Operation, maintenance *and* **sustainability** *of* **services** *for the* **urban poor**

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Findings, lessons learned and case studies summary and analysis

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List of acronyms

ASB	Anjuman Samaji Behbood
ADP	Annual Development Plan
CAP	Common Action Planning
CBOs	Community-Based Organisation
CDA	Cuttack Development Authority
CDCs	Community Development Councils
CkMC	Cuttack Municipal Corporation
CMC	Colombo Municipal Council
CMG	Community Management Group
CSPU	Clean Settlement Programme Unit
CUSIP	Cuttack Urban Services Improvement Project
DFID	Department for International Development
DMC	District Municipal Corporation
DMMC	Dehiwala Mt. Lavinia Municipal Council
FAUP	Faisalabad Area Upgrading Project
FDA	Faisalabad Development Authority
FMC	Faisalabad Municipal Corporation
KDA	Karachi Development Authority
KMC	Karachi Metropolitan Corporation
KWSB	Karachi Water and Sewerage Board
MNA	Member of National Assembly
MoU	Memoranda of Understanding
MPA	Member of Provincial Assembly
NGOs	Non-Government Organisations
NHDA	National Housing Development Authority
NWS&DB	National Water, Sewerage and Drainage Board
OPP	Orangi Pilot Project
PALM	Participatory Analysis and Learning Method
PHED	Public Health Engineering Department
PMU	Project Management Unit
REEL	Real Estate Exchange Limited
SIP	Slum Improvement Project
SKAA	Sindh Katchi Abadi Authrotiy
SSIP	Slums and Shanty Improvement Programme
ULA	Urban Local Authority
Unicef	United Nations Children's Fund
UPO	Urban Poverty Office
VGP	Vulnerable Group Programme
WASA	Water and Sewerage Authority
WSC	Water Supply Committee

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Part A:
Summary findings and lessons learned

Section A1

Introduction

Purpose of this study

This document presents the findings from Project R-7397, 'Operation, maintenance and sustainability of services for the urban poor'. The document also indicates a framework for potential community and institutional roles for effective O&M. The purpose of the project is to improve the sustainability of urban services in poor communities by using an appropriate management framework and supporting tools for external agencies, urban government and non-government organisations (NGOs).

Why we are doing this work

Many urban services improvement projects promote community participation in the planning, implementation and management of these services. Increased participation in operation and maintenance (O&M) is assumed, but is yet unproved. It is essential to review both consumer (urban poor) perceptions and municipal performance of O&M, including the sustainability of community-based processes. The actual and potential roles and responsibilities for O&M between communities, municipalities and intermediaries have to be more clearly understood in order to develop sound guidance for programmes that will lead to sustainable services. Otherwise, investments in capital infrastructure and community development will not realise the anticipated benefits.

Focus of the project

The key question being addressed is ***how to improve the performance and sustainability of O&M services for the urban poor.*** The work will centre on exploring relationship (contracts) and roles and responsibilities in the context of urban service projects.

What we have done so far

In our project proposal and subsequent reports, we set out the scope of work and the basis for selecting case studies that would increase our understanding of how the needs of the poor can be given more prominence in the development of sustainable O&M services. A key feature of this work is the prominent role which our Southern partners played in the planning, implementation and analysis of the case study material, which forms the basis for developing the project outputs.

We have carried out a series of case studies, of completed urban projects to investigate the performance of O&M, relationships (contracts) among the stakeholders, roles and responsibilities and consumer satisfaction. The following city-based case studies have been completed:

Colombo	Utility & community-managed water supply and sewerage
Faisalabad and **Karachi**	Utility & community-managed water supply and sewerage
India	Cuttack Urban Services Improvement Project

What this report is about

The objective of this report is to synthesise the findings of the case studies which have been completed to date. These studies focus on both the consumer (urban poor) perceptions and the municipal performance of O&M, including the sustainability of community-based processes. The objectives of this report are to:

- learn more about operation and maintenance routines;
- assess and improve performance of O&M and the capacity of local actors to manage pro-poor development;
- integrate learning from research future into O&M systems to improve capacities to address the urban challenge; and
- share experience of O&M with other interested parties.

We attempt to draw out lessons learned which:

- report the challenges faced and the opportunities created by different forms of urban operation and maintenance services in poor communities; and
- identify key issues, which are central to promoting the needs of the poor and the sustainability of systems in the future development of operation and maintenance services.

We emphasise that these are the findings so far; the final output, which will be advised by additional case studies, will include key guidance points for promoting pro-poor strategies within sustainable operation and maintenance services.

Part A of the report gives a summary of our findings and of the lessons learned so far. It is structured as follows:

- Introduction
- Key Findings

Part B of the report provides a summary of each case study, along with an analysis and synthesis of the findings.

The main purpose of this research was to identify the processes that improve the sustainability of urban services in poor communities. The working hypothesis was that ***greater participation of communities in the operation and maintenance (O&M) of services would improve sustainability***. In order to test this hypothesis, we needed first to understand the core elements underlying the notion of sustainability and the key questions that need to be asked to address each of these three core elements:

1. Technical sustainability
2. Institutional sustainability
3. Financial sustainability

Some of the services illustrated in the case studies are essentially provided at the household level, while others are community-based services. Others are provided at both community and a higher level, e.g. local government, whilst others are provided solely at a municipal level. These scenarios determine who is or should be responsible for O&M. An assessment of how each case study performed in terms of technical, institutional and financial sustainability will provide the basis for determining key lessons to be learnt, and recommendations for improved systems of O&M.

This report is a synthesis document; it contains summaries of the case studies and an assessment of the O&M status in the communities illustrated in the studies, and seeks to highlight the success and failures of the different approaches. General conclusions have been made that will be useful when thinking about O&M in the planning and implementation of future projects. This report goes on to develop these conclusions with reference to the case studies.

Who should read this report

We have written this report with a wide readership in mind, including:

- readers with a general professional interest in the provision of urban services, in operation and maintenance issues, and how these affect the urban poor;
- policy-makers who develop strategies that give an increased emphasis to developing improved management strategies for operation and maintenance; and
- staff of utilities, local government officials and NGOs/CBOs who are involved in programmes to improve the operation and maintenance of urban services.

Our final output will include shorter documents targeted quite specifically at different audiences.

Where to find out more

There is a project description on our web page which includes :

- a full discussion of the processes involved in operation and maintenance of infrastructure;
- a description and analysis of the roles and responsibilities; and
- sources of further information for the case studies.

The project details including outputs are available on the project website at http://www.lboro.ac.uk/wedc/projects/omssup/

Section A2

Background to operation and maintenance

Services are not ends in themselves but are initiators of a range of benefits, which can only be realised after projects have been handed over to communities. This can only happen if appropriate measures can be taken to develop effective O&M. The factors influencing O&M will have to be planned for during project planning and implementation.

Proper operation of the service contributes to a reduction in breakdowns and maintenance needs. Operation refers to the activities involved in the delivery of a service, i.e. the everyday running and handling of infrastructure. This involves:

- The major operations required to use the service
- Correct handling of facilities by users to ensure the long life of the service

Maintenance includes the activities required to sustain existing assets in a serviceable condition. The term *maintenance* covers:

- Preventative maintenance
- Corrective maintenance
- Crisis maintenance

Sustainability is an increasingly common term, which has a number of meanings depending upon the context. Infrastructure can be said to be sustainable if:

- The benefits of the service can continue to be realised over a prolonged period of time
- The facilities are maintained in a condition which ensures a reliable and adequate service

Problems with operation and maintenance are recognised as key constraints to a sustainable urban service. Operation and maintenance represents the difference between the construction of an installation capable of meeting the needs of a community and its actual use by individual consumers. The constraints on effective O&M, at both municipal and community level, that were highlighted in the case studies include the following:

Municipal level

- Low priority given to O&M by policymakers
- Municipality's inability to cope with all O&M requirements
- Political interference makes sustainability difficult to achieve
- Government priorities directed to construction rather than O&M
- Inappropriate engineering standards and technology choices creates unnecessary O&M difficulties and increased costs
- Lack of training and understanding of O&M by municipal workers

Community/NGO level

- Lack of community involvement in project design
- Lack of training and understanding of O&M
- Insufficient funds for O&M
- Lack of responsibility for systems

The development paradigm that has evolved in reaction to such apparent failures in management is a combination of many ideas, including those of environmental sustainability, community participation and demand-driven decision-making. Entwined in these terms is the idea of ownership. The development and sustainability of infrastructure is increasingly dependent on community management. Communities are becoming more responsible for the costs and the tasks involved in operation and maintenance. This has occurred as a result of the failure of public utilities to deliver urban services, and whilst the involvement of the local communities would appear to benefit end-users, there are increasing responsibilities being awarded to such communities.

Section A3

Setting operation and maintenance issues within the sustainable livelihoods approach

The Sustainable Livelihoods Approach helps one to ask questions about what changes are expected as a result of development interventions and why those changes will happen. It depicts the relationship between people and various resources or capital assets. The components of a sustainable livelihood depend on the possession of various **livelihood assets** (human, social, natural, physical and financial capital) to achieve livelihood strategies that are determined by transforming structures (government/private sector/service provider/NGOs) and **processes** (law, policies, culture, institutions). These strategies are used, depending on the stock of assets, to achieve **livelihood outcomes** (such as increased well being and reduced vulnerability) (Ashley and Carney 1999).

The five livelihood assets are linked together within the approach and thus it encourages holistic thinking. They are dynamic over time and differ for different households and communities. Access to these assets is a vital part of sustainability and resilience. Policies, processes and institutions can transform these five assets. Improved governance and management of cities can contribute significantly to the reduction of poverty in these areas. National public policy sets the framework for successful urban development and poverty reduction. Communities who can accumulate stocks of these assets tend to be sustainable, whereas unsustainable communities tend to deplete these stocks. In particular, social capital is the fundamental basis for sustainable development, but it can be rapidly diminished by the 'wrong' kind of approach for social and economic development. However, it can increase with use under some circumstances, and the more social capital is used, the more it can regenerate.

The concept of sustainable development has become strongly associated with the performance of operation and maintenance systems. The terms *sustainable* and *development*, as well as the term *sustainable development*, are problematic and there are differing views on their practical translation. Success in terms of sustainability depends on the influence people have on their own environment, power relations and policy processes, capacities to manage environments and the ability to analyse and articulate what is most critical in a particular situation.

Urban poverty is associated with over-crowding, unsanitary living conditions and limited access to basic services. In the settlements described in the case studies, environmental health (water supply, sewage systems, etc.), housing rights and public services are of great concern to poor people for accessing services and improving (urban) lives and livelihoods. Infrastructure projects aim for impacts that are intermediate to livelihood outcomes and that relate to capitals, policies, processes and structures in the sustainable livelihood frameworks. This indirect support to livelihoods (i.e. without physical inputs into production processes) includes technological support, training, capacity building, organisational development and lobbying.

The case study experiences suggest that NGOs and CBOs are focusing their support on services related to environmental health, physical infrastructure and also on housing but less so on direct support for livelihoods. The case studies also recognise the distinct nature of urban poverty and suggest that poor and excluded groups need representatives and support from such agencies and organisations interested in helping them improve their situation. Infrastructure development results from the interaction between these various stakeholders in the development arena, including groups of deprived people, development agencies, government departments and many other social actors.

Community participation

Participation and its associated term, *empowerment*, are words that express the idea that it is possible for the poor to gain more influence over their lives. Accordingly, participation is seen as a critical component of project 'success'. However, only some forms of participation lead to sustainability. The question of who participates is key.

There are important social, economic, political and cultural differences between individuals, which means that local stakeholders may have very different interests in whether a development activity succeeds or fails. Gender differences are

usually substantial because women and men tend to play very different social and economic roles in society. It is important, therefore, to check that opportunities have been built into a project to encourage participation from a range of community groups and interests, in decision-making processes and to benefit from development.

Community participation is a term commonly used in development literature and practice. There is no consensus about what it is or should be, what its characteristics are and what factors affect it. A number of writers and practitioners have devised scales of participation to highlight the different levels of community engagement. At one end of the spectrum, the objective of community participation is instrumental (participation as a means to increase the effectiveness and efficiency of investment), while at the other end participation is regarded as a means to an end, which is strengthening civil society and governance.

Four levels of stakeholder participation are commonly recognised. The first two levels are prerequisites for the third and fourth.

1. Information dissemination (one-way, top-down, flow of information)
2. Consultation (two-way flow of information)
3. Collaboration (shared control over decision-making)
4. Empowerment (transfer of control over decisions and resources)

Source: World Bank, 1996, Social Assessment and Participation: Methods and Tools, Susan Jacobs

The shift from participation as users of a new service to the participation of the beneficiaries as owners and managers is thought to be an important contributory factor to the sustainability of the project. This represents a change in emphasis from project initiation (a numbers game) in favour of project responsibility (the role of the community in sustaining the system). Facilitating this new role for the community means investing in skills and training to make decisions about the system and undertake management.

