/or amount of garbage produced 	

4.5 Failing cooperation with municipalities

4.5.1 Direct obstruction of community-based solid waste management

A municipality or solid waste agency can also obstruct community-based solid waste management in various ways, either directly, by hampering the performance of community-based services, or indirectly, by refusing to provide legal, financial or promotional support. In this paragraph attention will be paid to this direct obstruction, of which the bad coordination between primary and secondary collection is one of the most cited examples. Sometimes municipalities seem to obstruct the operation of community-based services unwillingly, simply due to a lack of knowledge, for example, when they do not take into account the effects of changes in the secondary system on community-based primary collection schemes. In Ivory Coast (AF 8), a COPRICOL project had to stop its activities because the municipality introduced a compactor truck that competed for waste collection in the neighbourhood that was served by the project. People were distracted from the COPRICOL system of communal collection points (where they had to pay a fee) and brought their garbage to the municipal compactor truck instead. In other cases, though, lack of comprehension or even distrust are reasons given for non-cooperation of governmental institutions with community-based efforts. Also political considerations may play a part. In Mexico (LA 13), SIRDO projects encountered problems with groups with vested interests. They experienced that governmental

institutions were unwilling to encourage this kind of projects, because they feared it would lead to empowerment of poor people and thus to political trouble.

One of the most frequently encountered problems in community-based solid waste collection projects is accumulation at communal collection points, the temporary dumping sites from which the municipal cleansing department is expected to remove the garbage. The schedules of primary and secondary collection are often not coordinated; municipal secondary collection is irregular and insufficient. Examples are Burkina Faso (AF 1), Ivory Coast (AF 6 and 7), Mali (AF 10 and 11) and India (AS 1). In South Africa (AF 13) it was the private company, contracted by the municipality to bring the waste from transfer sites to the final disposal site, who performed badly in this respect. This kind of problems are usually caused by a lack of means, equipment as well as finances. But more structural is the inability or unwillingness of municipalities to adopt a clear solid waste management policy and a strategy to integrate community initiatives into the whole solid waste management system.

Coordination problems between secondary and primary collection are part of larger communication difficulties between communities and municipalities. An ad hoc solution to the problem of bad coordination is to bring the waste directly to final disposal sites yourself (Indonesia, AS 8 and 9).

A more structural approach includes better communication between communities and municipalities, for example via meetings between representatives of the community and the municipality, right from the beginning of a project. This approach is tried in Sri Lanka in housing and upgrading programmes (AS 21).

4.5.2 *Lack of assistance from the municipality*

Municipalities can assist community-based solid waste systems in different ways. One manner is the provision of facilities (equipment, composting sites, etc.), others are the establishment of legislation, financial assistance, promotion. Sometimes a municipality plays a highly positive role in stimulating community-based solid waste management. Quito (Ecuador, LA 10) offers an example: the municipality stimulates a neighbourhood sorting and recycling plant by doubling the sales of recyclables. This money is invested in local projects, selected by the community. The attitude of the municipality is, however, often bound to elections, its assistance is thus temporary and its solid waste management policy lacks continuity. In Lima, Peru (LA 15), agreements were made between a local women's organization, MUPROBA, and the municipal cleansing service, ESMLL. These agreements concerned the provision of containers and a waste collection service in a previously unserved area. A sudden political change gave rise to a switch in ESMLL personnel. The new staff members did not feel obliged to follow the agreements with the community. MUPROBA had no means to enforce it. In Mali (AF 11) the micro-enterprise GIE Beseya suddenly had to pay for the land they had received free of charge for sorting and disposal purposes. Several NGOs also face difficulties in expanding and replicating their activities to other areas, because the assistance of municipalities is often bound to certain persons (Pakistan, AS 18, Brazil, LA 5). In particular, the influence of an active mayor is indicated in some cases as a success factor and the lack thereof often causes the community-based solid waste management project to slow down. For example, in Vila Reis (Brazil, LA 4), much was achieved in improving the living conditions in this informal settlement and in the provision of services, when a

progressive female mayor was head of the municipality. The Curitiba case in Brazil (LA 7) is also a very lively example of the important role of the mayor in the success of community-based solid waste activities.

Absence of legislation backing up community initiatives in solid waste collection and recycling is a common problem. For example, laws to oblige households to separate their wastes at source, or to make garbage ready for collection on certain days in the week, legal sanctions for non-payment of fees and laws to prohibit free discharge of garbage into rivers, streams, etc. (the Philippines, AS 19).

Community organizations that have proved their capacity to achieve visible improvement, are often able to convince the municipality of the need to help them. But this depends also on political circumstances. In Mexico (LA 14), the CACRETEM women's group did not receive help from the municipality, until problems became very urgent and they had proved their ability to carry out organic waste collection. Then they were given access to mass communication means.

Some community initiatives are able to mobilize the community to lobby for assistance from the municipality. An example is Mali (AF 11) where twelve delegates from the neighbourhood went to the district government requesting them to give back a piece of land they needed for a garbage depot. The effect of this action is not known. In San José, Costa Rica (LA 9), the contract of a waste collection micro-enterprise was not renewed by the municipality. Lots of households of the previously served neighbourhoods, protested against this decision. It is unknown what will happen next, but it seems as if this will lead to a new agreement.

From Nepal an example is known of involvement of local authorities in projects from the beginning, paralleling the involvement of communities. In three wards of Kathmandu a solid waste programme, funded by MEIP, a programme of the World Bank, was started based on a participatory action planning approach. First talks with ward officers, local representatives of the government, were held. Then partners within existing CBOs were sought. Confidence had to grow between governmental and non-governmental partners. Ward officers and CBOs jointly identified the existing problems. Then working committees were formed, based on established CBOs and newly formed groups. These committees conducted pilot activities such as mass processions, clean-up campaigns, street waste removal. A baseline survey was then executed by trained community volunteers. A series of ward-level workshops was held to disseminate this baseline information and to formulate action plans and implementation strategies accordingly. The municipality offered waste transfer equipment and ward budget could be used for the activities. This programme shows a way to deal with mutual distrust between elected officials and informal community leaders. This solution is called 'structured facilitation' of cooperation between formal and informal partners: briefing the various partners, eliciting their views and bringing them together. But even this programme suffers from a lack of policy and action from the higher level government, regarding systemic decisions and marshalling of resources, which led to an accumulation of waste at transfer stations. In the future, MEIP plans to install a waste management and sanitation forum that includes ward officers, NGOs and CBOs to exchange practical information and to carry out studies and demonstration projects (Stern, 1995).

4.5.3 *Overview of cooperation problems with municipalities*

PROBLEMS	SOLUTIONS	EFFECTS
direct obstruction of community-based solid waste management	<ul style="list-style-type: none"> - improve communication with the municipality - extend the service to include secondary collection 	<ul style="list-style-type: none"> - not always possible
lack of assistance from the municipality	<ul style="list-style-type: none"> - mobilize the community to lobby for assistance from the municipality - local authority involvement from the start - structured facilitation of formal-informal cooperation 	<ul style="list-style-type: none"> - effective - effective

CHAPTER 5 COMMUNITY-BASED SOLID WASTE MANAGEMENT AND WATER SUPPLY PROJECTS COMPARED

5.1 Working method

Chapter 3 provides an overview of the social and management problems encountered in the literature on community-based solid waste management projects. This chapter marks the transition to the water literature, to experiences from community-based water supply projects and their applicability for community-based solid waste management projects. Firstly the working method of the comparison will be explained. Later on the similarities and differences of solid waste and water supply projects will be described to put the comparison of both kinds of the projects in the right perspective.

With regard to the working method, the same five categories of social and management problems, described in Chapter 3, were used to guide the search in the water literature. A checklist was made, based on these five categories comprising the problems that lack a satisfying solution, and topics that require special attention. Box 4.A presents this checklist.

Box 4.A Checklist used searching the water literature.

Cooperation with households

1. Education

How can households be persuaded to see the relevance and benefits of a service?

What education is needed to make solid waste a perceived need? How can behaviour of households best be changed?

2. Women

How can women's involvement in service management be increased?

How can negative effects of solid waste management on women's daily tasks and well-being be prevented?

3. Incentives

How can the motivation of operators and managers be sustained?

How can the enthusiasm and participation of households be raised and sustained?

4. Responsibility for public spaces

How can a feeling of responsibility for public spaces such as streets, dumping sites, etc. be encouraged?

Management

1. Community management

What conditions have to be fulfilled to establish real community management?

How can a community-based service become more independent of the municipality?

2. Accountability

How can accountability of the management to the community be increased?

3. Representativeness

How can management be made more representative of underprivileged community groups?

4. Cooperation with traditional leaders

5. Involvement of local youth and women's group

Operation

1. Monitoring of the service

How can performance control be improved?

What systems exist to enable reporting of problems and to give feedback on the performance of a service?

2. Integration of private collectors into the system

Finance

1. **Mobilization of local financial resources**

What tariff systems are appropriate to enable cross-subsidies?

Which ways of fee collection are appropriate in low-income areas?

2. **Sanctions**

Which sanctions are effective in enforcing fee payment?

Cooperation with municipalities

1. **Political pressure**

How can a community be best mobilised to exercise pressure on the municipality?

2. **Tuning of policy and activities**

Which cooperation mechanisms exist to enable a mutual tuning of policy and activities between communities and municipalities?

How can an enabling attitude within the municipality be encouraged?

All articles and reports under examination were studied on these aspects, and solutions for the mentioned problems were sought. Water supply projects have a longer history on community participation and management than solid waste management projects, so the literature is also much more extensive and many project experiences have already been summarized in reports. Community management is a rather new issue, dating from approximately the last ten years. Both literature on community participation and on community management has been studied.

5.2 Similarities and differences

Water supply projects differ from solid waste management projects in a number of ways, but there are also similarities. Participation of individual households in community-based water supply projects is roughly comparable to community participation in solid waste management projects:

- Proper sanitary behaviour (obey to rules and schedules jointly agreed upon with regard to the use of the water supply)
- Contribution in cash, kind and/or labour (pay water fees, voluntary labour is common in the construction phase, although sometimes cleaning of pump or tap surroundings is carried out by individuals on a rotating basis)
- Participation in consultation (attending meetings, elect representatives for management, give feedback on operation and management)
- Participate in administration and management (as member of a water committee, or another CBO, etc.)
- Participation in decision-making

Also the form community management takes in a water supply project, is comparable. Very common is a water committee supervising the operation and management of system maintenance, collecting fees, buying spare parts, paying operators or repair persons. It then also is the point of contact with outside agencies. Sometimes the committee has been elected democratically, sometimes it is an elite-led association. It can be an existing organization, a newly created one, or a subcommittee of the neighbourhood/village development committee. In a number of piped water supplies lower level tap committees exist, which have functions such as monitoring, maintenance and keeping the tap surroundings clean. Sometimes higher

level committees are formed to coordinate community activities and to formulate policies. Operators and repair persons can be one or more caretakers who are responsible for continuous hygienic operation and sometimes preventive maintenance of pumps, taps, etc. Preventive and curative maintenance and repairs are often provided for by special mechanics or scheme attendants. In most cases the government is involved in major repairs, through two- or three-tier systems, in the form of local governmental units or district sectional offices of the national water agency.

5.2.1 *Similarities*

From the water literature it appeared that generally speaking many social and management problems, faced in community-based solid waste management projects, resemble those encountered in community-based water supply projects. Examples are:

- Low willingness to pay and problems with fee collection
- Lack of accountable management
- Difficult cooperation with governmental agencies
- Poor service performance (operation and maintenance in water supply projects, operation in solid waste management projects)

The difficulties faced by communities involved in primary waste collection with the interface with (municipal) secondary collection, are quite similar to those encountered by two- or three-tier maintenance systems in the water sector: a lack of coordination, no timely reporting of problems, lack of political will and a neglecting attitude from the side of the agencies.

5.2.2 *Differences*

When looked at in more detail, some important differences between water and solid waste management projects appear. These differences may influence the success of a community management approach in both kinds of projects and also the applicability of water experiences on solid waste activities.

1. Construction versus operation and maintenance

The first big difference is, that a solid waste management system is in fact a continuous maintenance system. Of all urban services solid waste management requires the greatest amount of citizen cooperation, on a continuous base. Water supply projects always have a construction phase, which is a one-off action. Only operation and management of maintenance of water supplies are relevant for solid waste services.

2. Felt need

The population usually considers water supply to be a more important issue than solid waste; it is a greater felt need. Waste can always be disposed of in the neighbourhood (thrown in the river, buried, burnt), but you cannot live without water. Therefore, solid waste collection, such as sanitation, often has a lower priority among low-income communities, facing many problems in their living conditions.

3. Benefits

An improved water supply has also more tangible benefits than an improved solid waste service; a tap or pump may become a status symbol. Water can also have more direct

economic benefits such as the greater availability of water for growing crops, watering cattle, etc. Recycling of solid waste requires extra skills and more uncertain benefits. This means that a community may be more easily motivated for a water supply project than for a solid waste management project. Besides, solid waste usually stands low on the priority list of many governments, international donors and city officials.

4. Perception of the service

The perception of the service is also quite different, because solid waste is a socially and culturally more complex issue. Waste collectors often have a low status; collection and recycling is frequently carried out by minority groups, such as the casteless people in India. In certain cultures and religions it is prohibited to touch solid waste with one's hands.

5. Nature of problems

Some problems are absent in the water literature, because they are linked to the very nature of solid waste. For example, a very particular problem of solid waste management projects is the negative attitude of servants and watchmen towards garbage separation and recycling, who are aware of the economic value of waste or who do not like the extra work. Furthermore, the status of waste collectors is much lower than the status of operators in the water sector. Pump caretakers, mechanics, etc. are often unpaid or receive a limited salary, but they have a rather high status. Women in India, for example, who received training in hand pump maintenance and repair, experienced that they had become more respected community members. Some of them even became candidates for the local council elections.

6. Context of the literature

A last remark concerns the context of the literature. Much of the water literature concerns rural projects. There are significant differences between rural, and urban and peri-urban conditions, although both rural and peri-urban water supply projects are focused on low-income communities. Solid waste is usually not a big problem in the countryside, because quantities are small and the major part of the waste is organic and as such used on the land. There is virtually no literature on solid waste management in rural communities, whereas the majority of water literature is concerned with rural projects. It has to be stressed that solutions from rural water supply projects may not be directly applicable to urban solid waste management projects, because of differing social, economic and cultural circumstances. This has to be kept in mind when rural examples are given in the next paragraphs.

These differences both limit the applicability of solutions from the water sector in the solid waste sector and are responsible for the absence of certain social and management problems in the community-based water supply projects. In the next chapter, solutions from the water literature for the social and management problems -as derived from the solid waste literature- will be described. These problems and solutions will be dealt with in the same order as in Chapter 3. At the beginning of each paragraph solutions that were already found in the solid waste literature, will be summarized.

CHAPTER 6 APPLICABILITY OF SOLUTIONS FROM COMMUNITY-BASED WATER SUPPLY PROJECTS

6.1 Low household participation

6.1.1 *Low community priority for solid waste management*

Solutions from the solid waste sector:

- Education
- Provision of appropriate incentives
- Consultation with the community
- Give the community a role in planning
- Community needs assessment study

Lessons from the water sector:

Also in water supply projects communities are more motivated when a safe water supply is a real community problem and when it has priority (Evans et al., 1993). Thus the importance of preparatory research to assess community needs is recognised and practised. Motivation activities should be based on aspects which are important for the target group and should continue during all phases of a project. The basis for motivation may be different for the different community groups, because women, for example, may have other needs and priorities than men (Wegelin-Schuringa, 1992).

Multi-purpose projects are a possibility to create different benefits (e.g. improved water supply both to generate income and to encourage domestic use for hygiene). This kind of projects make participation more attractive for community members, and thus stimulate their willingness to use and sustain water systems properly, including willingness to pay and to undertake community management (Kamminga, 1991).

In order for the service to be effective, it is argued that mobilization efforts should be accompanied with physical improvements that meet felt needs and with the involvement of the community in planning (Clever, 1990). The anticipation of some tangible reward or observable benefits in the short term are important elements of a strategy to create a priority/need for water or sanitation.

Methods used in sanitation projects for increasing community motivation, are:

- Demonstration of the improved technology
- Involvement of the people in design and adaptation
- Promotion by people from the project area who have already been convinced of the project's benefits (Bakhteari et al., 1992).

6.1.2 *Low willingness to participate in collection and recycling*

Solutions from the solid waste sector:

- Household and city competitions
- Pay households for their participation
- Exchange garbage for free bus tickets or food parcels
- Give proceeds of recyclables to servants
- Education

Lessons from the water sector

Low participation in waste recycling and collection can be compared with improper behaviour of households around water points. There is no experience in water supply projects with servants who do not want to cooperate. That is a typical solid waste problem. Ways to make people aware of the importance of cleanliness of the environment, used in water supply projects, are: sanctions for bad behaviour and education.

Sanctions for bad behaviour used in water supply projects and relevant for solid waste, are:

- Social pressure (easier in smaller user groups)
- Fines for offenders
- Warning by local leaders
- Use of the traditional village court

The assistance of local leaders and water committees is especially important to have sanctions, rules and regulations respected. The sanctions, rules and regulations should be well-known in the community. The role of education is essential in this respect.

In the water sector much experience has been obtained in the field of hygiene education. Some possible lessons for the solid waste sector are described here:

Often not more than 5% of the total budget of a water supply project is used for education. This has proved to be not enough for effective use and proper maintenance of the water supply (UNICEF, 1994). Some successful water supply projects that aimed at community participation have used 15 to 25% of their budget for education, promotion and training. This might be a lesson for community-based solid waste management projects: reserve an adequate budget for education and promotion.

Cooperation with other agencies, ministerial departments (e.g. Public Health) and NGOs to carry out education may be another useful idea coming from the water sector. But also the use of participatory techniques, which are often cheaper than conventional educational methods and involve an awareness raising aspect, might be useful. One-way information transfer (lectures, films, etc.) directed to individuals, has been found to be less effective in achieving behavioural change than a discussion approach. The mere provision of health information is also unlikely to change behaviour patterns based on what is often a complex set of socio-economic and cultural factors (van Wijk, 1987).

Useful participatory education methods derived from the water sector may include the involvement of water committees (or subcommittees) in the implementation of hygiene and sanitation surveys in their own community, the involvement of local leaders in the communication of health and hygiene messages, and participation of community members in the manufacturing of educational materials. Appropriate communication channels are a precondition to reach the target group with educational messages. From the water literature it becomes clear that men and women, for example, use different communication channels: public meetings and demonstrations (slide shows, films) are often more appropriate for men, radio programmes and home visits for women (van Wijk, 1993). The use of local channels of communication and traditional media such as puppet shows has proved particularly effective to spread health and hygiene messages.

Health education should be based on a thorough knowledge and understanding of the target groups, and not be mere promotion or distribution of one-sided health messages (WHO, 1989). Preparatory research on concepts and practices that live in a community should be carried out.

The content of education might be gender-specific, because men and women often have different interests, needs and responsibilities (van Wijk, 1985). Poorer people may need subsidies or the provision of implements which facilitate them to improve hygiene. With solid waste this might be subsidized containers or garbage bins for example. Seven lessons about the contents of education, which are probably applicable to solid waste management projects, are given in Box 5.A.

Box 5.A Seven lessons from sanitary health education in Lesotho.

Characteristics of effective health education:

- It promotes actions which are realistic and feasible within the constraints faced by the community.
- It builds on ideas, concepts and practices that people already have.
- The information is repeated and reinforced over time, using different methods.
- It uses existing channels of communication such as songs, drama and story-telling, and is adaptable.
- It entertains and attracts the attention of the community.
- It uses clear, simple language with local expressions and emphasizes short-term benefits of action.
- It provides opportunities for dialogue and discussion to allow learner participation and feedback on understanding and implementation.

Hubley, 1987.

6.1.3 Low willingness to keep public spaces clean

Solutions from the solid waste sector:

- Periodical clean-ups
- Education and make site valued
- Integrate street sweepers in solid waste management system
- Guard at transfer station
- Shared caretaking systems

Lessons from the water sector:

In water supply projects, problems with responsibility for public spaces relate to the area around pump, tap, well, etc. It is common to have a water committee which sets rules and regulations for proper use and behaviour around water pumps, taps, etc., which are not necessarily written down. Traditional leaders and formal administrative bodies can be involved in enforcing these rules.

The scale of the system is important in determining the feeling of responsibility. Successful community-based water supply projects use small water-user groups or pump/tap committees, which have few members and generally consist of people who are well known to one another. These are federated upward into groups at the next organizational level. The lower level committees reinforce social control (Narayan, 1995). Maybe with solid waste management lower levels, lower than the neighbourhood, can also be involved and groups organized on street or dump site basis. For the mobilization of these groups, for example for clean-ups,

local leaders who have proved their qualities, can be used (NGOs, churches, mosques, traditional leaders).

Specific arrangements to keep the area around the water point clean are characterised by a high participation of women. Possible arrangements are:

- Appointment of a woman living nearby
- Establishment of a special site committee (or a sub-committee of the water organization)
- A user roster (community members clean the area on a rotating basis)
- A female caretaker
- A team of a male and female caretaker (man for the technical jobs, woman for the hygiene aspects)
- Site management through organizations of women users

For solid waste management projects, caretaking arrangements for dumping sites or collection depots could be established too. It remains a question whether guards have to be employed by the municipality, a micro-enterprise, or a CBO.

6.1.4 Low willingness to pay

Solutions from the solid waste sector:

- Change the method of payment
- Education (people to change perception of fees and to clarify benefits and financial obligations)

Lessons from the water sector:

Experiences from the water sector show that low-income communities do not want improved services, but only if these meet their perceived needs. The most appropriate technology is not necessarily the simplest or cheapest. Users are able and willing to pay for services that they perceive to be valuable. Consultation with communities is essential in choosing technical and financial solutions (Briscoe & de Ferranti, 1988; WHO, 1989).

It is necessary to assess which factors determine willingness to pay for an improved service to establish appropriate fees and incentives and to provide the right kind of education.

Willingness to pay for an improved water supply, for instance, is linked to accessibility of the water supply (quantity and convenience), not to water quality (health aspects) as many governments and donors thought. Education has often been too much centred on health aspects, while these were not the most important for the community (UNICEF, 1994).