Participation in O&M is likely to be affected by earlier levels of participation in the project. This means that we cannot simply isolate the O&M aspects of services, if we are to understand the critical success factors in promoting sustainability. The degree to which communities participate is constrained by their ability and willingness to participate.

Key categories of constraints are related to:

1. Environment
   - Political context (e.g. support to municipal authorities and local community-elected structures)
   - The legislative framework (e.g. the framework of decentralisation and participatory local planning; legislation laying out municipal duties)
   - Administrative context in which municipalities operate and policy level leadership (e.g. strong leadership helps to operationalise legislation and may offset ineffective legislation)

2. Community level
   - Skills, knowledge, time available, cultural beliefs and practices, gender perspectives on needs and expectations, views about who should provide and pay for services.

Operation and Maintenance functions can be illustrated as a process that requires both monetary and non-monetary inputs. The involvement of the poorest and neediest in O&M can be described as a vehicle to benefit from increased individual capacity and therefore as a constructive step in development. There are no blueprints for alleviating poverty or creating successful projects, but through reflecting on past experience and learning from its successes and failures, communities can be given the opportunity to succeed where governments have failed.

Summary of the case study successes in O&M

Technical sustainability

Sri Lanka

- Participatory methods used to identify community needs/Community Action Plan (CAP) methodologies promoted concepts of self-help/beneficiary participation in planning and construction of houses and amenities
- Residents tended to take initiatives
- Establishment of Community Development Councils (CDCs) led to community empowerment & community-based practise
- Simplification of technical drawings/guidelines prepared in local language
- Residents supervised and monitored construction work
- Development of community management plans
- Support by external funding agencies and government
- Minor repairs are dealt with by community on an ad-hoc basis
- Families responsible for maintenance of household latrines/water connections

- Households may hire skilled people from the community for small repairs and Colombo Municipal Council (CMC) responsible for major repairs
- Community members received training to carry out O&M/SEVANATHA provided training for key community members in sewerage O&M
- Evidence of skilled people present in communities for elaborate repairs

Karachi

- Sewage systems laid by people themselves
- Local community members mobilised programme of solid waste removal, i.e. Mujahid Colony
- Construction of *kundi* to store rubbish with help from Sindh Katchi Abadi Authority (SKAA)
- Work done under OPP, where people finance, manage and maintain infrastructure laid down, i.e. Welfare Colony
- SKAA and Orangi Pilot Project (OPP) models provide social and technical guidelines, tools and supervision by communities
- Residents are said to be less dependent on Anjuman Samaji Behbood (ASB)/ OPP for advice and technical guidance

Faisalabad

- Some services laid by communities on a self-help basis
- ASB/OPP consulted closely with community representatives in terms of technical specifications
- Sewermen tend to have some expertise in carrying out O&M
- The OPP model used by ASB suggests that communities acquire skills and have access to ASB's maintenance unit for 'internal development'.
- Residents are said to be less dependent on ASB/OPP for advice and technical guidance

Cuttack

- Good community-based initiatives in O&M exist in the most highly mobilised of communities studied
- Cuttack Municipal Corporation (CkMC)/Public Health Engineering Department (PHED) have considerable unskilled resources i.e. drain coolies
- Community halls and temples are particularly well cared for
- Examples of community managing an O&M service such as sweepers for common toilets
- Residents have received some training from Cuttack Urban Services Improvement Programme (CUSIP) to undertake minor repairs
- Residents are paying for particular operational services
- Some of the routine tasks are extremely simple

Institutional sustainability

Sri Lanka

- Most of the micro-studies developed collaborative and empowering forms of participation through identification of needs to maintenance and monitoring
- CAP methodology
- People-centred approach
- Guidelines, procedures and forms developed for communities to assist in the planning process, identification of priorities and M&E
- Training and support with municipal health wardens reinforce CDC and community participation
- CDCs formed under government agencies, together with CBOs and NGOs
- User families are responsible for individual toilets/household connections common taps/toilets/bathing areas
- Municipality responsible for major repairs and septic tank emptying although not in squatter settlements
- CDC structure and CAP processes defined roles and responsibilities
- CDC acquired support from politicians
- Construction committees formed
- Community contracts promoted community participation

Karachi

- Where government/utilities are service providers the form of participation utilised was solely information dissemination. However, where NGOs were involved in implementation communities were involved in a collaborative and empowering way
- OPP model overcomes the four barriers to infrastructure initiatives
- Meetings held, consensus reached, disputes settled, individual contributions and community-supervised work carried out
- Orangi has existing tradition of self-help
- Central authority responsible for main drains, sewers, water lines
- Households hire sweepers for sewers and replace manhole covers

Faisalabad

- Sewermen view O&M as the necessary resources for them to carry out technical repairs
- Water and Sewerage Authority (WASA) view O&M with the focus on cost recovery
- NGOs focus on institutional frameworks and the role of community
- WASA has 18 complaint centres
- NGOs/CBOs also have a role in providing of services and O&M
- WASA responsible for water lines and sewers
- No clear distinction between roles and responsibilities between WASA and NGOs

Cuttack

- Community management groups formed, CBOs also formed or exist already such as Basic Service User Groups, Infrastructure Maintenance Groups, Muslim. Women's Welfare Association, Muslim Sahi, Mahila Samiti, Basti Development committees, Muraadakhan Patna, Samadhi Patni and Yubak Sangha
- Households take on minor repairs to roads, toilets and tubewells
- Authorities are responsible for roads, drainage, public toilets and power
- Responsibilities of CkMC becoming more clearly defined
- Community's roles are unclear to communities but there are examples of community-based initiatives
- Memorandums of Understanding signed by CMGs defining roles and responsibilities

Financial sustainability

Sri Lanka

- Cost recovery/sharing of implementation costs covered by NHDA loans, US Save the Children, community, UNICEF (payment for latrines)
- Cost recovery for O&M is paid by users as and when necessary
- Communities had some input (Bo-Sevana) into cost recovery policy and quality of services
- CDC/user groups raise money for repairs
- Limits in community trust of CDCs to hold a regular O&M fund
- Renting out of community centre

Karachi

- Under OPP models, community pays 80% of costs of sanitation
- Communities unwilling to pay for O&M but pay for costs and sweepers and replacement pipes
- Community not given choice over new service provision by the CkMC
- Social pressure under OPP model for households to make payments
- Households unwilling to make financial contributions to O&M

Faisalabad

- A percentage of costs recovered through bills to WASA
- Communities pay sewermen informally and ASB set up a maintenance unit
- Communities not given choice over utility's designs/level of service
- ASB provided data to show that new services would be provided at a lower cost in absolute terms than current raates
- Weak billing, disconnection's are rare, political interference and system perceived as unfair

Cuttack

- DFID/CkMC funded
- Communities hire sweepers, and make financial and labour contributions to minor repairs
- CAP methodologies and vulnerable group planning suggest that communities agree to proposed cost recovery/ new service type
- User groups and community management groups raise funds and make repairs as and when necessary
- Profits from community contracts are used for O&M (in Chhatra Bazar)

Lessons learned related to the procurement of services

We have identified a number of important issues in the stages leading up to the handing over of O&M to communities. There is a lot at stake, in terms of sustainability and environmental health/quality of life, in the operation and maintenance of infrastructure interventions. This is reflected in the findings of our analysis of the procurement of services of past projects, which are described below.

The key finding from the outset is that **operation and maintenance of urban services was not a priority issue for either the community or the municipal agenda** whereas the procurement of services was.

Procurement at the municipal level

In Colombo, municipal authorities were not able to provide any common amenities such as toilets or water taps for shanty town/slum areas. Therefore people had to use municipal common toilets and water stands situated in the streets outside the settlements. However, in regularised settlements improved earlier, communities were involved in the development process i.e. planning, implementation and maintenance. Community Action Planning methodologies promoted concepts of self-help and beneficiary participation in planning and construction of common amenities and housing. Million Houses Programme followed an enabling approach whereby government played the role of facilitator while communities were given greater freedom to decide on housing options and methods of construction. Community Development Councils (CDCs) were formed under the guidance of the municipality to assist the municipality with improving housing conditions and environmental health.

In Karachi, in the informal settlements known locally as *katchi abadis*, the responsibility for services lies with the development agencies such as Sindh Katchi Abadis Authority. In many *katchi abadis*, sewage systems have been laid

by the community on a self-help basis and with the assistance of Orangi Pilot Project/Sindh Katchi Abadis Authority. Where people have laid the infrastructure themselves without any technical advice, it has been found that the systems do not perform well. In regularised settlements infrastructure works are generally planned, constructed and executed in a process that only involves the contractor and the concerned government agency. The communities have little or no say in the process and the infrastructure constructed is generally below acceptable social and technical standards. This has caused problems for both communities and the municipality in terms of O&M.

A similar situation exists in Faisalabad. The Faisalabad Master Plan cannot be implemented due to lack of funds; a major part of the work to be done is in *katchi abadis*. The service provider agencies have failed to deliver adequate services because of the rapid development of unplanned settlements. Many communities have laid sewerage systems or water supply distributions on a self-help basis or through Councillor Programmes; these developments are haphazard, uncoordinated and substandard. The Faisalabad Development Authority does not encourage communities to participate in decision making on policy and implementation. This contrasts with the Cuttack Urban Services Improvement Project in Cuttack, which aims to find the balance between prescription and choice through offering communities a choice of cost effective, off-the-shelf options. Communities can choose a combination of designs that best meet their needs and the location of facilities.

Community procurement

The power and agency of the poor is generally thought to be limited; they are not generally assumed to be social actors. The case studies illustrated that although the poor and excluded tend to need representatives and support from agencies and organisations, there are instances where active community members have taken the initiative in service procurement.

The urban poor had the opportunity to participate not merely as beneficiaries but as active partners in the process. In particular, the UNICEF Urban Basic Services Programme of Colombo Municipal Council in Sri Lanka and the NGO/CBO community-managed water supply and sewerage project in Faisalabad were all community-driven processes. Most of the service improvement programmes in the case study settlements were carried out with active community planning to implement the project and assure its maintenance. The Community Development Council and other CBOs such as the Women's Saving and Credit Society were the two important community-level organisations instrumental in the procurement of urban services.

Women's participation was highlighted in the entire service improvement process in the Sri Lankan studies. The Women's Savings and Credit Society in the settlements also supported the CDC in implementing of the programme in Sri Lanka. In Kadam Rasool (Cuttack), there is the Muslim Women's Welfare Association and Mahila Samiti, an organisation formed by women in Chhatra Bazar, that participated in the procurement and O&M of infrastructure.

Community leaders of the case study settlements were well aware of the government and municipal systems. Elected CMC councillors have a funding allocation of Rs. 1 million per year for various development activities within their electorate. Where active community members had the skills to deal with existing relationships with relevant officials, the procedures for getting the job done and resolving the O&M issues of the settlements were not so much a burden to them. Therefore, most of the community leaders have acquired the knowledge and skills required to address their own problems, obtain the necessary funds for the settlement improvement activities and to procure expensive services (such as electricity connections, paving of roads and obtaining water mains to regularised settlements).

A lack of formalised land tenure arrangements is normally a barrier to the extension of networked infrastructure. The primary reason for the lack of infrastructure (or poor state of existing infrastructure) is poverty and the lack of incentive to save funds to invest in long-term facilities when land tenure is not guaranteed. The regularisation process undertaken by the public sector in the informal areas of Karachi and Sri Lanka before infrastructure interventions was a prerequisite to the successful partnership with the municipality, civil society groups and the consumers. Secure housing means that strong action can then take place to claim improved infrastructure and services. However, this is not always necessary, as illustrated in Cuttack.

The demand-driven services outlined in the studies were community initiated, agency stimulated or part of municipal activities. The problem with agency stimulated or municipal programmes, such as CUSIP or the examples from Karachi, can be that the establishment of a target figure of supplies to be built can result in a target-led rather than a community-led process, which may have negative consequences for the future O&M.

Some communities had succeeded in;

- analysing their own settlements and infrastructure needs;
- planning, locating and playing a part in the construction;
- partly paying for infrastructure; and
- organising strategies for paying for and organising the on-going work in O&M.

However, there are many factors that constrain choice for users, e.g. lack of information and understanding of the (O&M) impacts of different choices and financial constraints. Communities need a variety of forms of support: information, organisational, technical and capacity building. There is a role for NGOs in acting as intermediaries between communities and local government. The case studies drew attention to the role intermediaries played in providing technical support to communities. They explained the range of technical options, the implications for O&M and the financial aspects. Users were then allowed to choose from a range of infrastructure options, rather than having the choices made on behalf of communities by sector professionals. In the case studies NGOs have successfully been involved in people's development processes, e.g. SEVANATHA was responsible for community mobilisation, planning and organising the community education and training programmes, finding funds for construction, providing technical advice for the community during construction work and training community leaders on maintenance of community infrastructure.