Willingness to pay for improved sanitation (latrines) is usually much lower than for an improved water supply, although this depends on class and circumstances. High-income groups and people living in densely populated areas usually have a high priority for sanitation (Briscoe & de Ferranti, 1988). It might be a good approach to detect which groups or types of neighbourhoods are interested in an improved solid waste service and to start with these.

In the water sector communities are often allowed to choose their own sanctions and control systems, their rules and guidelines to deal with defaulters. Sanctions for non-payment used in the water sector are:

- Disconnection (and high reconnection fees)

- Social pressure
- Allow members to pay in kind
- Refuse access to the communal water point
- Fine offenders
- Verbal warning
- Use of traditional village court.

Disconnection from solid waste collection is only possible when fees are being paid directly to garbage collectors. The other sanctions apply best to smaller groups and more traditional communities. Effective enforcement of sanctions is crucial for their impact. The capacity to enforce sanctions differs from place to place, depending on the authority and legitimacy of the various institutions, such as local administrative bodies, traditional leaders or water committees.

Box 5.B How to solve user unwillingness to pay.

Measures to take:

- Make facilities more convenient and better suited to users' needs
- Fee reduction
- Modify the basis of payment (fixed rate, or graded rate based on consumption, distance to service, ability to pay, etc.)
- Make place of payment convenient (e.g. house-to-house collection of fee, pay at service point)
- Make time of payment convenient (instalments, after harvest)
- Increase user satisfaction by responding to feedback (complaints)
- Provide incentives (discounts for prompt payments)
- Impose sanctions against non-payers (group pressure, disconnection)
- Let communities decide on sanctions and incentives
- Make water supply free of charge for human consumption and paid for watering animals and irrigation

Whyte, 1986.

6.2 Management problems

6.2.1 Low willingness to manage

Solutions from the solid waste sector:

- Restructure management committees
- Training and exchange visits for management committees
- Technical/financial/moral support from the municipality

In water supply projects a system of one man or woman managing the system on his or her own was not encountered. Successful community-based water supply projects have shown a pattern of leadership that shifts to those most interested in project outcome. These are often informal leaders (leaders of influential CBOs, of health centres and churches, active members of political parties, etc.) from the community. Water committee members often receive a training and therefore have a rather high status in the community. In some cases they receive a small material reward for attending meetings such as an attendance allowance or a lunch, though this is not very common and mainly used in the beginning of a project. Educators and promoters receive a training, including a certificate of completion, sometimes reimbursement of travel expenses and/or a small material reward such as a sanitation kit. Some are given credits for future jobs in the formal sector.

6.2.2 *Lack of accountability to the community*

Solutions from the solid waste sector:

- Define rights, responsibilities and obligations
- Establish procedures of control

Lessons from the water sector:

Water supply projects have a lot of experience with problems of lack of accountability to the community resulting in a monopolization of public taps, misappropriation of funds, etc. There are three kinds of accountability:

- Operators have to be answerable to the management committee.
- The management committee has to be accountable to the users
- Sometimes, the management committee is held accountable to the governmental agency or an NGO.

Operators often keep records on frequency, nature and duration of pump breakdowns and report regularly to the water committee or its chairperson.

Means of control of operation, management and maintenance for users used in water supply projects are:

- Complaint boxes in shops, schools, government offices, health centres, etc.
- Complaint cards given to residents, preferably women, and collected by a mobile technician on his regular repair rounds
- Consumer surveys carried out by the management committee, governmental agency or an NGO

In solid waste management projects complaint cards could be collected by the operator of a solid waste collection service or a fee collector.

Financial accountability is a separate issue. Some ways of regular financial reporting by the treasurer or the water committee to the community are (Fry, 1993):

- A bulletin distributed to households
- A community meeting with an oral report given by the treasurer followed by questions and answers
- A financial report written on large sheets of paper and posted on walls in public places, particularly where people come to pay their bills
- A water committee meeting dealing with financial matters, open to the community

A prerequisite for financial accountability are good bookkeeping practices. In some water supply projects the provision of treasurers with account books and water fee collection cards at the end of a financial management training has been helpful to improve bookkeeping. The involvement of local teachers as bookkeepers has proved effective too (Mc Gowan et al., 1991). A way to avoid misuse of funds is the condition to withdraw money from the bank only with two or three signatures of committee members, or with one signature from someone of the assisting NGO, extension service, etc. (World Bank/UNDP, 1991).

The accountability of a management committee to a governmental agency or NGO is often laid down in a contract, which can be signed by all community members, all heads of households or a representing body such as the water or development committee. It is useful to

clarify rights, responsibilities and obligations of all parties involved in a public meeting at the beginning of the project. Training in accountability is very important. It should comprise the following:

- Treasurers: will have to know how to make simple summaries of costs and expenditures and how to present these to the committee and to general assemblies of the users.
- Committees: will have to know how to account to the users for their performance.
- Users: should know of their rights and how they can arrange for accountability, e.g. through statutory annual meetings and an independent audit committee for checking the books.

6.2.3 *Unrepresentative management*

Solutions from the solid waste sector:

- Intervention of implementing agency to adjust composition of committee (gender, ethnic)
- By-pass existing committee/work directly with beneficiaries

Lessons from the water sector:

To ensure the participation of women, it is necessary to involve women from the beginning, for instance, in public meetings about the project. Box 5.C provides some measures used in the water sector for facilitating the participation of women in public meetings.

Box 5.C How to facilitate the participation of women in public meetings.

- Promotion of attendance at meetings
 - * Make both male and female opinion leaders aware of women's involvement and ensure their support
 - * Use suitable times and places
 - * Inform women both through men's and women's channels
 - * Hold a second, separate meeting for women if necessary, or use small working groups
 - * Reach poor women through neighbourhood delegations or informal group meetings
- Increase two-way communication
 - * Use local language
 - * Adapt seating arrangements, so that women do not sit in the rear or very dispersed
 - * If necessary, use local educated women (nurses, teachers, midwives) as intermediaries
 - * Hold a break in meeting proceedings for women to discuss
 - * Use a spokeswoman to voice their opinions
 - * Establish individual membership and voting procedures, not by 'heads of households'

van Wijk, 1985; van Wijk, 1989.

Ways to encourage women to take part in a water committee have been developed in different countries. To make sure that women are adequately represented, guidelines for water committees can be established, including the guideline that a minimal proportion of committee members has to be female. The following activities can also be carried out with a group of women from the community to find local candidates for a water committee (IRC, 1988; van Wijk, 1993):

- Define the tasks: some responsibilities and tasks may be more appropriate to be done by a woman (e.g. communication with other women, management of health/hygiene aspects, financial management), others are more appropriate for a man.

- Determine the requirements (time, characteristics) of the job.
- Jointly identify the type of woman having the basic requirements for the job.
- Identify and contact possible candidates and, when interested, help them obtain acceptance and support from their environment
- Select at least two women, for mutual support
- Make sure that training and periodic support (especially for technical and managerial tasks) are available to women committee members.

To facilitate women to attend training courses, some specific measures can be taken: organize group travel for women to reach the training site (Bangladesh), decentralise training courses to the village level (Tanzania), provide child care facilities (Nigeria, Guinea-Bissau).

It is often necessary to develop positive attitudes of men to women's involvement. To overcome opposition by men, the following solutions were tried in the water sector:

- Obtain support from male local leaders right from the beginning.
- Prepare a ceremonial dinner at which the purposes of the programme are explained.
- Make the most negative elders official advisers of the mothers' club.
- Involve husbands in some of the activities (e.g. training courses).
- Have husbands accompany the women to a formal graduation ceremony at the end of a training course.

To adjust the ethnic composition of a management committee, only a few experiences exist. One solution from the water sector shows the representation of different ethnic groups in water committees according to their proportional share in the community. In other cases a 'functional' representation is used; the presidents of influential CBOs, women's organizations, political party branches, and the like, are represented in the committee.

6.3 Social operation problems

6.3.1 Low salary of operators

Solutions from the solid waste sector:

- Part-time employment
- Cross-subsidies
- Add income generating recycling projects
- Provide group benefits
- Provide exemption from certain municipal taxes

Lessons from the water sector:

From water supply projects it has become clear that a personal interest in a well-functioning pump, good local supervision and a compensatory appreciation are important in determining the motivation of operators. Women are therefore often engaged as voluntary caretakers or mechanics. Young people prefer, as in solid waste management projects, a material remuneration rather than to work voluntarily. Mechanics and caretakers in water supply projects often work part time. Sometimes having a primary vocation is even a prerequisite for participation in a training course (Dotse et al., 1995). Most pump/tap mechanics earn a salary. Payment according to achievement is not considered positive in hand pump water supply

projects, because if mechanics are paid per repair they tend to neglect preventive maintenance.

Caretakers are often remunerated through non-financial benefits: the exemption of communal labour, the provision of tools which they can use for other purposes too, or the right to use a piece of communal land, near the water point.

6.3.2 *Low status and bad working conditions*

Solutions from the solid waste sector:

- Education/promotion campaigns
- Identity cards for collectors
- Municipal letter of authority
- Official introduction of collectors by NGO
- Provide operators with facilities

Lessons from the water sector:

The problem of low status particularly exists in India with projects involving ex-waste pickers. Their low status is not comparable to the socio-economic position of most hand pump caretakers, tap attendants, mechanics, etc. Operators in water supply projects usually lack this kind of social stigma, so they do not need identity cards or a letter of authority.

In Nigeria village-based workers, who are among others involved in water and sanitation, are motivated with the following methods, aimed at the provision of identity, status, economic incentives and/or political leverage (Pickford, 1990):

- Provision with a uniform or vest
- Recognition during community meetings, visits of government officials, commissioning of boreholes, etc.
- Assistance in securing loans
- Priority in allocation of fertilizer
- Subsidized latrine slabs
- Access to promotion materials
- Formation of associations of village-based workers and assisting the associations with income generating activities

Some of the methods used in Nigeria to motivate village-based workers, may be applied in solid waste management projects too to increase the status of the job, such as the provision of a uniform or vest. Another option is their recognition during community meetings, visits of government officials, commissioning of boreholes, etc. Finally the formation of associations of operators and assisting the associations with income generating activities are a way of increasing their political leverage and giving them an identity.

6.3.3 *Unreliable service*

Solutions from the solid waste sector:

- Involve operators in decision-making
- Relate payment to performance
- Division of collection areas and responsibilities

Lessons from the water sector:

The background of an unreliable service is different for water supply and solid waste management projects: in the water sector it is often related to technical difficulties (resulting in irregular supply from taps), whereas in the solid waste sector the background is more social (low status, little incentive, the ‘freedom of the street’ attitude of ex-waste pickers).

Unreliability of the service is one of the more common problems in the solid waste sector. Paragraphs 5.3.1 and 5.3.2 illustrate ways to increase the motivation of operators. Box 5.D provides an overview of ways to improve performance control as used in the water sector.

Box 5.D Ways to improve performance control used in the water sector.

Ways to improve performance control used in the water sector		
For managers:	For users:	For the governmental agency:
To control operators: <ul style="list-style-type: none"> - Rules and regulations for operation - Record keeping by operators - Regular reporting to management committee by operators 	To control the management committee: <ul style="list-style-type: none"> - Statutory meetings - Regular elections of members of management committee 	To control operation and management: <ul style="list-style-type: none"> - Local monitoring assistants - Regular reporting by management committee
	To control operators: <ul style="list-style-type: none"> - Complaint boxes or cards - Regular consumer surveys - Selection of operators - Assessment of trainees 	

6.3.4 Competition from private entrepreneurs

Solutions from the solid waste sector:

- Consultation with municipality/governmental agency
- Education of households
- Integrate private entrepreneurs into the project

Lessons from the water sector:

Theoretically a similar problem in the water sector could be encountered with water vendors who feel threatened by a water supply project, e.g. the establishment of community-based water kiosks. No examples of this kind of problems were found in the literature. Only some ways to integrate water vendors in water supply projects are described. For example, in some countries water vendors are provided with a private metered connection supplying a public stand post. A concession agreement is made between the water agency and the vendor, with

covenants stipulating the concessionaire's maximum selling price and other obligations (WHO, 1989). In some cases, water vendors deliver a complementary service to the improved community-based water supply. For example, when water kiosks are closed, when there are long queues or as a personal service to people who are not able to transport water (Mathew, 1991).

6.3.5 *Space problems*

Solutions from the solid waste sector:

- Consultation with local NGOs and opinion leaders
- Start a media campaign with the help of local youth groups
- Have delegates from the neighbourhood lobby the municipality for space

Lessons from the water sector:

Space problems for public tap stands or hand pumps are not described in the water literature; sometimes the municipality provides land, sometimes a higher income community member, or, for example, a mosque (Mc Gowan et al., 1991). No real solutions are found for this type of problems in the water sector.

6.4 Financial problems

6.4.1 *Cost recovery problems*

Solutions from the solid waste sector:

- Improve financial control
- Offer additional services
- Carry out a socio-economic feasibility study

Lessons from the water sector:

To cover initial capital costs of water supply costs, funds can be raised through local revolving funds, lotteries, auctions, local credit circles, raffles, bazaars, entertainments (e.g. showing popular movies), donations from prominent individuals, and the launching of CBOs. In some water supply projects capital costs are covered by communities: they are obliged to make a down-payment in advance before construction starts. This is usually laid down in a contract between the community and the implementing NGO or the governmental agency.

Water supply projects have improved financial control by providing bookkeeping training, the provision of account books, water fee collection cards, etc. and by employing teachers or women as treasurers.

One of the experiences from the water sector with additional services are shared private water supply connections combined with sanitary blocks (latrines, showers, etc.), serving clusters of households. Residents have to pay in cash each time they use the connection. Sometimes water points are adapted in their design to special wishes of certain community groups, for example women; to create laundry places, washing basins, showers, etc. Involvement of the local people in design and planning of a solid waste service might give an insight into community wishes about additional services. The water sector has also experienced that feasibility studies are important, particularly if water supply projects are supposed to

stimulate economic activities. Here too local market conditions are not always conducive to the achievement of project goals (Kamminga, 1991).

Financing systems used in water supply projects may be adapted to solid waste management projects. Common financing systems used in community-based water supply projects are communal funds, user charges, vending arrangements and the use of local taxes. Box 5.E illustrates different financing systems with their conditions and approaches.

Box 5.E Options for community financing of a water system (GTZ, 1989).

What?	When?	Who organizes?	How?
Voluntary funds	In communities with a tradition of fund-raising, seasonal income, and a good knowledge and control of payments according to household capacity and benefits	Traditional leadership, voluntary organizations, e.g. women's groups, tap organizations	Targets are set and funds collected periodically through meetings, house-to-house collections, bazaars, etc. Funds are collected in advance or when required
General community revenue	In communities with own sources of income and a water supply with public facilities	Local government, water committee or subcommittee	Reservation of funds based on the estimated costs and the net annual income of the community; cost reduction or income generation where necessary
Cooperative funds	Water supply initiated and financed through producer cooperative or village revolving fund; no direct payments for water used	Cooperative's executive committee, water committee or subcommittee	Reservation of funds on estimated costs and income from cooperative ventures and/or member fees; cost reduction or income generation where necessary
Flat rates	Families have private taps, or share taps with well-defined social group, have fairly reliable incomes, and benefit more or less equally	Water committee or subcommittee, local government, tap users' committee	Project agency advises initial rate for approval of users; rates are collected and administered by the local water organization
Graded rates	In communities with appreciable differences in water use and benefits and sufficient community spirit to divide user households into different payment categories	Community water organization with support from promoters or other social experts assisting the project agency	Private tap owners are classified in high and low rate categories, using local indicators of water use and wealth; users sharing taps may pay lower or equivalent individual rates
Mixed systems	In communities with large differences in payment capacity and water use, with high and low-income households living in separate sections	Water agency with water committee or subcommittee	Surpluses or private taps are used to finance the costs of free public taps in poorer sections

What?	When?	Who organizes?	How?
Water metering	In large communities with limited water resources and an efficient administration	Water agency and/or community water organization	Metre reading, billing and rate collecting by separate workers, or payment through banks, at central government offices or local branches
Vending instead of a piped distribution network	In communities where a socially valuable vending system can be improved, where other solutions are technically, economically or politically impossible	Water agency with paid operators (licensed sales), women's groups or water sellers' cooperative	Water is sold from metered taps at controlled prices; when buying prices are subsidized, selling price may equal private rates, the difference forming the vendors' income
Vending as part of a piped distribution network	In communities where group connections or cross subsidies between private and public taps have not worked	Water agency with paid operators or socio-economically appropriate concessionaires, e.g. women heads of households	
Direct or indirect water taxes	In communities where the transfer of sufficient funds to the water organization is assured and taxation can be related to water use and costs. Water rate as addition to the local council taxation or as a percentage of property rent	Local government service organization for a specific area, e.g. a low-cost housing scheme	Taxes are exclusively for financing one or several basic services; categories of payment are based on level of service or house conditions

The applicability of these systems to solid waste management projects can be defined as follows. Voluntary funds often do not function adequately in solid waste management projects, as some examples from Indonesia show (AS 5-13). Other communal funds will probably encounter specific difficulties in cities, because they require a communal production base which may not exist. With regard to user charges, flat and graded rates are well-known in the solid waste sector. Mixed systems and water metering may provide new possibilities of cross-subsidies. Water metering can be compared to measuring the amount of solid waste produced (in volume or weight).

Vending systems with relevance to solid waste are:

- Shared private connections and sanitary blocks serving clusters of households, who have to pay in cash each time they use it (Sierra Leone, CHF, 1992). This kind of system could be combined with garbage collection depots. One income-generating service could even subsidize other services.
- Metered group connections paid for by a larger user group with its own group committee. This system is somewhat comparable to a community or group paying a private operator to collect solid waste in its area.

- Semi-autonomous systems, e.g. piped water is sold in bulk by the governmental agency at a discount rate to a specific neighbourhood or group which organizes its own distribution system and fee collection. In the same way communities that organize their own primary solid waste collection systems could receive some benefit from the municipality like exemption from certain local taxes or a subsidy to buy equipment.
- Concession system: an individual or group concession/license to exploit a water kiosk, allowed for by the local government. This is comparable to the system of local private operators (micro-enterprises) of solid waste collection systems, who obtain a license or concession from the local government and are paid by them. This is not necessarily a community management option. A new aspect appearing from some water supply projects is the explicit involvement of female heads of households as concessionaires.

Inclusion in local taxes is often not working in solid waste management projects, because tax collection is deficient, or the transfer to management committees is not secured. It is also more difficult to maintain a direct relationship between solid waste management costs and revenues.

6.4.2 *Inadequate fee collection*

Solutions from the solid waste sector:

- Change way of payment
- Give fee collectors more personal benefit
- Establish/enforce sanctions for non-payment
- Fee collection by operators rather than by government officials
- Fee collection by respected community members

Lessons from the water sector:

Ways to increase willingness to pay and to establish/enforce sanctions for non-payment have already been described in Paragraph 5.1.4. Paragraph 5.2.2 provides ways to improve financial accountability. Women have been particularly active in financial aspects of improved water supplies; as treasurers in water committees, in fee collection and fund raising (van Wijk, 1985). In solid waste management projects their actual and potential involvement in financial management has still to be explored. From the water sector some lessons to improve the organization of fee collection can be derived. For example, the use of community meetings to ratify the billing rate, a fee collection plan, regular meetings to encourage rate payment (see Box 5.F). In water supply projects fees are collected by separate (special) workers, by small user groups via house-to-house collection, via community meetings, via deposits on bank accounts, at government offices or through payment in cash directly at the water point. The water supply projects experiences show that not all ways of payment are convenient for women. Payment at central places for example, is often culturally less appropriate than home collection of fees. Payment on a savings account is very appropriate, because it enables women to deposit small amounts at a time, and poor people to join projects which want larger payments as deposit or tariff (IRC, 1992^b).

To increase fee collection, a different tariff system using cross-subsidies can be introduced. In water supply projects tariffs depend on:

- Level of service
- Type of users (domestic, institutional, commercial, industrial)

- Income level
- Property value or characteristics
- Amount of water used
- The size of the connection pipe

Only the size of the connection pipe is not applicable to the solid waste situation. The amount of garbage can be measured according to the size or weight of the bin. Varying levels of service are also applicable to solid waste management projects: different rates could be used for collection from communal collection points, kerb side or house-to-house collection. Often the water agency, the government or the donor sets the tariff, but in many cases the local water committee determines the payment arrangements and obtain the users' approval. It appears that a community preferably decides itself on the water tariff or at least is consulted about it and agrees with it before implementation.

Box 5.F Community management and financing in the Philippines.

The rural Baranguay Water Programme has a well established financing policy.

Roles and responsibilities: Provincial authorities bear training costs, set up repair workshops, and provide officers. Users must agree to pay all costs of o&m, repay the loan for part of the construction costs, establish and staff a water and sanitation association, and make a first cash deposit.

Participation in planning: all heads of households are involved in planning through a series of meetings. The provincial and programme staff emphasize responsibilities which users will be taking on, more than benefits of the water supply. There is no need to convince people of these. By way of discussions, the level of service is adapted to community needs and payment capacities. A general meeting is called to ratify billing rates and a fee collection plan is devised in the course of working with the community.

Training: Training courses of five days on technical skills and administrative procedures are held. There are follow-up courses for bookkeepers.

Operation & maintenance: Frequent membership meetings are organized to encourage regular rate payments. The need for outside support is reduced by forming federations of water and sanitation associations which meet to discuss problems and to organize group purchases.

IRC, 1988.

6.4.3 Low ability to pay

Solutions from the solid waste sector:

- Different fees for different waste generators and levels of service
- Base fees on income level and/or amount of garbage produced

Lessons from the water sector:

Ability to pay has long been a measure for governments and donors to determine appropriate water supply systems. A range of 3 to 5% of the average household income spent on water fees covering capital and recurrent costs, was deemed feasible. Recently it was discovered that willingness to pay, combined with ability to manage, are far more adequate measures to assess the feasibility of a community-based project. Nowadays a service is considered affordable, when a community perceives it as valuable. This may lead to a desired level of service, which is not necessarily the simplest and cheapest.

One way to enhance ability to pay for an improved water supply is to combine it with income generating activities (e.g. irrigated crop production). The use of cross-subsidies, i.e. different tariffs according to service level and type of user, is quite common in water supply projects. It often occurs that access to one basic supply point (e.g. a stand post) is charged a lower rate than a more convenient supply (e.g. yard tap). This system is comparable to different solid waste tariffs for communal collection points and house-to-house collection.