The Khannagar case study in Cuttack illustrated the point that even though an intervention was made in the slum and some community members participated, it does not mean that all community members have an equal knowledge about the programme they are expected to participate in or the ensuing O&M requirements. This was illustrated again in Sri Lanka, where community members took initiatives, using their links to local politicians as leverage to obtain funding. This suggests that there is little incentive for different stakeholders to take an ongoing role in maintenance, since they took no role in procurement, deferring to the more powerful and articulate groups within the community. These groups have different levels of power and authority within community decision-making, and influence the process of change. Where such broad-based stakeholder participation is not given attention needs to be paid to the way in which different stakeholders interact in service provision.

The participatory process adopted by some of the agency-stimulated projects (e.g. CUSIP) was unfamiliar to the local authority organisation (CkMC) and acted as an institutional barrier to this stakeholder's participation. This meant extensive training for staff and realignment of goals in infrastructure provision so that all partners shared a common goal and had clearly defined roles and responsibilities. This included changes to the 'work culture' of the organisation, the relationship between municipalities and contractors for provision of infrastructure, the political environment and the nature of the communities served. In this situation the incentives of each target group may then be formalised and it will become more apparent where service providers have a relationship with the user communities.

The following table summarises the constraints found in the case studies:

Cuttack

- Lack of guidelines
- Passive community involvement in management
- Shortage of sufficient funds for finance
- Inadequate training of community for management
- Overlaps in responsibility
- Many actors involved
- Communities not contributing much
- Lack of skills and capacity
- Funding O&M a problem
- Community not aware of their role in community management
- Community responsible for small repairs and government responsible for big repairs

Karachi

- Environmental hygiene poor
- Centralised management
- Problems with land ownership
- Inadequate water supplies
- Community has little trust in utility
- Collapse of services
- Communities are not trained for management
- Breakdowns are rampant
- Unsustainable environment for O&M
- Lack of clear strategy
- Inadequate health education
- Poor management
- Lack of trained staff
- Insufficient funds for recurrent expenditure

Faisalabad

- People used to policy of government intervening in all O&M
- Inappropriate technology
- High technology with high O&M costs
- Shortage of funds for O&M
- Inadequate priority setting by WASA and government
- Centralised management
- Poor data for O&M
- Lack of official involvement of communities
- Lack of trained personnel
- Breakdowns common
- O&M budget not responsive to needs
- Policies do not continue for a reasonable period
- Poor monitoring system
- Complicated billing system
- Lack of safety equipment for sanitary workers
- Shortage of staff
- Negative behaviour of users/users reluctant to pay for services/illegal service connections
- Low quality material used for construction
- Lack of ownership at all levels

Sri Lanka

- Policy change in 1995
- Community participation declined
- Investments in poor communities are not viewed in wider perspective of development
- Overlaps in responsibility
- Lack of co-ordination
- Political interference
- Communities responsible for minor repairs and government makes main repairs
- Training aspects declined
- Lack of capacity and legal framework for provision and O&M to low-income settlements due to resource constraints
- Legal limitations in promoting community contracts
- No proper system for developing a public, private and community partnership in O&M of services
- Full capacity of CDCs are not exploited
- Inadequate regulatory mechanism for promotion of community-based O&M
- Insecure land tenure – Garden No. 211

Lessons learned related to the technical sustainability

Important in the choice of technology are both the level of local skills required and the recurrent costs of maintenance and operation of the system. Between these two factors, there is scope for all community members to contribute to the O&M systems by financial and non-financial methods based on ability to pay. However, this approach demands that a community have the capacity to examine itself, and to recognise the needs of all social groups and to include them in the benefits of local development. In the 1980s, the concept of Village Level Operation and Maintenance was conceived; pump design was to be simple and pumps would be handed over to the community following installation. This approach had mixed success, partly due to a failure to simplify pump design but largely because communities did not accept ownership. The failings of this approach led many to the conclusion that a willingness of the community to invest money in a water supply scheme is the real test of ownership. There is a need to promote and invest in such technologies that offer lower recurrent operation and maintenance costs to disadvantaged communities.

The identification of O&M technical requirements involves:

- Components of the scheme
- Description of O&M activities
- Description of O&M requirements
- Identification of tasks (monitoring, preventative maintenance, minor repairs and major repairs)

Intermediaries. There is a role for development of technology which is low cost, easily maintained by users and which does not incur high operation and maintenance costs. It is important for local consumer groups who become directly involved in construction and operation to receive technical support. NGOs, such as OPP and SEVANATHA, are in a position as extension workers to communities to ensure, as far as the context allows, that the poorest and neediest members of the community are not financially disadvantaged through the choice of technology. NGOs can inform communities of the varying levels of service and operation and maintenance costs involved with each type of hardware. The communities are then able to make an informed choice for the appropriate technology that is within the community's assessed level of capacity to pay. Consequently, the planning and design of systems is directed to the lowest appropriate level, in an attempt to secure access to infrastructure services by all members of the community.

Levels of service. There are several cases where more appropriate and flexible levels of service have been introduced. This has generally been in response to public dissatisfaction and the lack of existing municipal investment in infrastructure. The technical choices that a community will be able to support will reflect the technical resources available to them and their competence in using them. It is important that the community understand the advantages and disadvantages of each option and what the risks and costs are. The most appropriate choice should be the system that a community can afford and manage so that when there is a problem the community can solve it with the minimum of outside intervention. There have been particular problems in informal settlements where the land tenure situation is unresolved. However there is evidence that local politicians will fund some basic level of networked infrastructure in these circumstances as illustrated in the case study of Garden No 211, Colombo.

Technology must be appropriate to the socio-economic and technical context in terms of ease of maintenance with the available skills, use of locally available spares, etc. Thus, some engineering design standards may be inappropriate. Factors affecting the level of service include:

- Existing institutional and regulatory frameworks/design standards and norms
- The role of construction quality standards and ensuing O&M burdens
- Provision of guidelines of O&M for users
- Research and consultation to provide workable norms and standards
- Changes in municipal attitudes, customs and standards

Appropriate technical standards. CBO/NGO initiatives in Faisalabad have worked where technology has been standardised, which simplifies O&M by limiting the range of spare parts and expertise needed. The Cuttack example created scope for departure from the concept of planning norms, materials and construction practice to ensure flexible provision of infrastructure. Communication with communities is important for the exploring of alternatives. Success was also promoted where simple technology was installed on a household basis, which was easy to maintain and repair and where technical assistance was available. Interestingly, sanitation issues, particularly household latrines, were regarded as priority issues. The sustainability of O&M routines was also enhanced by simple O&M jobs like routine inspections and minor repairs. These changes have resulted from a number of factors including:

- Analysis of settlements and its needs
- Community preference as to type, cost and convenience
- Knowledge of alternatives and technical know-how
- Presence of proven models which have been adopted by communities, i.e. designs that have been simplified and costs reduced
- Willingness on the part of agencies to find innovative alternatives to standard solutions.

The lack of monitoring/supervision of contractor work in Karachi/Faisalabad meant that standards of infrastructure are below approved levels. This has typically increased the cost of repair and maintenance work and means that municipalities deal with problems that arise as part of a crisis maintenance strategy. An additional problem emerging from Karachi is KWSB's lack of information on existing lines laid by other agencies. Absence of records of infrastructure means each time new work is commissioned a survey has to be carried out to find existing lines.

Construction committees. The formation of community construction committees and participation in construction also helps a community to understand how a system operates and how it can be maintained in future. Building guidelines were used in Sri Lanka to make clear that agreed work procedures were followed by housebuilders and that the quality of work reached a certain standard. SEVANATHA also had an important role in interpreting technical drawings and making them more accessible to residents. It was the responsibility of both the municipality and NGOs/CDCs to ensure that correct procedures were followed and that an acceptable standard of work was maintained. Poor quality and substandard infrastructure has the obvious implications of unnecessary operation and maintenance difficulties and increased costs.

Expertise. In general minor repairs appear to be dealt with by communities on an ad hoc basis in Sri Lanka, yet people tend to consider that the maintenance of services is the responsibility of either the municipal council or the concerned service provision institution. The technical skills required to carry out the necessary tasks were either present within the community or were developed. The case studies illustrated how agencies promoted the collective acquisition of specific skills related to O&M. Written training materials and guidelines and the holding of training courses can supply evidence that NGOs and CBOs have thought about the roles and responsibilities of communities in O&M. This creates local capacity to respond to simple repairs and carry out scheduled maintenance and preventative maintenance. However, the formation of a separate group of community

members as a maintenance crew in low-income communities was not felt to be of much benefit in Sri Lankan studies because the O&M work left to the communities is minimal.

Substandard works by contractors and poor quality of materials are common causes of the decline in service levels experienced in the settlements in Karachi. Factors contributing to this problem include the unrealistically low quoting practice used by contractors in order to secure work and the lack of monitoring and quality supervision of public works. There seem to be no mechanisms for maintaining the sewerage system on a regular basis and although municipalities have the responsibility to desilt lines, the DMC does not have any equipment to perform this task, nor do the trained staff have the equipment to maintain *nullahs* over extended lengths. This situation is compounded by a lack of interest or contractual obligations for agencies towards O&M in low-income settlements. As such, communities may either perform repairs themselves (with assistance from OPP) or pay for the work to be done privately.

In the Faisalabad case, sewer men tend to have the expertise to conduct O&M, but usually lack the resources to do all the work. There is a municipal schedule for desilting on a monthly basis, but this tends to be subsumed by the current strategy of crisis management. In addition, blockage of the WASA main adversely affects the functioning of community-built sewers. Communities must then either pay for the cleaning of these lines or do it themselves. Some of the activities under the umbrella of maintenance are more about adjusting community behaviour to prevent the dumping of rubbish/solid waste into the sewerage system.

The CkMC and PHED have considerable unskilled resources at their disposal, i.e. drain coolies and sweepers. However there is not much evidence of formal O&M activities by either CkMC or PHED in the study areas. As such, much of the O&M depends on how matters are managed by the Ward Councillor. Attention has been given to developing a maintenance strategy for the CkMC under CUSIP, in addition to strengthening existing capacity for O&M.

Technical support. The levels of support and acceptability of community members to O&M of services has been raised in some of the settlements described in the cases. In some of the cases, for certain services, community members received training, for example by Bo-Sevana in Sri Lanka and OPP in Karachi, Faisalabad. In some of the cases, there is evidence that skilled people were present in the communities when more elaborate repairs were needed. However, there is no general CMC policy for community-based operation and maintenance, whereas communities involved in the CUSIP in Cuttack and those that worked with OPP

in Pakistan where made aware of their on-going responsibilities for O&M. In addition, it is said that residents are becoming less dependent on OPP for advice and technical guidance, having acquired the necessary skills and expertise themselves. MoU detailing the type of O&M to be carried out by the community are included in the community action plans detailed in the Cuttack study. Residents have also received some training from CUSIP to undertake minor repair work; the problem in the settlements is motivating people to perform these tasks.

The case studies illustrate a number of good community-based initiatives in relation to O&M, indicating both the wide range of activities which can be undertaken by communities and the degree of ownership and care afforded by such communities.

In addition NGOs and CBOs may have a role in building the financial management skills required in fundraising activities and managing finances. Organisational skills are also needed to mobilise the community and manage conflict. NGOs and CBOs were also key in instituting participatory methodologies for planning and evaluation, and assisting communities to deal with politicians and local government. Thus, agencies need to have all these skills in order to train the community if skill gaps exist, but also need skills in social organisation, communication, developing programmes in hygiene education training, monitoring and follow up/evaluation.

The carrying out of O&M services within settlements has been an income opportunity to the skilled and unskilled people who are engaged in such work, for example sweepers in Cuttack. Increasingly there is a new and expanded role for the small-scale private sector, responding to growing demands for maintenance, i.e. the self-employed plumbers/mechanics paid piece rates in Colombo.

Municipal workers are supposed to be the key people responsible for carrying out O&M, but they lack knowledge of how systems work, and their activities tend to exacerbate O&M requirements. For example, municipal workers of the CMC who operate Gally Emptiers have been known to remove the filter bed stones from community septic tanks.

Systematic approach to maintenance. The operation and maintenance of water supply and sanitation systems still receives much less attention than their design and construction. This is especially in the Karachi case study where supplies rapidly began to fail, the expected benefits have not materialised and the investment has been wasted.

Table A3.1. Systematic approach to maintenance

Management procedure	Responsibilities	Constraints
Local government institution	■ Main lines with piped water ■ Trunk sewerage	■ Lack of long-term planning ■ Little capacity for O&M ■ Consumers do not pay bills/ ■ Illegal connections ■ Rent-seeking politicians
Community managed	■ Stand posts ■ Lane lines of sewage ■ Communal latrines ■ Taps at communal latrines ■ Manholes ■ Stormwater drains	■ Collection of funds for O&M to hire local people with skills/or to remove solid waste ■ Need for specialist skills ■ Willing/able to manage the system. Systems for reporting/repair serious faults? ■ Community spirit/ Creation of institutions to manage the services ■ Separation of responsibilities means added risk if municipality does not fulfil obligation ■ Clear definition of roles – no grey areas
Individually managed	■ Own latrines ■ Emptying individual septic tanks ■ Individual water lines ■ Individual water connections ■ Common bathing areas ■ Water bills	■ Can the household carry out the O&M themselves ■ Can they finance the spare parts/hiring of skilled people? ■ Impact of bad management practices on community, i.e. removal of septic tank waste onto street ■ Incentives to pay for water/sewage – not make illegal connections

There is very little evidence of a formalised approach to O&M in the case studies i.e. O&M manuals covering tools, works, description of activities, items to replace, recording of malfunctioning, repairs and replacement. This is particularly surprising in case studies where communities have been involved in the construction of systems, since such involvement is aimed to develop a strong sense of ownership and responsibilities for systems and thus promote O&M. Low-income communities, in general, consider that maintenance of service is the responsibility of either municipal councils or the concerned service provision institutions.

The case studies suggest that communities and municipalities are also not, in general, taking a systematic approach to maintenance. A lack of preventative maintenance procedures and the irregular collection of maintenance money or lack of a specific budget line for O&M can illustrate this. An emphasis on the selection of technology that is appropriate is pointless if there is difficulty in raising the revenue at the municipal level or persuading the community to contribute money to maintenance. The incomes from the communities, methods of collection and material stocks were not generally agreed before construction. Having said this, the case studies also highlighted the success of institutionalised procedures of maintenance, wherein householders and communities were clear about their responsibilities and those of the municipality.

Health promotion. The Sri Lankan and Cuttack case studies illustrated the need to create a commitment to and motivation for O&M through education and health promotion. The role of health promotion in the case studies was in motivating households to take on the responsibility and be willing to pay for water and sanitation services in order to maximise the benefits from infrastructure improvements. Where possible the projects outlined linked up with health promotion led by the public sector.

Lessons learned related to institutional sustainability

Although the procurement of infrastructure such as water, sewerage, roads, etc. has considerable health, social and economic benefits and is an asset to a community, the ownership of such may become a liability in terms of continuing commitments for operation and maintenance. Typically, insufficient thought at the planning stage is given to the way the completed works will be operated, maintained and financed, i.e. the way systems will be managed. Planning for management involves both the municipality and community at the initiation and planning stage, during construction and in use. Thus, the issue of sustainability outweighs the short-term impacts of widespread coverage. Sustainability requires

the use of incentives for all stakeholders to remain committed to the continuing support of infrastructure services. The case studies illustrate the comparative advantage of the actors, and how their roles can be used to complement each other.

Long-term strategies for O&M need to be addressed and developed at the planning stage of any project. The long-term community management of services depends on the placement of urban services in a development context. As such this may include:

- A sense of ownership of the system and a felt need (a service that people want and are willing and able to pay for)
- Participation of users and agencies in the process, and the capacity building of both (demystify expertise, strengthening/development of institutions, different methods of management, creation of an enabling environment/supportive attitudes)
- Support services (institutional reform/supportive policy frameworks and financial, technical, social and customer services)

The realisation of the potential benefits of improved infrastructure: i.e. time saving, health improvements, a sanitary environment, etc. cannot be achieved if systems are not used or have broken down. The case studies suggest that many communities are taking over the 'government's role'. They must meet the heavy demands of cash contributions, labour and materials, spending time and effort on the management of the system and providing community volunteers. Much of the success depends upon clearly understood agreements as to roles, resources and intended results.

The following issues were raised in the case studies:

- The commitment to provision of services
- The political will to achieve sustainability
- Clear policy and legal framework
- Creation of autonomous organisations
- Services tailored to people's needs
- Clear objectives for construction and operation and use of facilities
- Creation and maintenance of a positive environment to ensure that the facilities will provide maximum benefit to the users

Sense of ownership. There is a perception that no system/technology should be installed unless a proven maintenance system, preferably at the stakeholder level, is also established to support it. For the impact of projects to be sustained, the beneficiaries must have a major stake in the ongoing success of their supply. For this to occur a sense of ownership is needed. A 'sense of ownership' does not only suggest the legal possession of land and capital, although these issues are very important. It can relate to the degree of decision-making power within a project in which the community is involved. The sense of project ownership is therefore largely dependent on the degree of community participation. The importance of a commissioning ceremony to mark the completion and handing over to the community was raised in the Anjuman Samji Bebhood study. It has symbolic and legal significance and promotes the responsibilities for ownership of the completed works. Sustainable community management depends on capacity building of the communities and activists involved and the availability of resources, time and efforts to transform communities into managers rather than only users of the systems.

'De-projectisation'. Community participation can be developed as a response to the government's inability to deliver services, but this requires capacity building and the setting of an infrastructure project firmly in a social development context. The results will often be slower to materialise and the benefits promised by a new service may fail to come as quickly as expected. Committees and trained individuals may lose interest or ask for payment as happened in one of the Sri Lankan studies. There is a need for the continued support of NGOs like ASB and SEVANATHA, who are responsible for follow-up monitoring and advice after the installation of the infrastructure. This goes beyond the boundaries of the 'project' approach. The case studies highlight the necessity of maintaining the community's motivation after the novelty has begun to fade and reinforcing the community's vested interest in the continuing maintenance of the service. Community participation can be seen to work in the short to medium term, from the evidence in the case studies, but it is too early to say whether the strategies they have employed (like strengthening institutions and communities) will translate into permanent models for the longer term maintenance of services.

The role of NGOs. Centralised management often contributes to O&M failure because of over dependence on limited government resources, user expectations of government, non-payment for services and lack of user participation in decision-making. The shift in funding means that more resources are moving away from high subsidies towards supporting a community-based approach and com-

munity mobilisation, which has potential for vast improvement. NGOs and CBOs have a role in motivating and generating solidarity with people who confront overwhelming problems at the local level.

The approach by indigenous, local NGOs reflects cultural values and provides supportive functions, e.g. training and providing technical and managerial support. These local NGOs knew what would work in that context and also had the patience and flexibility to not push for quick results. Grassroots groups are emerging and citizens are more involved in local decision-making and the procurement of services. The NGOs and CBOs described in the case studies have proved their ability to increase collective and individual confidence in assessing and finding solutions to social and political problems. NGOs/CBOs may also empower communities with a greater ability to organise to approach their local authorities for better living conditions. Participatory approaches to project management, e.g. CUSIP and CMC, have contributed to this gradual strengthening of civil society and changed the behaviour of local leaders and officials. This has involved conscious efforts to organise new structures and groups. Building the capacity of communities through the input of resources, time and personnel means solutions are more sustainable because human resources have been developed.

In Sri Lanka, the lesson is not that programmes have not been well implemented but that empowerment is a slow and difficult process and requires persistence on the part of the external agencies to create forums in which minorities can voice their concerns and demonstrate their abilities. Yet participation is difficult and this raises the question of how NGO/CBO activities can be scaled up. The success of local NGOs was in their knowledge of local circumstances, which are complex, local to that settlement and cross-sectoral. It is difficult to suggest how these realities can be simplified to form a sectoral policy framework. In addition, these NGOs can be seen as running a parallel structure to the state, and there may be scope for NGOs to create a 'demand pull' on government, who have a permanent and obligatory responsibility to people and an ongoing role in water supply operation and maintenance.

Public sector involvement. In the Faisalabad and Karachi case studies, the public sector displayed systematic deficiencies in responsibilities for policy-making, project design and utility management; there is no consistency, long-term vision, management and sense of ownership developed.

There is a need for institutional change and capacity building through organisational development, adoption of new skills and procedures and strengthening of management as in the Cuttack case study example. Governments tend to be rigid bureaucracies, with set structures and procedures and the political and institutional cultures of decision-making are often authoritarian. Thus, officials may perceive citizens and NGOs as threats and so mistrust is created between stakeholders. Recognition of the need to change their approach to enable communities to manage their own schemes has been slow to materialise. Government must establish and sustain the environment in which communities can construct, operate and manage improved facilities. The importance of politics and rent seeking is visible at the interface between local CBOs and authorities. A particular concern was the need for change in the staff attitudes in municipalities (whose administrative frameworks are geared towards the construction of physical infrastructure – engineering – and are not people orientated) and the rent-seeking politicians in the Sri Lankan studies (accountability, predictability and transparency in their allocation of services are important).

The Colombo municipality has legal responsibility to provide O&M for all services, although not in squatter settlements. However, the CMC has little control over the line agencies, which have powers of decision-making for most services. In the Bluemendhal Flats, Sri Lanka, the first generation of occupants thought that it was the responsibility of the municipality to provide and maintain common amenities. The second and third generations realised that they had to organise themselves and find ways of improving the services.

The quasi-institutionalism of the CDC structures and the CAP processes suggest that roles and responsibilities were clearly defined, at least informally, even if these roles were not executed as intended. Municipalities are in charge of access roads, septic tank emptying, main lines and major work on the end-users' end of water and sanitation. Communities were responsible for individual water lines, common and individual toilets, interior drains and community centres (however, there is common reference to CDCs acquiring support from politicians to sponsor works, which suggests that systems may be due to more arbitrary factors).

NGOs, NHDA/Public Sector and CDCs formed a strategic partnership to set urban policy in Colombo. There was a change in the attitudes and habits of municipal staff and status of poor communities. Changes in government attitudes included:

- Senior government staff acknowledge the reality of the maintenance problems
- Considerable time and efforts to establish good working relationships

- Day-to-day co-operation between NGO and government staff
- High service standards have been maintained

The strengthening of local level offices was achieved by providing information about structures, services offered and the procedure of obtaining services from service delivery agencies. This meant that the poor were better served by government resources and thereby the skills and resources of the poor could be diverted to improve their socio-cultural status by involving them with software activities.

According to the KWSB Act 1996, the water supply and sanitation systems are to be controlled and managed by the KWSB. However, in practice, management and maintenance is performed by a variety of agencies (since infrastructure has been laid by different agencies in different settlements). Solid waste management is the responsibility of respective municipal agencies or cantonment boards, however the case studies illustrate an irregular system for rubbish collection. In cases where KWSB has been unable to meet its responsibilities, communities have taken on the role of service provision, often with the assistance of OPP/SKKA, after which they are responsible for the O&M of this internal infrastructure.

It is suggested by WASA that the roles and responsibilities between them and NGOs/CBOs were not clearly defined, but it appears to be in WASA's interest to promote this collaboration. Some NGOs perceived that models which co-ordinated activity with WASA, laid systems with planning, sought technical know-how, and used good quality materials were more replicable and sustainable than those which acted independently. In addition, the case study suggests that the management of WASA needs improving in terms of planning, implementation and monitoring activities and WASA officers and workers should be adequately trained. The management structure of WASA tends to promote a lack of continuity in WASA policies and operations.

Recent changes in the legislation governing CkMC's power and roles reinforce CkMC's legal obligation to safeguard the interests of the poor when addressing economic and social development issues. CkMC's main obligation is to take over responsibility for maintenance of the infrastructure created under the CUSIP. It is suggested that decentralisation has brought a more transparent system of responsibilities of staff for O&M and allocation of supplies and resources. However, the instances of community members approaching the different statutory authorities are quite widespread but with little evidence of successful outcomes. There is no clear-cut understanding between the authorities and people with regard to shouldering the burdens of O&M. It was suggested that PMC-CUSIP schemes are not thoroughly understood by officials or field functionaries either.

- Improve municipal maintenance to increase the lifespan of infrastructure and reduce O&M burden on communities
- Set targets for municipal staff performance and provide on going training to all stakeholders
- Promote technical support to communities for carrying out O&M, e.g. municipal staff in an extension role or the facilitation of NGOs to carry this out
- Develop institutions for financial support tailor-made to low-income groups for infrastructure development
- Set rules for infrastructure O&M for all stakeholders and formal agreements of responsibilities

Community institutions. A community's ability to manage a supply will depend, to a great extent, on the level of its involvement in the development of the service. The history of co-operative organisation and institutions should be taken into account when designing systems and service delivery (e.g. those in Cuttack), however this does not prohibit the emergence of new institutions such as CMGs or CDCs. The Khannagar case raised the issue that while local initiatives may be involved in project implementation, on-going 'back-stopping' should also be encouraged for sustainability. Insensitivity to gender-related matters may have led to either women's weak participation in decision-making and activities regarding O&M or lack of analysis during project evaluation.

CBOs played a major role in the mobilisation of communities in the Cuttack and Sri Lankan case studies; this is a large part of ensuring sustainability. Such organisations had clearly defined responsibilities, and a formal and permanent status with autonomous control of finances. These institutions tended to have strong leadership and support from the community, and were able to organise and carry out the planned programme of activities effectively. Community management aspects seem to be emerging as sustainable arrangements for ensuring on-going water supply and sanitation in settlements.

The recent political changes have also led to a decline of CDCs from 600 to 20; CDCs are no longer felt to be a platform to launch urban development programmes (shelter, health, water, sanitation, solid waste management, etc.). Similarly, Community Action Planning has declined largely because it has been associated with the past political system (although it was intended to be a civil ideology) and a particular urban typology (which is no longer the jurisdiction of NHDA).