Water tariffs sometimes take into account different abilities to pay (of women, poor neighbourhood inhabitants, etc.). An example is block rate pricing, where initial consumption (e.g. 10 cubic metres per month) is charged at a lower rate than subsequent blocks that are charged at full costs (Briscoe & de Ferranti, 1988). Block rate pricing could be used in solid waste too: a low rate for a basic amount of garbage (the poor usually produce less waste) and higher rates for subsequent blocks.

Several experiences from the water sector point to the different positions of women in financial household decision-making, depending on local cultural traditions. If men and women have their own sources of income and take part in financing arrangements as individuals, programmes should avoid that the same contribution is asked from men and women. In Niger for example, women pay 30% of the contribution to maintenance of the water supply system (van Wijk, 1993). This is a remark that applies also to solid waste management projects and that pleads for gender-specific preparatory research into ability and willingness to pay.

6.5 Failing cooperation with municipalities

6.5.1 Direct obstruction of community-based solid waste management

Solutions from the solid waste sector:

- Improve communication with municipality
- Extend service to include secondary collection

Lessons from the water sector:

One conclusion from the water literature is that, to function properly, two- or three-tier maintenance systems of water supplies require three elements: a proper communication system, a service-oriented attitude from the water agency and a management structure that enables prompt action. But also in the water sector these three elements are often lacking (Wegelin-Schuringa, 1992).

Communication with communities can be improved through changes in the organizational structure of a governmental agency. Conventional water agencies, for example, rarely have the socio-organizational knowledge, skills and attitudes required for stimulating community participation. Some solutions for this problem that have worked in the water sector, are:

- Adapt personnel management (engage community workers, communication staff, sociologists, etc.) and organize training of existing staff in community aspects
- Creation of separate socio-economic units or a community support section within the agency
- Cooperation with a (socially oriented) NGO
- Cooperation with other governmental agencies (Public Health, Community Development)

For the solid waste sector, the most relevant ways to adapt the organizational structure of the solid waste management department depend on the size of these departments, which determines the feasibility of separate socio-economic units, on the existence of strong NGOs and the willingness and capacity of other governmental agencies to cooperate.

Other ways to improve the communication with communities are:

- To engage special community workers
- To install joint management committees

Special community workers or promoters can be employed to help carry out socio-economic surveys, to organize the community to set up a management committee, and to carry out the administration and monitoring of the project (Briscoe & de Ferranti, 1988). Joint management committees include representatives of the community, local leaders, local government, implementing agency, etc. These are forms of communication between governmental agencies and communities that might be applicable to solid waste management projects too.

A service-oriented attitude in water supply projects includes that governmental agencies are able to assist communities in making the right choices, by explaining the various technical and managerial options and setting out the consequences in terms of costs, reliability, ease of administration and finance, and implications for hygiene practices and local development.

In the water sector decentralised management structures have been tried to enable prompt action if repairs are needed. Decentralised offices of the water agency are considered to enhance accountability and to be more conducive to timely performance of maintenance of water supplies. This issue is not very useful for solid waste management, because these are often already decentralised at the municipal level.

6.6 Lack of assistance from the municipality

Solutions from the solid waste sector:

- Mobilize the community to lobby for assistance from the municipality
- Involve the local authorities in a project from the beginning
- Structured facilitation of formal-informal cooperation

Lessons from the water sector:

In Latin American countries, it is rather common that local pressure groups from a specific neighbourhood petition for services, but it is also well-known in India. In the water sector, these groups sometimes use political power by forming so-called voting blocks. This might be a way to exercise pressure on the municipality to improve the timely performance of secondary waste collection services.

Experiences from the water literature show that some conditions concerning organization, policy and support services, have to be fulfilled at the agency level to make community management possible:

- **An appropriate organizational framework, adaption of personnel management and training of existing staff in communication skills**

This includes partnerships with other ministries, NGOs, etc. as mentioned in the previous paragraph.

- **Institutionalization of procedures and linkages for inter-ministerial collaboration**
In urban areas most infrastructure services (water, sanitation, solid waste, drainage) are interlinked, specifically at community level, which requires coordination of planning, implementation and promotion/education between different ministries.
- **A policy framework to permit and support community management**
For solid waste this includes a municipal solid waste management strategy, laid down in a policy document. This document should explicitly make room for community management efforts of solid waste management and it indicates available means and resources to enable their functioning (budget, communication plan, provision of facilities, land, equipment).
- **Provide a legislative framework that is conducive to community management**
This may include giving management committees a legal status, determining a fixed percentage of women in community organizations, developing realistic standards for equipment, quality of service, etc. From some water supply projects it is known that links of management committees with the wider representative structures like local administrative bodies are needed to gain official recognition and legitimacy.
- **Effective external support services** must be available from governments, donors, NGOs and the private sector in the field of organization and training of management committees and operators, technical advice, credit, etc. Furthermore, a governmental agency can provide technical services for tasks the residents are not trained for, act as supplier of spare parts, or provide facilities, land or equipment.
- **Serve as financial intermediary.** It also occurs also that monitoring and auditing of financial operations is carried out by the governmental agency, eventually in collaboration with a donor or NGO.
- **Help carry out preliminary studies and consultation**
The governmental agency can carry out hydrological and topographic surveys, feasibility studies, and socio-economic surveys, design a system in consultation with the community, assess organizational capacity of the community, meet with community leaders to discuss community and government inputs and commitments.

There is one big difference between governmental agencies involved in water supply and those responsible for solid waste that limits application of the above mentioned enabling measures. Water agencies are often centralised and operate on a national scale. They have usually more funds, because of their greater possibilities for cross-subsidies and their parastatal character. In the case of solid waste, municipalities are often responsible. They use to suffer from a considerable lack of funds, of appropriate equipment, of knowledge, of skilled personnel, and the like. In fact, they need material assistance from donors or the central government before they can enable communities to manage their own systems.

CHAPTER 7 CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

The point of departure of this literature search has been the social and management problems experienced in community-based solid waste management projects. This study has focused on the applicability of lessons from community-based water supply projects for solid waste management projects. The main hypothesis was that these 'water lessons' would be relevant. In most cases, this assumption appears to be true. Sometimes, however, the relevance of experiences from water supply projects is limited, either because the problems experienced in the solid waste management projects are absent, or because solutions are not applicable. The Summary of findings will elaborate on this. The hypothesis was difficult to test, since much literature on community-based solid waste management projects is incomplete and lacks details on community participation and management. Gaps in the documentation have therefore been identified, which may give rise to needs for future research.

The introduction mentions some questions with regard to the UWEP core-issues. The following is an attempt to answer them.

7.1 UWEP core-issues

1. Inadequate waste services for low-income communities

How is community management achieved? In case of a good relationship with the municipality and households and an effective management, community-based solid waste services do function in low-income neighbourhoods. Preconditions for community management appear to be strongly felt needs for the service, the involvement of the community in design and planning, the provision of appropriate incentives to households, managers and operators, sustained by appropriate education.

What are the problems these community-based solid waste services encounter? Which solutions for these problems have they tried? Problems are: low participation of households, management problems, social problems related to operation, financial problems, and cooperation difficulties with the municipality. Chapter 3 provides some of the solutions encountered in the literature. Chapter 4 illustrates some solutions tried in the water sector.

2. Inequalities in the provision of waste services and employment

What is the role of socio-cultural minority groups and of women in community-based operation and management of solid waste services? Only one third of the solid waste management projects is clear about the women's role. Women have a role as initiators, educators, managers, operators, political activists, and watchdogs of the community. Minorities are mainly involved as operators, seldom as managers. They use to be engaged in the informal solid waste sector. Examples are the Zabbaleen in Egypt and the casteless people, or 'untouchables', in India who are engaged in collection of solid (and liquid) waste. Both groups collect garbage from richer neighbourhoods because of the higher volume and value of waste there. Both groups have been involved in the extension of solid waste management on a community base to the low-income neighbourhoods, where they live themselves (Egypt, AF 4 and India, AS 2).

Do they encounter specific problems in community management of solid waste services? Yes. Women who are involved in operation, suffer from the physically straining character of certain tasks. Socio-cultural minorities suffer from their low status and a social stigma. A problem that both minorities and women face in certain cases, is underrepresentation in management of the service. Intervention by an NGO can lead to representation of underprivileged community groups. When women take the initiative, they usually remain in charge of operation and management of the service.

7.2 Summary of findings

Community participation in solid waste management may take different forms or levels. Community management is one of them. Real community management, involving all three aspects of responsibility, authority and control mentioned in the Introduction, is not very common in solid waste management in urban low-income neighbourhoods. Local leaders, formal and informal, women and youths often have special roles in community-based solid waste management. Organizational structures differ, depending on locally variable partnerships between different agencies. As a rule, in community management of solid waste management, there is an active community-based organization, an existing CBO or a newly established one.

The most important social and management problems faced by community-based solid waste management projects appear to be motivational issues and cooperation with municipalities. Motivational issues refer to the motivation of participating households and their servants, of operators and managers of solid waste services. They have crucial roles in the functioning of the service. These groups are all affected by the low status of waste and its dirty image, resulting in low willingness to participate in recycling and collection, unreliable service, and low willingness to manage. Education appears to be an inadequate solution for these problems. Education alone does not seem to be enough to change the behaviour of households or to increase their willingness to pay. Moreover, it has to be tuned to the benefits of the solid waste service as perceived by the target community.

Another major problem is the failing secondary collection, which can undermine the motivation of the community undertaking primary collection. Bad coordination of primary and secondary collection, illustrated by accumulated garbage at transfer stations, is a problem that is mentioned by most community-based initiatives. The bad performance of the municipalities in this respect is rooted in a lack of funds, inappropriate equipment, inefficient management, and unskilled personnel.

Other important managerial problems are those related to financial issues, because these determine reliability and sustainability of a service for a major part, notably inadequate fee collection and lack of sanctions for non-payment.

It has to be noted that community-based solid waste recycling and collection projects face different problems. There is also a difference between projects that operate with or without (ex)waste-pickers.

Solid waste and water supply projects differ in many aspects, especially in their 'image' and the benefits they are perceived to generate for communities. They also differ in their social and management problems. Some problems of community-based solid waste management projects appeared to be absent in community-based water supply projects. These include the low status of operators, the low priority of solid waste in many communities, the negative attitude of servants and watchmen, space problems and competition from private entrepreneurs. The lack of these problems in the water sector is due to the very nature of solid waste and water respectively, but it may also be caused by the nature of the sample of cases studied.

The majority of social and management problems found in the solid waste management project can be encountered in some form or the other in the water sector. Only solutions to these problems are not always applicable, due to the differences between solid waste management and water supply projects. An example to illustrate this is the different organizational set up of water agencies and solid waste departments, which makes decentralisation irrelevant and the establishment of separate socio-economic units unfeasible for the solid waste sector. Solid waste departments used to suffer more from a lack of funds, unskilled personnel, and managerial incapacity than national water agencies. Some financial systems used in the water sector have proved not to function in the solid waste sector.

In the water sector an extensive body of literature exists about community participation and community management experiences in Asia, Africa and Latin America. For example, information about the establishment of management committees, training, hygiene education, the reduction of impediments to the involvement of women, financing systems in low-income neighbourhoods, performance control, and methods and approaches in preparatory research. These project experiences, reports and manuals can provide major lessons for community-based solid waste management projects.