The WASA and ASB study developed the potential of community-based initiatives to be adopted by local government – if government has structures in place that recognises the importance and the role of these activities, as in the OPP project in Welfare Colony.

- Involve communities at the planning stage and define roles and responsibilities
- Develop guidelines for the execution of these tasks
- Make municipalities accountable and responsive to communities' demands/problems identified. There should be a dialogue in place between municipality and users
- Community institutions may lobby to de-link land tenure and the provision of services

Commitment. Before all this, there is a need for genuine commitment at the household/community level for improved services. This involves local consultation between planners and community representatives; there is then a trade-off between what the settlement wants and what the construction body is prepared to supply. Commitment may depend on the awareness of health, social and economic benefits of improved services, and willingness to contribute to the development and maintenance of the facilities. The need for a particular level of service may be encouraged through health promotion, literacy programmes and general microenterprise, e.g. in the Orangi Project. People may be happy to pay for services if they feel that they have a direct say in decisions, and to make a contribution is also to declare equality in status. The cases studies reflected the view that municipal services reached those of greatest influence and not of greatest need, so for change to matter the areas of high priority should be those with least political significance. There is also a role for the agency to encourage communities to make these improvements. Commitment to the proposed projects can be ascertained once the following is taken into account:

> Training and support for the project management unit of CUSIP included poverty, gender awareness training, and CAP training. The senior management of CkMC had training to strengthen programme planning and management skills and awareness regarding the initiation of community management groups and community partnering/contracting. Activities included on-the-job training, workshops and study tours.

Resources. The materials and equipment for the agreed service should be available for rehabilitation and operation and maintenance. The Orangi PP had a stock of tools available for use. Discussions with sewer men, WASA officials and NGOs were used to establish what makes a good O&M system. These provided

useful indicators, with sewer workers focusing on the necessary resources for them to carry out technical repairs, WASA focusing on weak cost-recovery systems, and NGOs focusing on the institutional framework (i.e. the role of communities and WASA in ensuring functioning O&M).

Lessons learned related to financial sustainability

Payment for minor O&M activities is possible even from the poorest of communities if appropriate technology is selected. The choice of technology should reflect the community's needs, preferences, required levels of O&M and level of willingness to pay. Overall, the introduction of a new infrastructure is viewed as a process of community mobilisation, demand generation and training for O&M to ensure project sustainability.

Table A3.2. Means of fundraising

Type	Description	Example
Voluntary fundraising	Funds collected periodically when required through meetings or household collection on an irregular basis	Cuttack, Sri Lanka, ASB (Faisalabad), Karachi
Community income	In communities with their own source of income, e.g. renting out community centres, a proportion of income may be set aside for O&M	Sri Lanka
Water metering	Connections are metered and users pay per household	Sri Lanka
Taxation	Local and national government taxation	Karachi, Faisalabad and Cuttack
Microcredit	Revolving loans	ASB system in Faisalabad
External funds	Donor funding for initial capital investments	Cuttack, Bo-Sevana (Sri Lanka)

Table A3.3. Summary of sources of funds

Example	Capital costs	Recurrent costs
Karachi	In the main government funded, but with community-managed services – cash contributions, local materials, trench digging – full cost met by communities/ SKKA	Full costs met by KWSB for their systems and full costs met by communities/ SKKA for their self-managed systems
Faisalabad	WASA meets full costs In ASB projects the full costs are met by communities, provision of materials and skilled/unskilled labour	Full cost met by WASA budget ASB projects – recurrent costs paid by communities
Cuttack	DFID funded	CkMC budget for O&M raised from taxes However, community raises special funds to cover minor repairs and services, voluntary caretakers, communal labour obligations, hiring plumbers and sweepers as necessary
Sri Lanka	External funding, household loans from NHDA, assistance from NGOs, community contributions of capital and labour (20% of total capital cost)	Individuals are personally responsible for maintaining pipes/ taps/ toilets for their own house, special funds raised for common O&M to cover minor repairs, some cases of metered charges for water, voluntary caretakers, communal labour obligations, additional funds raised through funds on renting out community centre to cover percentage of O&M costs in addition to profits from community contracts

Willingness to pay. The linking of operation and maintenance with the poorest and neediest members of a community is to link the central function of the system with its weakest social groups. Therefore, it is essential to recognise and identify these vulnerable groups if the costs of operation and maintenance are to reflect the whole community's ability to pay.

In general, the communities presented in the case studies were willing to pay for the cost of procurement but not the maintenance. However, it is recognised in the case studies that if the community does not pay the recurrent costs of infrastructure operation and maintenance then no one else will. The main factor affecting people's willingness to pay is the belief that it is the government's job to bear maintenance costs. Provision of urban services and O&M of services are often the legal responsibilities of the municipality and service provider organisations. In Sri Lanka there was no government policy in favour of community-based O&M and community leaders are beginning to question this practice and are also requesting payment for their efforts. Unnecessary political interference hindered the O&M process initiated in some settlements and reinforced settler's views that O&M is the responsibility of the municipality. Many of the community groups investigated did not collect regular contributions from community members for the use of O&M activities. It is suggested that they do not consider O&M of services a serious issue. In squatter settlements where land ownership was not given, the houses were not upgraded and it is difficult for community leaders of such settlements to link up with service delivery institutions and gain funding.

Demand-driven projects allow ownership to develop when the community is consulted and involved in decisions throughout the whole project. For use and maintenance of a water supply or sanitation system to be sustainable the user must actually want it. Therefore, there is a greater chance of providing an effective scheme for sustained operation and maintenance by collaborating with communities and trying to reach a compromise.

The cost of development of infrastructure should be low enough for people to afford; this requires technical research and the development of cost-effective community-based building procedures. OPP social organisers explain to homeowners the necessity of the project and new co-operative units are formed to collect individual contributions. Communities are consulted on policies of cost sharing and cost recovery in relation to the technical options. Communities under the CUSIP were able to choose a higher standard of service than that costed in the budget if they met the additional cost themselves. It is suggested that communi-

ties are unwilling to raise funds for activities that do not result in new infrastructure, but the lack of ownership of infrastructure may be an underlying problem, leading to disinterest in O&M.

Maintenance costs. The case studies show that there is great potential for maintenance to be funded and organised at the community level. The CkMC does not charge any household for use of communal water and sewerage facilities so there is little scope for cost recovery. It was anticipated by the CUSIP that the communities would make a small contribution in cash or in kind to the O&M costs of the in-slum infrastructure. The main purpose of this is to generate some sense of ownership, as the small amount that it will be feasible to raise from the community will not meet the full sum required. Some O&M activities are financed by users making direct payments to obtain specific services, e.g. there are several instances of residents paying for operational services such as latrine cleaning. One mechanism used by communities to fund O&M is to use the surplus generated through community contracts during the implementation stage, as happened at Chhattra Bazar. However, the fundamental problem of O&M remains that people are often less willing to pay for something that does not result in new facilities.

Another issue presented in the studies is whether the maintenance costs can be set at a level that communities can afford. Communities can minimise costs by:

- Regular preventative maintenance
- High-quality repair work
- Correct operation by users
- Cheap distribution of spare parts

Another method of minimising costs illustrated in the case studies to increase the use of voluntary work that local people are willing to carry out. Only the complicated repairs may then require paid assistance from self-employed 'handymen'. Once communities are organised and financing the majority of maintenance themselves, government funding can then be channelled into the requirements of the capital costs of new projects. The CDCs in the Sri Lanka study raise money for repairs in the communities. The strategy of only collecting money when specific repairs need to be carried out appears to be effective, given the limits in community trust of CDCs to maintain a regular O&M fund. Community-evolved management systems for services have frequently generated local employment opportunities or raised funds, e.g. through renting the CDC community centre. In this way, some funds have been generated for O&M.

Payment problems. Communities should not be underrated in terms of their ability to contribute (to costs and labour) of services. However, communities are reluctant to use mobilised funds for preventative maintenance unless there is a need for a major intervention. The Sri Lanka studies suggest that community members and leaders contribute to the cost of small-scale O&M, while for larger scale works, CDCs aim to get the assistance of outside agencies, including politicians. The scarcity of money and competition for the same money for other activities within these communities means a sudden breakdown of the system could take time to repair if the communities do not encourage the users to make regular contribution to maintenance funds. Community contributions tend to be made only in response to specific repair needs and such community-based initiatives in O&M are said to be less costly. Thus, the O&M system that exists in the case study settlements was more of a trouble-shooting nature than a systematic approach.

Problems with payment were also highlighted in the WASA municipal system. The WASA billing system is characterised by weak management, billing procedures and record-keeping. Disconnections are difficult and rarely carried out and law enforcement is poor. In general, the system seems unfair to customers, so there is little incentive for compliance, and illegal connections are widespread. It is suggested in the Faisalabad case study that there is some kind of corruption and misuse of funds within WASA. The funds allocated to O&M are based on the previous year's expenditure, revenue position, inflation and salaries. Financial requirements for O&M are not taken into account in the budget. WASA relies on sewage/ water charges for the main part of its revenue, yet nearly half of WASA service users are not paying their bills. Financial sustainability of O&M in Cuttack is dependent on the general revenue position of the corporation. However, expenditure on O&M is difficult to determine from the Cuttack case because the reporting system associated with municipal accounts does not distinguish clearly between capital and O&M costs.

In Karachi, where communities adopted the OPP model, the general principle is that communities use their own finances to construct and maintain facilities. Costs are said to compare well with the costs incurred by municipalities because they draw on local skilled labour, instead of bringing in outside contractors. In other communities, unwillingness to pay for O&M is based on the assumption that O&M is the responsibility of the municipal agencies. There appears to be no apparent penalties for not recovering costs under the OPP model, yet the formation of organisations which are lane based are usually large enough to be effective yet small enough to be cohesive; this suggests there would be social pressure for households to make payments.

Topics for further research:

- Monitoring and evaluation – lessons learnt on M&E and how these lessons will be used to improve practise
- Capacity building that unlocks knowledge and changes of behaviour within municipalities – not just building skills
- The difficulty of accumulating funds for O&M, collecting tariffs and building a community fund

Emerging themes

The basic objective of operation and maintenance is to ensure a sustainable, reliable service at an agreed standard of quality. This needs proper management, planning, budgeting and effective human resource management and training. Achieving this objective involves setting up systems for:

- Planning and budgeting for maintenance and rehabilitation
- Revenue collection and customer complaints
- Checking for defects in the distribution systems
- Control of illegal connections and unauthorised users

Sustainability. Improved management of services is necessary to meet the challenges of sustainability. The development of a systematic O&M programme depends on the improving management aspects and developing monitoring and evaluation activities. The management models illustrated in the case studies includes:

- Government assumes full control of activities
- Community assumes full responsibility
- Partnerships between government, community and agencies

The initiative to transfer O&M to communities tends to come from governments or other agencies and not from communities themselves. The fact that government does not wish to pay O&M costs does not mean communities wish to take on the responsibilities. Where communities undertake or are given sole responsibility for O&M, there tends to be a gradual reduction in community enthusiasm towards participation in O&M. The case studies also illustrate a varying interest in services provided. There appears to be a lack of understanding on the part of the municipality/agencies of the factors that can motivate communities. In addition governments are perceived by communities as avoiding their responsibility.

Where government assumes full control of activities, this tends to exclude the interests of the community, which leads to a lack of appreciation by both communities and government of O&M requirements.

Failure of O&M requirements includes:

- Lack of appreciation of the community's role
- Inadequate monitoring (use of old maps, lack of background information, lack of responsibility)
- Inadequate supervision of schemes by municipality staff due to lack of resources/overload of work

Where government and community play some management function there tends to be uncertainty over who should act in certain circumstances and who takes financial responsibility. This overlap or duplication of responsibility necessitates the separation of roles and regulation.

Sustainable O&M programmes are found where:

- Communities, agencies and municipalities carry out decisions jointly
- Communities, agencies and municipalities share knowledge and information
- There are well-defined commitments linked to specific outputs
- Community management structures are established
- Communities, municipalities and agencies receive appropriate training

Municipal responsibility/good governance The nature of urban settlements (overcrowding, not constructed in accordance with official standards, lack of land tenure, etc.) makes it difficult for government to provide basic services and thus they have been typically ignored. This results in communities lacking adequate access to basic services partly because of neglect but also because existing facilities are over-stretched.

The case studies define the need for sound policy and legislation that express the government's goals and objectives with regard to O&M. The case studies show how legislation may inhibit or promote the introduction of community management, for example ownership of services/infrastructure may be legally vested in utilities. Alternatively, projects may be used by politicians with the danger that projects can be based on political and not community needs. A legal framework may then minimise political interference.

Other constraints on governmental responsibility for O&M include:

- Institutional capacity
- Financial constraints
- Social issues
- Willingness and ability of municipality to take responsibility for O&M
- Technology choice
- Lack of effective monitoring, co-ordination, collaboration and training
- Lack of existence of effective policies, strategies or commitments
- Budgets which do not reflect commitment to O&M
- Weak support services for O&M

Government responsibilities should include:

- Setting up supportive policy guidelines which create an enabling environment for O&M
- Planning investment requirements
- Co-ordination of actors
- Supervision
- Provision of technical expertise/facilities
- Monitoring and evaluation
- Integrating community management into overall management strategies
- Protecting public health
- Acting in a transparent and accountable fashion

Government also plays a vital part in the promotion and implementation of community management through its control over policy and national resources. In this way, community management is no substitute for good governance.

Participation or partnering. The case studies draw attention to the distinction between community participation and community management. Community participation implies that the beneficiaries are involved in development activities. However, the support agencies are in charge of the projects and can also be clearly identified as the provider of services. Thus, community participation, the contribution of locally available materials and labour is used for specific activities.

Community partnering, on the other hand, brings out the capabilities and willingness of beneficiaries to take charge and determine the nature of development affecting them. Within community management, communities take charge of their own infrastructure and support agencies are facilitators, thus the relationship

between the agency and the community is dynamic. However, community management cannot work without the existence of appropriate skills within the community.

The case studies suggest that the transition between community participation and community partnering, which is vital for O&M at the grassroots level, has yet to be made. This can be depicted by waning enthusiasm for community work, when individuals/committees feel reluctant to continue working voluntarily for the community. The intensive training in participatory methods for extension agents (e.g. CUSIP and to a lesser extent CMC) creates pressure for quick implementation and results, which sometimes leads them to coerce communities to agree on a decision which they did not sufficiently understand or achieve consensus on. Where agencies (NGOs/CBOs)/municipalities are involved, a patron–client relationship typically develops, which requires attitudinal and organisational change (e.g. the decentralisation of authority) to make community management work.

Community partnering has the potential to improve sustainability of O&M of services. Factors which contribute to effective community partnering have been identified as:

- The establishment of committees to assist in project management issues
- Strong community leaders
- Involvement of communities from the beginning of projects, and
- Enough time allowed by support agencies to prepare communities and to solicit their involvement.

Community partnering develops according to the importance a community places on a particular service, a sense of communal belonging and the stake and interest a community invests in a scheme. The case studies suggest that, despite current thinking, community participation in infrastructure provision does not necessarily result in sustainable O&M provisions.

Lack of information. The case studies indicate that there is a lack of access to basic information about the urban services. People generally do not know what is supposed to be done and by whom. There is need a to develop pathways for information based on systematic documentation and the monitoring and evaluation of community-developed processes for improvement in future planning of projects.

Managing information systems. The collection of data on all services in place is necessary to properly plan for improved performance and prediction of O&M costs (electricity, materials, labour, operational staff wages, technical support, administrative overheads, capital depreciation of facilities, reliability, rate of breakdown or various types of equipment/facilities). The collection of data and the compilation of registers would enable asset management at both the community and municipal level. This would also be a means of acknowledging the efforts of communities and of incorporating community-built services into municipal planning systems. Managing information would include planning training programmes for maintenance crews and communities in the recording and documentation of drawings and other data.

Information dissemination. Meetings, reports, trends of performance, and publishing news in local papers, would create accountability and act as a means of informing communities. Information dissemination would also include systems for public organisations to report breakdowns. Informing communities would include the disseminating of information about the way operation and maintenance is to be planned, organised, scheduled and performed, in addition to the monitoring policy – its priorities, performance standards, manpower conditions, capital to purchase tools and equipment and evaluation.

Acquire data processing knowledge. Communities and municipalities need systems for keeping maintenance records, regular updates of routine and emergency maintenance, spare part stock cards, maintenance job cards and log sheets. Data processing would also include the preparation of manuals indicating location types and condition of fixtures, regular updates made to distribution systems, and systems for documentating data such as conventional and digital mapping systems. The acquisition of GIS capabilities by NGOs working in urban poor areas may be an important intervention.

Part B:
Case studies summary and analysis

Section B1

Introduction

Purpose

The purpose of this part of the interim report is to present a summary of the case studies and an analysis of the studies in terms of:

- Technical sustainability
- Institutional sustainability
- Financial sustainability

Case study summaries

The summary of the case studies will be organised around:

- Background of each case study
- Key administrative, policy and political context for service provision
- Assessment of current O&M for different services in the case studies

Section B2

Case studies summary

The case studies

Sri Lanka	**Community-managed sewerage**
Project areas:	Kirulapura Bluemendhal Flats Kalingamawatha Garden No. 211 Bo-sevana Govipolawatta
Pakistan	**Community-managed water supply and sewerage**
Project areas:	Faisalabad Anjuman Samaji Bebhood projects – Hasan Pura – Dhuddiwala Karachi
India	**Cuttack urban services improvement project (CUSIP)**

Sri Lanka

The context

Colombo is the capital city of Sri Lanka and is the main urban, commercial and financial centre of the country. Its authority of area is 37.31sq.km, accommodating a residential population of about 800,000 in 1998, with a daily floating population of about another 400,000. Though several attempts were made to ensure planned city development in Colombo, it has grown mainly as an un-

planned city. Of the residential population about 50% live in low-income settlements. The dominant nature of low-income settlements in the city is reflected in the condition of the housing stock:

Type of housing units	Number	Percentage
Permanent dwellings	40,861	49
Slums (old settlements)	22,358	27
Shanties	20,685	24
Total	83,904	100

Source: Budget Report, Colombo Municipal Council, 1998

A comprehensive survey carried out by the Sustainable Township Programme of the Ministry of Urban Development and Housing in 1997/8 identified about 1506 low-income settlements located within the city.

Table B2.1 Distribution of under-served settlements in Colombo by type

Settlement type	No. of settlements	%	No. of housing units	%
Slums	1071	71.1	25500	38.6
Shanties	183	12.2	13313	20.2
Low-cost flats	103	6.8	8950	13.6
Relocated housing	97	6.4	14814	22.4
Old deteriorated quarters	31	2.1	2575	3.9
Unplanned permanent	21	1.4	870	1.3
Total	1506	100.0	66022	100.0

Source: Survey of Urban Low Income Settlements of Colombo, STP, 1997/8

This table illustrates that a majority of these settlements (71%) are slums. They are deteriorated old residential quarters owned by private individuals (usually

blue-collar workers in the city) located within the inner city areas. Most of these settlements do not have amenities. Shanties are those temporary structures built with improvised materials. They constitute the second largest category of low-income settlements of Colombo. They are mostly located on government reservation land (railways and canal reservation lands) and on low-lying swampy lands. Low-cost flats are those owned by the city councils as well as staff quarters of government departments, e.g. railways. Relocated houses refer to those low-income settlements relocated under various government development programmes.

Past improvements

Until 1978, no major government programmes were carried out to improve the conditions of low-income settlements in the city since they were considered to be privately owned houses or illegal settlements.

The purpose of the ***Enactment of the Ceiling on Housing Property Law No. 1 of 1973*** **(**CHP Law) was to regulate the ownership, size and cost of construction of houses in the country, in response to the overall serious housing shortage in the city and the deteriorating condition of existing quarters. 12,000 families living in shanty settlements felt no benefit from the CHP Law since they were illegal settlers.

UNICEF's ***Urban Basic Services Improvement Programme*** (1978 – 1986) was the first major government programme implemented to improve the conditions of the urban poor settlements in Colombo and several other towns in Sri Lanka. Communal toilets, common bathing places, water, drains, paved access to roads, community halls and preventative health care programmes were carried out.

The Urban Development Authority initiated the ***Slums and Shanty Improvement Programme*** **(**1978 – 1984). SSIP was a pilot programme for improving the urban poor settlements in Colombo. This involved upgrading low-income settlements through amenity improvement projects. A major achievement of SSIP was that it was able to convince the policymakers to relax normal planning and building regulations (permitting the construction of legally accepted houses by low-income communities) and to declare low-income settlements as special project areas in the city. The SSIP promoted the concept of self-help, common action planning (CAP) and beneficiary participation in the planning and construction of projects and developed a sense of confidence in the minds of the poor to work with officials.

Major housing development programmes implemented by the National Housing Development Authority (NHDA) since 1978.

- 1978–1984: *Hundred Thousand Houses Programme*, a provider-based approach, direct construction of houses and self help methods.
- 1985–1989: *Million Houses Programme*, developed in response to limitations of provider-based approach for achieving a large-scale housing development; the government followed an enabling approach and the government's role was as facilitator. The homebuilder was given greater freedom to decide options and methods of construction, e.g. site and services projects, land regularisation projects, common amenities improvement project, individual housing improvement, housing loans for purchase of plots and construction of housing units.
- 1990–1994: *1.5 Million Houses Programme*, planned to encompass all the economic sectors of the country, e.g. urban housing, rural housing, fisheries, housing, plantation sector and the private sector housing.
- 1995–2000: Pilot Projects such as the *Clean Settlement Programme* and the *Sustainable Township Programme* changed government policy in favour of direct provision of housing by introducing an urban redevelopment programme called Real Estate Exchange Limited (REEL). This can be seen as a reversal of the development of a participatory process in housing.

During the period 1978 to 1994 about 601 settlements with a combined population of approximately 240,000 (around 60% of the city's urban poor) had benefited under the government-implemented amenities and housing improvement programmes. The past development programmes not only contributed to enhancing the physical quality of the low-income settlements but also helped to strengthen the community-based organisations and empower communities to participate in the development process. In part, this is due to the establishment of 600 Community Development Councils (CDCs) under the patronage of Colombo Municipal Council. This has been a remarkable opening for the poor in Colombo. This process continues to operate though less effectively. Community Development Councils bring leadership to the settlements in the procurement of services and management of O&M activities. CDCs maintain close links with local politicians and officials of urban local authorities. Community involvement in O&M of services is typically organised through these councils. When the need arises, CDC leaders seek community labour and resources to carry out small-scale O&M activities such as maintenance of storm water drains. In the case of large-scale maintenance work, the assistance of outside agencies is sought.

70-80% of community leaders have been trained in Community Action Planning methodology and leadership training, which enables them to respond effectively to their communities. Community-led O&M processes have evolved on different issues and are more effective than the official systems alone in terms of efficiency and cost savings. Community management has become an employment generating opportunity for some of the community members, who provide an invaluable service to their fellow community members. Women's participation in CDCs and CBOs has enlarged opportunities for their active involvement in O&M activities.

Current efforts

The urban low-income housing improvement process has gone through a long period of experimentation and testing in Sri Lanka. The community participation process in providing shelter as well as improving urban services has been a particularly significant achievement.

The recent deterioration in the maintenance of services is linked to some extent to a national political change in 1995. This has led to the gradual abandonment of the Community Development Councils and participatory methodology (this is not necessarily due to weaknesses in the CDC and the planning systems themselves). The current housing development programme, REEL, implemented through the National Housing Development Authority, advocates direct construction of apartment houses for urban middle-income groups. This change in direction has created confusion among the poor and the development institutions. There is a lack of policies and programmes that identify, recognise, and promote CDCs and community-based practices to improve urban low-cost housing. The lack of institutional participation in the upgrading of settlements means they are developing haphazardly. This lack of planning hinders service provision and other improvements to the physical environment.

Some of the major issues pertaining to the operation, maintenance and sustainability of services in urban poor settlements have been identified as follows:

- In the settlements where services have been provided, there is no proper system to operate and maintain those services.
- Neither the Municipal Council nor any other formal sector organisation has developed any new mechanism to deal with the service maintenance of low-income settlements except by operating within conventional framework and systems.
- Communities do handle many of the services on an ad-hoc basis with no knowledge and skills.
- Poor maintenance of services has already contributed to the deterioration of some of the services in low-income settlements causing serious inadequacies.

The micro studies

The criteria developed to identify the different kinds of low-income settlements used in the case studies were mainly related to the major government policies and the resultant programmes. They can be characterised by type of settlements (Slums, Shanties, Upgraded Settlements, Low-Income Flats), the geographical distribution (Colombo and its municipalities Kotte and Dehiwala Mt. Lavinia), the size of settlements (low-income settlements of above 100 - 200 households), and operation and maintenance performance (priority was given to those that were improved prior to 1998, where communities have been actively involved in the process of service improvements).

Municipalities are often constrained in service provision and O&M services by:

- **Political interference**. In Sri Lanka, the provision of urban services and operation and maintenance of services are legal responsibilities of the municipality/service provision organisation. For example, a local politician promised to engage municipal council workers in the cleaning of storm drains although community members were performing the task. The promised municipal workers then visited the settlement once or twice only; as a result, the community thought that the cleaning of drains was the municipality's duty and neglected to clean the drain system. It took several months to reverse that situation.
- **Poor technical expertise among municipal authorities for carrying out O&M.** It has been usual for municipalities to become the key organisation responsible for maintenance of these services, but because of lack of information on the operation of systems, maintenance became a problem (e.g. when municipal workers who operate a Gally Emptier do not know the purpose of the filter bed stones of a community septic tank, they tend to remove the stones and paralyse the system).
- **Occupants of squatter settlements are unable to request services from municipalities**. There is an institutional and information gap between the communities and the institutions at local level. The gap prevents the appropriate level of community participation being created in O&M of urban services. In squatter settlements, where land ownership was not given, houses were not upgraded; the occupants are not equipped to request the services of municipal council. So there has been little link between community leaders and service delivery institutions. There is also no proper co-ordination between the municipality and the other organisations at the time of implementation of service delivery projects by different organisations.