As a result of the study of the water literature on community participation the gaps in the documentation and the lack of details of the literature of community-based solid waste management projects became clear. The water literature has been used as a theoretical framework for the definitions of community participation and community management in solid waste services.

The water literature has some shortcomings itself that render the comparison with solid waste management projects more difficult. Firstly, the background of the majority of literature on community participation is rural. Moreover, much is said about how community participation (or community management) should be, and much less on how it takes place in reality, how problems are solved.

7.3 Gaps in the solid waste documentation and needs for future research

Many experiences with problems, solutions and their effects in the community-based solid waste services are not written down. There has been a lack of research in this field until recently. Exceptions are the Indonesian report on the COPRICOL projects (Yayasan Dian Desa, 1993), some articles and reports of SANDEC (formerly IRCWD), the MEIP project in Nepal (Stern, 1995), and the HIC-LIFE case studies about Senegal and Mali (Moussa Kaba, 1994^c; Gaye & Diallo, 1994).

The focus of most literature and research is either on privatisation of municipal services through micro-enterprises (especially in Latin America) or on the activities, problems and living conditions of the informal solid waste sector (Asia). In Africa research and project intervention in the field of solid waste management received attention rather recently. There is a lack of comparative studies on community-based solid waste management projects in different countries. The emphasis usually is on all kinds of environmental action or on urban services. The experiences that are described often lack details, especially on aspects like the strategy or working method used, incentives, approach used in education, effects of solutions tried, the role of women, contents of preparatory research, etc.

These gaps in the existing documentation, together with other conclusions of this literature review, leave much room for future research. There is a clear need for comparative studies on community-based solid waste management in low-income neighbourhoods in Southern cities, comparing situations in different cultural settings and physical conditions. These studies could take the following issues as point of entry:

1. Empirical research to identify workable solutions for certain social and management problems in community-based solid waste management projects

The literature about community-based solid waste management projects often lacks important details on problems and solutions. Box C.A gives an overview of specific research topics and unanswered questions evolved from this literature review, which can be addressed through this kind of research.

Box 7.A Research topics and questions concerning social and management problems in solid waste management projects.

- Community management: Who has taken the initiative for the solid waste service? How has it become a community activity? Which conditions have to be fulfilled to create willingness to manage?
- Motivation: With which incentives are households stimulated to participate? Which incentives can be used to motivate operators and managers? How are city competitions organized and what makes them effective?
- Education: Which combination of incentives and education is needed to influence behaviour of households? Which kind of education is needed in this respect?
- Finance: Which factors determine willingness to pay for a solid waste service? Which tariff systems, ways of payment and sanctions do function and in which circumstances? What experiences do exist with cross-subsidies sharing income from different services or from different income groups?
- Women: What is the role of women in community-based solid waste management projects? Which conditions determine women's involvement? Are women more motivated for operation and management of community-based solid waste management projects than men? If so, why?
- Cooperation: How can cooperation between formal (government-related) and informal (NGOs, CBOs, traditional leaders, etc.) leaders be improved? How can primary and secondary collection become better integrated? How can the informal solid waste sector be integrated in community-based projects?

2. Empirical research to compare experiences with community participation and community management in the solid waste management and in other service sectors in the same urban area

In the water sector the importance of environmental sanitation to improve health conditions in urban neighbourhoods is more and more recognised. Environmental sanitation is used here in its broadest sense, including solid and liquid waste collection and disposal, drainage and hygiene. The growing attention for this issue can be used to stimulate research and pilot projects to combine community participation experiences from different service sectors.

3. Studies on the effectiveness of different forms of community participation in solid waste collection, treatment and disposal

The definitions of community participation and management used in this study need empirical testing to assess their applicability and operational value.

4. Investigation on the organization of communities in low-income neighbourhoods in large southern cities and its (potential) role in community activities to improve their environment

This considers well-established communities and neighbourhoods which exist already for some years.

Community-based solid waste management projects are a reality in many cities in developing countries, although it may take different forms. Given the continuing lack of means and the shortage of managerial capabilities of many governments in developing countries, and the fact that the private informal sector is not interested in low-income neighbourhoods, community-based solid waste management projects will remain the only option for many low-income communities to keep their environment clean.

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ANNEX INVENTORY OF COMMUNITY-BASED SOLID WASTE MANAGEMENT PROJECTS

LEGEND

Abbreviation of the project:
Country; city; neighbourhood - type of neighbourhood; initiative from; activities;
community management/participation.
Problems. Literature.

LA 1:

Argentina; Sao Paulo; Vila Madalena; municipality; education about separation through neighbourhood associations, selective collection, recycling centre, legalize profession of waste picker/respect their claims on certain areas; management by collection committee (civic leaders and city employees), people separate at source.
Problems not known. Caccia Bava & Mullahy, 1993.

LA 2:

Argentina; Sao Paulo; Monte Azul - favela; municipality; fête to start clean up, education, distribution of plastic bags, waste collection curbside, outside favela weekly door-to-door, recently paper recycling; management by project team, people bring garbage to collection points in plastic bags.
Problems not known. Caccia Bava & Mullahy, 1993.

LA 3:

Bolivia; La Paz; periphery, low-income, steep slopes; GTZ; 21 micro-enterprises engaged by STARCO, people from the area, (in teams of 2) who collect waste door-to-door, curbside or from transfer points in inaccessible areas, paid per k waste by STARCO (private company), GTZ gave equipment; (drains cleaning - SAMAPA); people do not pay yet; women very active in ME's, self-help tradition (confradías and comité's cívicos; similar GTZ projects in Colombia and Peru.
Problems: collection fees, ME's not paid for many months because of lack of funds government. Attempts to collect fees together with electricity bills, but not successful, STARCO wanted to collect waste in poor areas himself (save money), not interested in recycling because paid per k too (by EMA/government). Protest by neighbourhood committees. Mutz, 1994.

LA 4:

Brazil; Sao Paulo; Vila Reis - low-income; local neighbourhood committee; waste collection, improve living conditions and services in area, organize residents to put pressure on politicians, much achieved when progressive female mayor; contact with waste pickers' cooperation, support from university of Sao Paulo and municipality.
Problems: large distance to centre. Solution: waste deposit station, is being built now (with ICCO assistance). van de Klundert & Lardinois, 1995; Lardinois, 1994.

LA 5:

Brazil; Niteroi (near Rio de Janeiro); Sao Francisco; higher middle income; initiative from University de Fluminense and Community Centre of Sao Francisco (since 1985); waste collection, sorting and recycling; funds from Brahma and GTZ. Experience transferred to other areas in Sao Paulo and Rio de Janeiro.
Problems: financially dependent on outside funding, municipality not willing to cooperate in other areas. Eigenheer, 1987; van de Klundert & Lardinois, 1995; Lardinois, 1994; Eigenheer, 1989.

LA 6:

Brazil; Olinda (Greater Recife); Triangulo de Peixinhos - low-income, unplanned, flat, swampy, previous dump site; residents' association for improved infrastructure; waste collection, sorting and composting pilot plant; in planning phase participation limited to labour in construction (composting plant) and selection of local collection

workers. Management and operation by local cleansing department. Extended to many unserved low-income areas in Greater Recife.

Problems: in '94 only the plant in Triangulo (low-income area) was still working. Others were stopped, because residents of richer neighbourhoods complained of malodour and a spoiled view of the city for tourists. Another reason was that the mayor was replaced by another, less active one. Coura de Cuentro, 1990; Meyer & Schertenleib, 1992; Hawkins, 1989.

LA 7:

Brazil; Curitiba; favelas - low-income, along riverine valleys; municipality (progressive mayor); "garbage purchase" project in favelas (free bus ticket for every bag of trash, later parcels of surplus food). This would cost the same as when municipality would hire a private contractor collect garbage there. Education about separation, "garbage that is not garbage" project (> 70% of inhabitants participate): weekly curbside collection of recyclables, recycling. "Green exchange" program: recycling bins at supermarkets and schools in unserved areas (exchange garbage against food vouchers). Toy factory in neighbourhood Vila Pinto where children make toys from waste in classes. Recycling coordinated by FREI (public institution), workers are ex-alcoholists and very poor people, collection operated by LIPATER (private company), people separate and deliver at certain points.

Problems: organic waste not used yet, limited integration of waste pickers, treatment not always optimal. Rabinovitch & Leitmann, 1993; Caccia Bava & Mullahy, 1993; Lardinois & van de Klundert, 1993; Obladen & Mansur Aisse, 1988; Lardinois, 1994.

LA 8:

Brazil; Curitiba; Parolin and Prado Viejo (10.00 households)- upgraded slum areas (favelas); municipality/IPPUC; collection, sorting and composting of waste by local people, sell recyclables, training by DDS (governmental agency); 17 future residents of Vila Pinto (local unemployed) form association to manage recycling, workers at composting/recycling plant are ex-waste collectors. People separate at source; income divided among workers, socially beneficial activities in community and new employment generation (each 33%). After 4 years pilot plant closed down, new bigger plant is built for urban peripheries Curitiba.

Problems unknown. Rabinovitch & Leitmann, 1993.

AF 1:

Burkina Faso; Ouagadougou; Wogodogo (commune Baskuy) - low-income, peri-urban; pilot project COPRICOL (introduced 1993), form local waste management committee, primary collection bi-weekly in donkey carts by local people, assistance of CREPA and IAGU; waste management committee manages and operates door-to-door collection. People pay fees.

Problems: accumulation at communal collection points, because municipal collection is irregular and insufficient. Meyer, 1993.

AF 2:

Cameroon; Yaoundé; 15 spontaneous quarters in centre and periphery; FOCARÉE; provision of communal garbage bins in neighbourhoods, sorting and composting projects managed by local committees, that hire 2 persons to operate (work only in the morning, earn 20.000 CFA per week), sell compost, income invested in local projects.

Problems: low salary workers, bad working conditions (separation beforehand needed to reduce health problems). Solution: part time job. Ndoumbe Nkotto, 1995 (personal communication).

AF 3:

Chad; N'Djamena; Ambassatna-old area; Oxfam and N'Djamena town council; pilot project, waste collection per concession (group of households), manufacturing and distribution of bins; sanitation committee for each square (circa 80 concessions) organizes collection, fee collection, upkeep and renewal materials, recruitment and payment collectors, awareness- raising. People pay fee per concession.

Problems: irregular collection resulting in payment per round, declining willingness to pay, committees are mere figureheads, streets remain unclean, no continuity in committees. Solution: monitor their operation for one year before giving them assistance.

Oxfam has assisted other neighbourhoods. 30 sanitation committees are functioning now. Oxfam organizes training, exchange visits and coordination of committees and NGOs in the field. Gadji, 1991; Kany Pagoui, 1995 (personal communication).

LA 9:

Costa Rica; San José; district Hatillo (quarter 1,2 and 3); ACEPESA; establish a micro-enterprise for waste collection and disposal, provide training and technical assistance (ACEPESA), recognised and paid by municipality, basic financing from Austrian NGO and ILO Promicro project, meetings with community organization before and during operation; people pay fees to municipality.

Problems: technical/performance, irresponsible behaviour households, cooperation with municipality, contract not continued (1994), protest from households, new proposal in 1995. ACEPESA, 1994; van de Klundert & Lardinois, 1995.