Table B2.2 Study of settlements in Colombo, Sri Lanka

Name	ULA	No. of housing units	Type of settlements
Kirulapura	CMC	144	Upgraded low-income settlement
Bluemendhal Flats	CMC	144	Low-cost flats
Kalingamawatha	CMC	39	Relocated settlement
Garden No. 211	CMC	140	Shanty settlement
Bo-sevana	CMC	40	On-Site upgrading settlement
Govipolawatta	DMMC	215	On-Site upgrading settlement

(ULA - Urban Local Authority, CMC - Colombo Municipal Council, DMMC - Dehiwala Mt. Lavinia Municipal Council)

The following tables give the salient features of the settlements and the status of urban infrastructure and services in the settlements.

Table B2.3 Summary of community profile in Colombo, Sri Lanka

Description	Community						
	Kirulapura B, Kirula	**CGR Quarters, Dematagoda**	**Bluemandhal Flats**	**30/40 Kalinga Mawatha, Kirula**	**211 Watta, Maligawatta**	**Bo-sevana, Manning Town**	**Govipala Watta, Rathmalana**
1. Location of the community							
Urban local authority	Colombo Municipal Council (CMC)	Colombo Municipal Council (CMC)	Colombo Municipal Council	Colombo Municipal Council	Colombo Municipal Council	Colombo Municipal Council	Dehiwala Municipal Council
Municipal dstrict	District 4	District 3	District 1	District 4	District 2A	District 3	
Municipal ward	Kirula	Dematagoda	Bluemendhal	Kirula	Maligawatta - West	Borella-South	Rathmalana
2. Brief about the community							
General terrain	Plain, low-lying area	Plain, station	Plain,	Plain	Plain, low-lying flood area	Plain, low-lying area	Plain
Community type	Onsite upgrading	Old Deteriorated Quarters	Low-cost Flats	Onsite upgrading	Shanty	Onsite upgrading	Onsite upgrading
Project initiated period	1979/1980 (During Million Houses Programme)	1953/1965 (Before Million Houses Pro-gramme)	1965/1970 (Before Million Houses Programme)	1984/1985 (During Million Houses Programme)	Still, not regularized	1980/1984 (During Million Houses Programme)	1996/1997 (After Million Houses Programme)
3. Housing details							
No of permanent houses	167 (100%)	198 (100%)	144 (100%)	39 (100%)	05 (4%)	40 (100%)	146 (68%)
No of semi-permanent houses	0	0	0	0	03 (2%)	0	32 (15%)
No of temporary houses	0	0	0	0	132 (94%)	0	37 (17%)
No of vacant lands	0	0	0	0	0	0	0
Type of land ownership	A letter from National Housing Development Authority (NHDA)	Official agreement with the CGR	A letter from the CMC	A letter from the NHDA	No ownership	A letter from NHDA	A letter from NHDA

Table B2.3 Summary of community profile in Colombo, Sri Lanka, (continued)

Description	Community						
	Kirulapura B, Kirula	**CGR Quarters, Dematagoda**	**Bluemandhal Flats**	**30/40 Kalinga Mawatha, Kirula**	**211 Watta, Maligawatta**	**Bo-sevana, Manning Town**	**Govipala Watta, Rathmalana**
4. Service availability							
4.1 Water supply							
No of individual users	167 (100%)	198 (100%)	108 (75%)	39 (100%)	0	40 (100%)	215 (100%)
No of common water users	0	0	36 (25%)	0	140 (100%)	0	0
No of common water taps availability	9	0	9	0	10	0	0
4.2 Sanitation							
Toilets							
No of individual users	65 (40%)	198 (100%)	86 (60%)	39 (100%)	0	40 (100%)	215 (100%)
No of common toilet users	102 (60%)	0	58 (40%)	0	140 (100%)	0	0
Type of sewer system available							
Individual septic tank users	65 (40%)	0	0	39 (100%)	0	0	215 (100%)
Common septic tank users	102 (60%)	0	58 (40%)	0	140 (100%)	0	0
Municipal sewer System	0	198 (100%)	86 (60%)	0	0	0	0
Community sewer System	0	0	0	0	0	40 (!00%)	0
4.3 Storm and waste water drains							
Availability of drains	Yes	Yes	Yes	Yes	Not available	Not available	Yes
Type of drain	Open, masonry drains	Open, masonry drains	Open, masonry drains	Open,masonry drains			Open, concrete drains
Coverage	80%	100%	80%	100%			100%
4.4 Solid waste management							
Collection type	Municipality service, Door to door collection	Municipality service, Door to door collection	Municipal service, Door to door collection	Municipal service, Communal bin	Not available	Not available	Not available
Frequency	Twice a week	Twice a week	Twice a week	Twice a week			
4.5 Inner access roads							
Type of road	Gravel road	Tarred road	Concrete roads	Tarred roads	Gravel roads	Gravel roads	Gravel road
Width of road	6-10 feet	20-40 feet	8-20 feet	10-20 feet	3-6 feet	6-10 feet	8-20 feet
Availability							
4.6 Common facility	Community centre	Not available	Community centre	Community centre	Not available	Not available	Not available

Table B2.3 Summary of community profile in Colombo, Sri Lanka, (continued)

Description	Community						
	Kirulapura B, Kirula	**CGR Quarters, Dematagoda**	**Bluemandhal Flats**	**30/40 Kalinga Mawatha, Kirula**	**211 Watta, Maligawatta**	**Bo-sevana, Manning Town**	**Govipala Watta, Rathmalana**
Community Participation							
■ Available community-based organisations	Community Development Council (CDC)	CGR - Employees Federation	Community Development Council (CDC)	Community Development Council (CDC) Women Savings Bank	Community Development Council (CDC)	Community Development Council (CDC) Women Bank	Community Development Council (CDC)
■ List of community participated activities happened	Land regularisation Housing improvement Provision of individual water connection Construction of storm water drains Community centre management	None available	Provision of individual water connection Provision of individual sewer connection Construction of wastewater drains	Land regularisation Housing improvement Construction of community centre Construction of drains Provision of individual water connection	Provision of common water taps Provision of bathing place	Land regularisation Housing improvement Construction of sewer system Provision of individual water supply Provision of electricity service	Land regularisation Construction of drains Construction of common well Provision of individual water connection

Table B2.4 Salient features of urban services in Kirulapura

Communities	Pre-existing situation	Intervention	Outcome	O&M responsibilities	Agencies involved
Kirulapura B Upgraded Settlement	■ Large squatter settlement ■ 800 households ■ Situated in a low lying area ■ 2 street taps located ½ a kilometre from the settlement & bucket latrines	■ 1979-1987 US Save the Children became involved in the settlement ■ NHDA regularised the settlement under the Million Houses Programme ■ Housing loans provided	■ 1979 Water line to the settlement and 20 standposts ■ 1987 Main water line provided to the community and individual water connections ■ 65% of families have individual toilets ■ Construction of community centre ■ Electricity ■ Street lamps ■ Solid waste collection service ■ Public health programme ■ All houses are built of permanent materials	■ Common toilets ■ Common water taps at the toilets ■ Main line (6”) ■ Inner lines (2/ 3”) ■ Problems within the house are the responsibility of the household as are problems with the water bills ■ Main access road, inner roads & main large storm drain are maintained by the Colombo Municipal Council The community maintains the interior drains The CDC is responsible for the community centre	■ US Save the Children ■ NHDA ■ CMC ■ SSIP ■ NWS&DB ■ Municipal councillors ■ Members of Parliament ■ NGOs CDC

Table B2.5 Salient features of urban services in Bluemendhal Flats

Communities	Pre-existing situation	Intervention	Outcome	O&M responsibilities	Agencies involved
Bluemendhal Flats	■ Built in 1944 ■ One of the oldest low-cost flats owned by the CMC ■ Common water taps and toilets	■ Formation of a group of 10-12 active residents to lobby for improved services	■ Individual water connections ■ Wastewater drainage system Individual toilets and bathrooms	■ Repairs at the household level Repairs to supply lines of water sewerage and electricity centre	■ CMC ■ CBO
Kalingamawatha Relocated Settlements	■ Relocated as part of a road extension project ■ Three public water standposts, five common toilets and a bathing well ■ 39 families in 1977 Lack of drains/ waste disposal service creates an unsanitary environment for residents	■ Identified for the Million Houses Programme in 1987 ■ Land Regularisation ■ Community Action Planning Methodology	■ Land regularisation and demolition of unauthorised constructions ■ Construction of permanent houses ■ Individual water connections ■ Household flush toilets and septic tanks ■ Electricity connections ■ Garbage collection Community centre built	■ Water supply system ■ Toilet systems	■ NHDA ■ CDC ■ CMC

Table B2.6 Salient features of urban services in Garden No. 211

Communities	Pre-existing situation	Intervention	Outcome	O&M responsibilities	Agencies involved
Garden No. 211 Shanty Settlement	■ Located on a canal reservation ■ Area subject to flooding and rubbish dumping ■ 140 houses of which 94% are of a temporary nature ■ CMC provided four common standposts and three common toilet units	■ Residents formed a community development committee and began lobbying councillors for more water taps	■ Prior to elections in 1994 the community received six additional street taps ■ Funding to construct three common bathing rooms with a shower	■ Water Supply – households and CMC ■ Common Bath rooms – user families contribute to cost of repair work	■ Community Development Council ■ Municipal Councillors ■ Local Politicians

Table B2.7 Salient features of urban services in Bo-Sevana

Communities	Pre-existing situation	Intervention	Outcome	O&M responsibilities	Agencies involved
Bo-Sevana Upgrading Settlement	■ Shanty settlement ■ Occupied by 40 families, living in temporary housing ■ Use two street taps and one toilet block with four units ■ No other services available	■ Identified for improvement under the Million Houses Prgramme in 1987 ■ Local NGO – SEVANATHA involvement in settlement	■ 1987 People built own toilets with soak pits ■ Land regularisation ■ 1993 construction of a sewer system in Bo-sevana ■ Construction of household latrines ■ Individual electric ity connections ■ Inner access road ■ Individual water connections ■ Training and community organisation	■ Water supply – household and CMC ■ Sewerage – minor repairs are dealt with on an ad hoc basis by families and individuals and local CBOs organised for the maintenance and operation in the settlement	■ NHDA ■ CDC ■ SEVANATHA ■ CMC ■ Minister of Housing and Urban Development ■ The Women's Bank (a CBO in Bo-sevana)

Table B2.8 Salient features of urban services in Govipolawatta

Communities	Pre-existing situation	Intervention	Outcome	O&M responsibilities	Agencies involved
Govipolawatta On-Site Upgrading Settlement	■ Located 10-15km from Colombo ■ 215 families ■ Regularised under the Million Houses Programme ■ Until 1997 people used common standposts/ common toilets	■ 1987 NHDA provided housing loans to improve houses ■ Included in the World Bank Clean Settlement Programme (1995-1998) ■ Use of Community Action Planning Methodology to identify and prioritise problems in settlement	■ Under the Clean Settlement Programme ■ Repair of common bathing well ■ Construction of storm water drainage system using community contract system ■ Individual water connections	■ Common bathing well – CDC collects money from families for repairs ■ Water supply – NWS&DB responsible for main line, household responsible for individual water connections ■ Stormwater drains – cleaning of drains in front of houses and contributions collected for repairs	■ NWS&DB ■ Dehiwala Mt. Lavinia Municipal Council ■ NHDA ■ World Bank/CSP ■ CDC ■ Ministry of Urban Development, Housing and Construction

Table B2.9 Urban infrastructure and services in Kirulapura

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	NWS&DB US Save the Children Community labour	CDC NWS&DB	Ongoing	
Solid waste management	Solid waste collection – CMC	CMC	Ongoing	
Sanitation	Household Latrines – Family Common Toilets – existing	Household User Families Septic tank/ major repairs – CMC	Ongoing	
Drainage	Stormwater drain – CMC	Main drain – CMC Interior drain – community labour & money	Ongoing Ongoing	
Community Centre	US Save the Children Community	Executive committee of CDC	Ongoing	
Paving/roads	Main access road and inner road – CMC	CMC		

Table B2.10 Urban infrastructure and services in Bluemendhal Flats

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	Funds from CMC, constructed own system	Users make small repairs CMC repairs supply lines	Ongoing	
Solid waste management	N/A	N/A	N/A	N/A
Sanitation	Sewerage connection to main line – funding from local politician	CMC repairs main line Small repairs made at house-hold level	Ongoing	
Drainage	Funds from CMC, constructed own system	CMC	Ongoing Ongoing	
Paving	N/A	N/A	N/A	N/A