LA 10:

Ecuador; Quito; Barrio del Carmen (250 households) - low-income, south; neighbourhood (with political support from councillor and local religious group); door-to-door collection by micro-enterprises, sale of recyclables, composting of organics, rest collected weekly by municipality; management by neighbourhood, operation by micro-enterprises, municipality doubles sales of recyclables to invest in local projects, selected by community. People separate at source; households engage in vermi-composting and urban agriculture, surrounding neighbourhoods are interested.

Problems not known. Gidman et al., 1995.

AF 4:

Egypt; Cairo; Mokattam -biggest Zabbaleen settlement, low-income, rocky plateau east of C.; EQI, APE, local churches; (launched in 1981) improve environmental and living conditions in area (extend waste collection to low-income areas, infrastructure, internal clean up, composting since 1986, paper recycling, training, rag weaving, clinics, school); management by Al Gameyya (garbage collectors association), recycling financed with rotating funds; sustainable, self-propelling.

Problems: recent closure of nearby municipal dump site, cooperation with other waste collectors for mechanisation (trucks instead of donkey carts). Ghazoly, 1994; YWCA, 1993; Bessis, 1995; EQI, 1994; Vogler, 1991; Baaijens, 1994; Jensen, 1990.

AF 5:

Ghana; Accra; 3 low-income neighbourhoods; GTZ; composting project, first talks with NGOs and opinion leaders (site selection), operation by team (unemployed people from neighbourhood), paid from project budget.

Problems: find sites for composting, find buyers for compost, supply workers (NGOs could not provide enough people regularly). Solution: part time work.

Adequate remuneration workers (first food for work was tried), cost recovery. Schweizer, 1989; Koch, 1995 (personal communication).

LA 11:

Guatemala; Guatemala City; Alameda Norte (600 households), Zone 18 - low-income, peri-urban, at edge of steep gully; community; selective waste collection, pilot composting plant (since 1984), sale of non-organic fraction; local committee manages collection, operation by local cooperative service, people pay cost covering fee.

Problems: education, sustain community participation. Meyer & Schertenleib, 1992; Barrientos, 1989.

LA 12:

Haiti; Port-au-Prince; Solimo - low-income, centre; SOLAM (CBO) and CHF; solid waste clean up and landfill management project (CHF) with assistance from local private companies, 3 month demonstration solid waste management project, 4 trainers of SOLAM for education, find ways of financing with population; run first by CHF, later by SOLAM, funds from USAID, operation by three teams of 20 workers and 3 inspectors. Later: 10 waste collectors, partly paid by residents, partly by SOLAM.

Problems: find local sustainable resource base. CHF, 1994.

AS 1:

India; Bangalore; Jayanagar IV Block- higher middle income; Waste Wise; meetings to explain programme, door-to-door collection, separation at source, dry sold, wet composted (vermi-culture), residues disposed in

communal bins, training collectors (ex-waste picking children); supervision by project field supervisor, paid by Waste Wise, operation by waste collection team. People separate at source and pay fees.

Problems: extra work servants (separation), attitude households (willingness to pay), cooperation with municipality, opposition waste traders, access to land for composting, training ex-waste picking children. Rosario, 1994; Furedy, 1992.

AS 2:

India; Madras (and Badora and Bangalore); elite and middle class areas, later: squatter and slum areas (financed by extra donations from rich households) where collectors live; Exnora International; Civic Exnora units (street-based, scale: 15 streets) train waste-pickers for door-to-door collection, pay fees and provide carts. Organize street clean ups and regular sweeping. Recently engaged in separation at source and composting in boxes/backyard, tree planting; meetings with officials and elected representatives at neighbourhood level.

Problems: negative attitude of some rich people towards waste-pickers. Raman, 1995; Furedy, 1992.

AS 3:

India; Pune; Kalyani Nagar -newly developed; Dept. of Adult Education and Extension Work of Women's University in Pune; GRASP, garbage collection and recycling, plastic trade centre, unionisation of women waste-pickers, separation at source, motivate people to vermi-compost wet waste at home or dispose it, dry waste collected by waste-picker; supervision by area committees (Mohallah) and housing societies, 1 coordinator and 2 workers from the Department. Plans for extension of trade units (funded by UNICEF).

Problems: attitude servants/watchmen, some households not cooperative, small coverage area, competition from private collectors and vermi-composters. Raman, 1995; Huysman, 1994.

AS 4:

India; Panaji (state Goa); Regional Water and Sanitation Group-South Asia (UNDP/WB); community needs assessment study as part of project preparation; major issues raised by the community: inadequate number and faulty design of bins, irregular cleaning by municipal workers, wet and unhygienic conditions around bins. They wanted a communal collection system with bins instead of a door-to-door system. Willingness to pay was also checked (affordable fee).

Problems: municipal fallacies, system does not take into account people's needs and capabilities. Panneer Selvam, 1993.

AS 5:

Indonesia; Ujung Pandang City (Sulawesi); kampung; government; waste collection door-to-door, other community development activities; village head (Lurah) coordinates waste collection, carried out by LKMD (informal leaders/semi-government).

Problems: lack of cooperation between governmental agencies, shortage of garbage workers, bad condition infrastructure. Solution: development coordination meetings once a week. Ineffective, because no one feels responsible as coordinator. Hanafie, 1995.

AS 6:

Indonesia; Yogyakarta (Java); kampung Luminahan; near river, low-income; COPRICOL (unsustainable, unsuccessful); community member (=manager now); 2 locally made carts, funds from UNICEF, kampung committee (manager, secretary, 4 local garbage collectors (work in 2 teams), who collect fees and sell recyclables. People pay fees.

Problems: manager is motor system (vulnerable), reliance on outside help (financial/technical). Yayasan Dian Desa, 1993.

AS 7:

Indonesia; Yogyakarta (Java); kampung Pajeksan; low-income, poor enclave in business area; COPRICOL (sustainable, successful); individual initiative (=manager now); people pay fees and paid once for cart, 25% of income used for local welfare, operated by 2 waste collectors (extra income in other quarters), recyclables sold, report to neighbourhood committee, manager is volunteer.

Problem: manager is motor system (vulnerable). Yayasan Dian Desa, 1993.

AS 8:

Community-Based Solid Waste Management and Water Supply Project
WASTE, May 1996

Indonesia; Padang (Sumatra); kelurahan Parupuk Tabing; slopes, low-income; COPRICOL (successful); LKMD; managers voluntary (only secretary paid), collection of waste by 2 drivers and 7 collectors, 1 controller. Fee collection by 7 young people (youth group) against 10% of collected fee, COPRICOL management responsible to LKMD, LKMD to kelurahan, profit goes partly to kelurahan development plan.

Problems: get workers from the area (3 out of 7), managerial (2 systems existed next to each other, kelurahan decided to allow one to continue operation). Yayasan Dian Desa, 1993.

AS 9:

Indonesia; Padang (Sumatra); kelurahan Lapai; low-income, swampy, peripheral; COPRICOL (successful); kelurahan and LKMD; organized by kelurahan, managed by youth group, collection of waste to fill swampy area, 4 collectors, profit used for youth group activities, people pay fees directly when garbage collectors come.

Problems: limited understanding of risks of filling swamp near housing area.

Yayasan Dian Desa, 1993.

AS 10:

Indonesia; Ujung Pandang (Sulawesi); kelurahan Bara-Baraya; low-income, very densely populated; COPRICOL (unsuccessful); change of system in 1993 (government responsible for payment garbage collectors, maintenance carts, fee collection by DK or via water bill), **does not work yet**. Before: each RW, coordinated by LKMD responsible.

Problems: fee collection. Temporary solution: one garbage collector begins on his own in 1 RW. Yayasan Dian Desa, 1993.

AS 11:

Indonesia; Ujung Pandang (Sulawesi); kelurahan Baraya; low-income, swamp; COPRICOL (unsuccessful); kelurahan constructed small dumping sites, 1 in each RW. In 1992 each RW received a cart, fees collected by kelurahan officer. In 1993 switch in system (see AS 10).

Problems: smell, dirty surroundings. Solution: guard (paid by kelurahan). Other problem: fee collection. Temporary solution: 2 garbage collectors who collect on command (for a tip), no regular working areas.

Yayasan Dian Desa, 1993.

AS 12:

Indonesia; Surabaya (Java); kelurahan Pacar Keling; low-income, poor enclave in centre, very densely populated; COPRICOL (successful); felt need because little storage space; kampung committee organized collection of contributions for cart. Head of RW hired garbage collector.

Problem: waste collector too old, irregular collection. Solution: engage more operators, split up into 9 smaller areas, make RT's responsible.

Meeting with residents to set minimum fee for social welfare contribution (also for sewerage, drainage, roads, etc.). Fee collection through social meetings. Head of RT makes financial report for residents (every 2 years). 7 garbage collectors for 9 RT's, each RT decides on salary. RT/RW leaders collect city-sanitation fees and get 15% of collected fees. Sanctions on non-payment city-sanitation fee: kelurahan refuses provision of official letters/documents.

Problems: for waste collectors it is a side job, poor bargaining position for management, less reliable service. Yayasan Dian Desa, 1993.

AS 13:

Indonesia; Surabaya (Java); kelurahan Sidotopo; low-income, most densely populated of Surabaya; COPRICOL (rather successful); wife of RW head financed cart and equipment. Fee for welfare contribution (40% from COPRICOL), minimum fee set at community meetings, collected at monthly social meetings. Wife of RW is responsible for everything, but reports to no one. Repair of equipment paid from collected fees, then from her money, then via personal contacts she has. 2 garbage collectors (part time). Sanctions on non-payment city-sanitation fees: denial of renewal identity card, letter, etc. **Problems: no accountability to community, system dependent on her/vulnerable.**

Yayasan Dian Desa, 1993.

AF 6:

Ivory Coast; Abidjan; Alladjan (commune Port Bouet) -informal, seaside; AMCAV/CHF; survey of community concerns and priorities, relocation roads to facilitate waste collection (initiated by community leaders), development of equipment with local materials, introduce COPRICOL system, training and recruitment of community sanitation team, health/sanitation education by 6 women from different cultural backgrounds; local sanitation committee oversees operation (collection and use latrines), operation by sanitation teams (4 men from different ethnic groups). Committee responsible for financial decisions, AMCAV shares financial management to overcome local political power constraints. People pay fees, collected weekly by sanitation team (get 80% of fees collected individually), part of revenue is put on community bank account, accountable via bulletin board, self-supporting.

Problems: cooperation with secondary collection, ethnic/gender representation in committee (AMCAV objected). Stopped in '92 because municipal collection changed (from skip containers to compactor truck). Meyer, 1993; Meyer & Schertenleib, 1992; CHF, 1991; CHF, 1993.

AF 7:

Ivory Coast; Abidjan; Avocatier (commune Abobo) - low-income; pilot project COPRICOL, technical assistance from EEC (handcarts); local cooperative and small enterprise operate scheme, people pay fees and keep environment houses clean.

Problems: difficult to increase coverage area, cooperation with secondary collection. Meyer, 1993.

AF 8:

Ivory Coast; Abidjan; Adjoufou II (commune Port Bouet)- coastal irregular resettlement area; form local sanitation committee to discuss main problems and decide on optimal solutions, COPRICOL system introduced, technical assistance from commune and EEC; operation by local unemployed youths (appointed by local chiefs of different ethnic groups), people pay fees weekly and bring garbage to communal bins (less than 30 m).

Problems: declining willingness to pay (because service provided to everybody regardless of willingness or ability to pay), no sanctions for non-payment/no legal obligations to pay, dependent on external finance.

Solution: additional services (cleaning toilets/bathrooms) to improve cost recovery. Stopped in '92 because municipal collection changed (compactor truck, people bring garbage to main roads, because this is free of charge. Later this practice declines also. Meyer, 1993.

AF 9:

Kenya; Nairobi; Mathare Valley- illegal, low-income; Mathare Youth Sports Association (MYSA); youths organize their own sports leagues and slum clean ups (waste and drains) every weekend; operation by 20 or more teams who work with city council and who earn additional points in the league, planning and organization of clean ups by community service council (local youth leaders).

Problems: program grows faster than finances. Munro, 1992.

AF 10:

Mali; Bamako; Medina Coura, (later, via AGETIPE: Djikoroni-Para); old, crowded, low-income; COFESEFA (women's cooperative, unemployed graduates) (since 1992); women contribute \$200 each, waste collection, make and sell bins, health education service; contract from municipality, funds from UNIFEM and UNFPA, training from UNDP/PROWESS.

Problems: cost recovery (sale of bins, poor tax collection which leads to low payment by government, poor people cannot afford fees they ask in beginning) and ad hoc character intermediate agency (AGETIPE), inadequate secondary collection, no municipal coordination of activities of NGOs. YWCA, 1993; GERAD, 1992; van de Klundert & Lardinois, 1995; Lardinois & van de Klundert, 1993; Robson, 1990.

AF 11:

Mali; Bamako; Hamdallaye (Commune IV); GIE Beseya; education households (their tasks and fees), door-to-door collection of waste, composting, tree nursery; GIE has a president and a management team, collection crew collects garbage, people pay fees to senior person from each concession (group of households) who hands the money over to crew. Weekly meetings with community to talk about problems, loan for carts (Caisse Française de Développement).

Problems: municipality collects irregularly from transfer points, bad equipment, municipality wants them to pay for land. van de Klundert & Lardinois, 1995; Lardinois & van de Klundert, 1993; Moussa Kaba, 1994^{a,b,c}; Grondin, 1994.

LA 13:

Mexico; Merida (also: Valley of Mexico, Mexico City, Bosques de Pedregal); Alternative Technology Group (GTA); (Merida since 1978) introduce SIRDO system, separate grey and black water, black water separated in tank in water (filtered -used in agriculture/aquaculture) and sludge (dried and co-composted to make fertilizer, which is sold), grey water filtered and 70-80% used in agriculture; funds from IRDC, management by cooperative (mostly women), people separate at source and contribute in labour (construction, maintenance and management) on a rotating basis. Productive activities evolved: plastic recycling, horticulture, flower cultivation for export.

Problems: more organizational than technical (equal remuneration in Merida led to declining motivation people working hardest), working with CBOs led to political problems, working with the government to corruption. Schmink, 1984; Lardinois & van de Klundert, 1993; YWCA, 1993; Pezzoli, 1993; Monasterio & Schmink, 1986; Mena Abraham, 1995 (personal communication).

LA 14:

Mexico; Mexico City; Villa Copa (Block 1 and 2); CACRETEM (housewives); education housewives about separation, collection of separated waste from households, markets and schools, bring organic to countryside/farmers, sell non-organic to factories; people separate waste; first government not cooperative, but in 1982 (with growing gravity of environmental problems and when results became obvious) they obtained access to mass communication means. Similar committees in other towns. **Problems unknown.** Zendejas Huerta, 1992.

AS 14:

Nepal; Kathmandu; GTZ project; clean up of courtyards and education; Panchayats (local governmental organization) recruit cleaning committee. People are consulted on clean-ups and contribute in labour or money. **Problems: clean-ups were "one-off" actions (behaviour households did not change). Solution: more participation through involvement Panchayats and education. Project stopped in 1990, when GTZ went away because of political problems.** Furedy, 1989; Nicolaisen et al., 1988.

AS 15:

Nepal; Kathmandu; Kopundole Lalitpur; WEPCO (women); door-to-door collection by special waste collectors to containers, membership, clean drains, sweep roads, sorting, (partial) paper recycling, sell glass and plastic to municipal centre (SWMRMC), education (prevention, recycling), pressure group acting as watchdog for community behaviour, every household pays a fee. Plans for composting. **Problems unknown.** Brochure WEPCO, Ridder, 1995 (personal communication).

AS 16:

Nepal; Balaju: slum (70 households); near river; WE (women's group from Kathmandu); spoke with local people to identify problems and issues, training WE members, action committee (12) to work as a catalyst in community. People did not see solid waste management as a problem. **Problem: no felt need/priority. Solution: WE held lectures on health risks. No effect. Then WE provided households with buckets and promised a cash prize for the most effective disposal/cleanest house. Within 2 months everybody disposed waste at WE-recommended site and nobody wanted the reward.** Kamala Dhungel, 1992.

AS 17:

Pakistan; Karachi; KAEHS housing project, south of Karachi, Baloch Colony -higher middle income; KAWWS; (since 1988); provide communal bins (paid with grants), arrange for private waste coll., public education on health and garbage, composting, tree planting; people pay fee to KAWWS, consultation about site bins, KAWWS watch dog and pays supervisory staff, sweepers and collection crew. **Problems: run by volunteers (limited area of action, not enough staff), low level of participation households (perception of system as service delivered, not as a way to participate in neighbourhood cleanliness), low willingness to pay (60 families pay, 200 benefit), no responsibility for streets/street sweepers, space for bins, municipal sweepers become jobless.** Mansoor Ali, 1994^{a,b}; Mansoor Ali & Saywell, 1995; Ahmed, 1994; van de Klundert & Lardinois, 1995.

AS 18:

92

Pakistan; Karachi; Federal B. area (50 housewives) -middle income, planned; community activist/organizer; waste collection, sorting, sale of non-organics; organizer has contacts and resources (equipment), pays collection crew. 2-3 ex-waste pickers are paid daily from sale of recyclables. Organizer first informed people by letter. First run under auspices municipal councillor, later as independent enterprise. People pay fee for collection; system is self-financing.

Problems: disruption of municipal sweeper system, lack of assistance (for replication) by municipality, irregular operation trucks. Mansoor Ali, 1994^{a,b}; Mansoor Ali & Saywell, 1995.

LA 15:

Peru; Lima; Bayovar (district San Juan de Lurigancho) -illegal, unplanned, low-income, north of Lima; MUPROBA (women's group, daughter of Flora Tristán) and Dutch students; organize cleaning days, arrange for containers and waste collection by ESMLL (government), education; neighbourhood committee (CSAB) including MUPROBA women, has contacts with ESMLL, controls use containers and emptying service. Site selection (containers) jointly by MUPROBA and local representatives.

Problems: government changed, change in ESMLL personnel, activities stopped. Too dependent on municipality, could not keep up with growing number of similar activities in surrounding new towns. YWCA, 1993; de Hoog, 1986; Claringbould, 1990; van de Klundert & Lardinois, 1995.

AS 19:

Philippines; Metro Manila; San Juan; Women's Balikatan Movement (MMWBM) (1978-1980: unsuccessful system designed by government); education on separation/environment, organization and assistance to junk dealers, agreements with home owners' associations, dry waste collection by eco-aides, supervised by junk dealers; MMWBM organized routes and schedules of collection, meets weekly/monthly with junk dealers, who recruit eco-aides (> 100 informal collectors) to collect/buy dry waste, people separate at source in dry/wet (20,000 households), wet collected by a governmental agency; successful program, expansion to Pasig, Quezon City, Manila.

Problems: financial constraints hamper further expansion. Lapid, 1994; CAPS, 1991; Furedy, 1992; Lardinois & van de Klundert, 1993; van de Klundert & Lardinois, 1995; Robson, 1991.

AS 20:

Philippines; San Antonio Valley II Subdivision (outside Metro Manila) (200 families); Catholic Women's League; transformed vacant lots of land into sanitary landfills where burying to make compost takes place. Dry wastes recycled or sold through junk dealers. **Problem: cooperation house helps. Solution: proceeds from sales given to maids and house helps working in private residences as an incentive to participate in separation.** Pressure on local government to collect waste twice a week. Meetings and memoranda about proper waste disposal. Inspection of house surroundings by committee members and officials. Camacho, 1992.

AF 12:

Senegal; Rufisque (near Dakar); 9 neighbourhoods (pilot project in Diokoul); ENDA-TM; collection of waste as a part time private activity; health committee awards collection areas and routes, owns carts and is responsible for replacement/repairs. Together with local people it forms a continuous assessment committee. Operator collects fees (adjusted to income households), he pays a flat fee to the health committee, rest is his income (also from sale of garbage). Operator is responsible for operating costs. People pay fees (60% of costs).

Problems: revenue not enough to maintain carts, no local frame of reference. ENDA-RUP, 1994^{a,b}; Gaye, 1994; van de Klundert & Lardinois, 1995; Gaye & Diallo, 1994.

AF 13:

South Africa; Johannesburg; Stswetla (municipality Alexandra); squatter area, outskirts of Johannesburg; KSAB (Keep South Africa Beautiful); one-man contract, sponsored by two major corporations, six zones where 1 unemployed person, nominated by the community, was appointed as waste collector (door-to-door) to bring garbage to communal skips.

Problems: skips not regularly cleaned by private contractor (engaged by council), large mounds of waste require heavy equipment. Byrne, 1995.

AS 21:

Sri Lanka; Colombo; Nawagampura; marshy land, filled up, low-income, periphery; sites and services project developed under UHSD (urban housing sub-programme) launched by NHDA (National Housing Development Authority); curbside collection, people get plastic bags, written down responsibilities: community development councils (education), community (cleaning roads and drains), NHDA (maintenance equipment).

Problems: people go to main road with bags, do not put waste in bins. Suggested solution: discuss during monthly HCDC meetings (of community representatives, NGOs and governmental agencies), solidarity in quarter is weak, community representatives get feeling of officialdom. Sirisena, 1989

AF 14:

Sudan; Gedaref; Salamat-el-Beih - low-income, southwest; neighbourhood committee (NC), legal status, exists 8 years; first consultation of health department, NC and community about most appropriate system (by Dutch students), provide households with baskets (locally made) to put garbage in, door-to-door collection by a team of 10 men with donkey carts; management by member of NC (paid by NC), running costs born by inhabitants (through sugar distribution: government subsidizes, NC sells at market price and invests income in local projects), capital costs as a loan from Save the Children/UK, becomes revolving fund after 2 years. DUGAP (Dutch University Gedaref Assistance Program) serves as an intermediate agency in finance and gives advice, makes progress reports with SCF.

Problems; cost recovery (to pay back capital costs). DUGAP, 1992.

AF 15:

Uganda; Kampala; markets; SWAG (environmental women's group) and consultant; experimental resource recovery centre, sorting at markets, organics sold to pig farmers, residues brought to centre; SWAG operates the centre, hires labour for sorting, sells materials, consultant gives technical advice and provides equipment; plans for more similar initiatives managed by private companies or CBOs.

Problems: continuity/sustainability after EQI consultant went away.

Lardinois & van de Klundert, 1993.