Table B2.11 Urban infrastructure and services in Kalingamawatha

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	CMC Users	Family/skilled men in community CMC (District Office) – following verbal and written complaints	Ongoing	
Solid waste management	Collection service – CMC	CMC	Ongoing	
Sanitation	NHDA provided loan for families to install flush toilet and septic tank	Families Septic tank emptied by CMC (for a fee)	Ongoing	
Drainage	N/A	N/A	N/A	N/A
Community centre	Community	Community	Ongoing	
Paving	N/A	N/A	N/A	N/A

Table B2.12 Urban infrastructure and services in Garden No. 211

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	CMC constructed six more taps Council funding for community to construct common bathrooms	Community agreed management plan for water supply District office of CMC do all repair work Community maintain bathrooms	Ongoing, community involvement limited to making request	
Solid waste management	N/A	N/A	N/A	N/A
Sanitation	N/A	N/A	N/A	N/A
Drainage	Community constructed temporary drains on self help basis	Community	Ongoing	
Paving	N/A	N/A	N/A	N/A

Table 2.13 Urban infrastructure and services in Bo-Sevana

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	Funded by Minister of Housing and Urban Development	Households CDC Women's Bank CMC	Ongoing but political interference	No government policy on community O&M
Solid waste management	Under discussion with CMC	N/A	N/A	N/A
Sanitation	Individual toilets and soak pits Community built and funded sewerage system (supervised by NHDA & CMC)	Training in O&M for key community members/CBO Individuals CDC and District Office for major works	CDC are raising the question of payment for efforts	Lack of an agency to enforce local bylaws threatens the sustainability of sewers
Drainage	N/A	N/A	N/A	N/A
Paving	NHDA funding	CMC	Ongoing	

Table B2.14 Urban infrastructure and services in Govipilawatta

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	Clean Settlement Project funded individual water connections with community contributions CSP also assisted with the repair of the common bathing well with community resources	NWS&DB Individual connections attended by families Families make and pay for repairs to bathroom as needed	Ongoing	
Solid waste management	N/A	N/A	N/A	N/A
Sanitation	N/A	N/A	N/A	N/A
Drainage	Clean Settlement Project funded stormwater drainage system – CDC organised implementation	Families clean the drain and pay for repairs	Political interference jeopardises O&M initiatives	
Paving	N/A	N/A	N/A	N/A

Lessons

Improvements in the quality of life in communities is the ultimate overall objective of these urban infrastructure interventions. Community Action Planning methodologies were successfully used to identify problems, through a qualitative understanding of conditions and livelihoods, and ways of solving these problems for each specific community. Informants felt that the current polices are missing the poor and are unsympathetic to community-driven processes and undermine the progress made during the Million Houses Programme.

The recent political changes have also led to a decline in active CDCs from 600 to less than 50 in the direct procurement of infrastructure. CDCs are no longer felt to be a neutral platform from which to launch urban development programmes (shelter, health, water, sanitation, solid waste management, etc.). Similarly, Community Action Planning has declined largely because it has been associated with the past political system.

The case studies show that there is great potential for maintenance to be funded and organised at the community level. The issue is whether the maintenance costs can be set at a level that the community can afford. Management by CDC can minimise costs by:

- Regular preventative maintenance
- High-quality repair work
- Correct operation by users
- Cheaper distribution of spares from local stores

Another method for minimising costs is to increase the use of voluntary work that local people are willing to carry out. This could be achieved by increasing the level of respect afforded to voluntary caretakers/CDC members. Only the complicated repairs may then require paid assistance from self-employed mechanics. The role of government mechanics may include supervision, stores management and reporting as well as work on the main line. Once communities are organised and financing the majority of maintenance themselves, government funding can be channelled into the requirements of caretakers and the capital costs of new projects. However, the sustainability of such voluntary actions is questionable.

The emergence of a clear institutional structure gave CDC a voice within both the CMC structure and the partnership with the Housing and Community Development Council, thus providing a platform for communities to develop negotiation skills and exercise powers. NGOs, NHDA/public sector and CDCs formed as

strategic parts in the setting of urban policy. There was a change in the attitudes and habits of municipal staff and in the status of poor communities. Changes in government attitudes include:

- Senior government staff acknowledge the reality of the maintenance problems
- Considerable time taken and effort made to establish good working relationships
- Day-to-day co-operation between NGO and government staff improved
- High service standards have been maintained

Lessons learnt related to the procurement of services

- Most of the service improvement programmes in the case study settlements were carried out with active community participation from planning to implementation. The urban poor had the opportunity to participate actively in the above programmes not merely as beneficiaries but as active partners of the process. Thus, most community leaders have acquired the knowledge and skills needed to address their own problems. The Community Development Council and the Women's Saving and Credit Society were the two important community-level organisations instrumental in the procurement of urban services.

- Community leaders were well aware of the government and municipal systems, and knew both relevant officials and the procedure for getting their job done. These strong partnerships between the communities and the municipal councillors and politicians enabled communities to obtain the necessary funds for the settlement improvement activities, e.g. procuring expensive services like obtaining water main connections.

- Women participated in the entire service improvement process; The Women's Savings and Credit Society of the settlement also supported the CDC in implementation of the programme.

Lessons learnt related to the maintenance of services

- The operation and maintenance of urban services was not a priority issue on the CDC agenda, whereas the procurement of services was.
- Low-income communities, in general, consider that maintenance of service is the responsibility of either the municipal council or the concerned service provision institutions
- Though there was no regular collection of community contribution for O&M of services in practice, the CDCs have been able to collect community contributions when the need arises. Thus, the O&M system that exists in the case study settlements was more of a trouble-shooting nature than a systematic approach.
- There is no institutionalised system to monitor, guide and support the CDCs activities.
- The formation of a separate group of community members as a maintenance crew in low-income communities was not felt to be of much benefit because the O&M work left to the communities is minimal.
- The carrying out of O&M services within settlements has been an income opportunity for the skilled and unskilled people who are engaged in such work. In addition the provision of training opportunities to youth and women in skills development related to O&M means that these groups could be gainfully employed.
- The strengthening of local-level offices (through providing information about structures, services offered and the procedure to obtain services from the district offices of the municipal council as well as from the local area offices of other service delivery agencies), would mean that the poor are better served by government resources thereby the skills and resources of the poor could be diverted to improve their socio-cultural status by involving them in software activities.

Karachi

A large segment of Pakistan's urban population lives either below or marginally above the poverty line. Most of these poor people reside in settlements termed *katchi abadis* (squatter settlements). They have been built as an enterprise of the informal sector. While these settlements have fulfilled a need, the infrastructure components have developed in a rather haphazard fashion. Water mains, sanitation lines, roads, lanes, streets, etc. are generally constructed below acceptable social and technical standards. The infrastructure works are generally planned, contracted and executed in a process that involves only the contractor and the concerned government department. The communities have little or no say in the process of estimation, tendering and subsequent implementation. The priorities of infrastructure services are made according to the availability of funds and according to the perception of need by the government department. The performance of contractors is seldom monitored.

The following localities were studied as part of this case study:

Table B2.15 Study settlements in Karachi, Pakistan

Planned settlements	Unplanned settlements
■ Surjani Town	■ Shah Rasool Colony
■ Metroville	■ Bilal Colony
■ Liaquatabad	■ Lyari
■ New Karachi	■ Orangi Town
	■ Welfare Colony
	■ Mujahid Colony
	■ Baldia

Some of the key issues that have been identified from observation are:

- Duplication of lane-level work
- Absence of grassroots initiatives for regular operation and maintenance of the laid infrastructure in older settlements

- High spending due to the routines of contractual agreements
- Lack of interest on the part of agencies towards O&M in such areas
- Common action in situations of crisis
- Unwillingness to pay on the assumption that O&M is the responsibility of the civic agencies
- People finance, manage and maintain the infrastructure laid down by them in Orangi
- Technical inadequacy of O&M
- Continuing O&M problems due to substandard work
- No binding agreement on contractors to participate in O&M during the initial phases of work
- Community not involved as a partner in the work

Water supply

The tail-end settlements which are still growing and expanding in size and volume face problems of access to water supply and related infrastructure. For example, in Baldia the water pipes have not been extended in many locations. As these locations are still developing informally, there is a neither the capacity to expand the network by the Karachi Water and Sewerage Board (KWSB) nor is there an adequate degree of organisation and motivation among community members to undertake these tasks.

Illegal connections are common in almost all the low-income (and wealthier) settlements in Karachi. In *katchi abadis* the water supply network has been laid by various local government arrangements or by the efforts of people themselves. For example, in Shah Rasool Colony No. 2 and 3, the majority of people face absolute scarcity of water despite the fact that water is supplied through the lines for two hours on alternate days. The reason is the number of illegal connections to the main line.

Water pipes laid in the low-income localities are usually sub-standard and inadequate for the use for which they are laid. In Surjani Town, the branch-lines that were development by Karachi Development Authority (KDA) are all broken or completely damaged. A great proportion of water supplied is wasted through seepage. The criteria of addressing earth load and pressure for the pipes was not accounted for in the design and execution.

Water infrastructure has not been maintained at any level. The same situation is found in planned and unplanned settlements. With the exception of crisis management, no back-up or routine maintenance is carried out by agencies. In *katchi abadis* where the communities organise, they undertake maintenance work often

on the basis of dealing with crisis or dire problems. Welfare Colony is an example; in planned settlements the same trend is emerging. In Surjani Town, a local CBO has been formed which lobbies for the improvement of water supply service. It also monitors the local water supply lines and attempts to guard them against illegal connections wherever it can.

In low-income areas where no water has been supplied through the laid pipes, the water lines have been damaged beyond repair and maintenance. Miran Naka, in Lyrai and Sector 5/3 of Surjani Town are examples.

Table B2.16 Water supply infrastructure laying and management

No	Settlement	Laid by	Operated and managed by
1	Metroville III	KDA	KWSB
2	Talib Colony	KMC	DMC – Central/ KWSB
3	Karim Bux Para	PHED	PHED
4	Mujahid Colony	KWSB	KWSB
5	Welfare Colony	KDA/SKAA	KWSB
6	Mansoor Nagar	KWSB	KWSB
7	Singhu Lane Lyrai	KDA	KWSB
8	Shah Rassol Colony	KMC	KWSB
9	Bilal Colony	KDA/KWSB	KWSB
10	Ittehad Town	Awami Tanks by self help	KWSB hydrants/ Rangers

Old and obsolete lines are weak and become permeable. In most cases these lines are laid close to sewerage lines, and the mixing of sewerage and water is common. Lyrai, Shah Rasool Colony and Mujahid Colony are examples where this has happened. In some cases the source of contamination is located outside the settlement, i.e. in Mujahid Colony people say that they are being supplied with impure water.

In several cases, the maps and up-to-date plans of the water infrastructure were not available. The tasks of operation and maintenance obviously become difficult in such situations. Lyrai and Baldia are two examples where engineers did not possess appropriate drawings, maps, or plans of the infrastructure already laid, which has led to the duplication of work in Baldia.

Most locations in Karachi West were affected by the dam on the Hub River, thus desperate people often damaged infrastructure themselves to obtain a supply of water. In many cases illegal suction pumps were installed which caused sewage to be sucked into the empty water lines.

Sewage

Due to uneven settlement patterns, the sewage generated from external sources passes through low-income settlements. It spills out whenever there is any blockage, obstruction or difference of level. Welfare Colony faced this problem for several years. The entire sewage of Aga Khan University Hospital, localities in Stadium Road and a few blocks of Gulshan-e-Iqbal passed through the Welfare Colony. Due to blockage it often inundated the lanes. Sindh Katchi Abadis Authority and Orangi Pilot Project have developed the *nala* with the assistance of the community.

In many cases, the sewage system, which is either laid by the people themselves or by a local government institution, ceases to function due to the absence of a secondary drain/nala/sewer. Since the development of outfalls is beyond the capacity of the people due to its high costs and technical implications, the area suffers. Shah Rasool Colony No. 1 is an example where the sewage stands in an open plot at the border of the locality.

Old and worn out internal systems is a constant problem. The passage of heavy vehicles, encroachment and routine blockage further aggravates the problem. In Lyrai the water supply network is almost entirely contaminated due to continuous leakage of sewage. In Surjani Town, due to delayed occupancy, most of the internal and in some cases the external network is damaged and does not serve the purpose.

Areas where internal drains fall into open stormwater drains or backyard drains (which are mostly uncovered) are affected due to continuous dumping of solid waste. The lane drains become choked and often back-flow results. In Welfare Colony, this was a continuous problem. Planned areas are also affected by this problem.

People and their organisations respond to immediate problems only. When a drain or manhole overflows to an unbearable stage, only then a private kundiman, or the KWSB or KMC is approached for help.

Theft of manhole covers and slab covers is a constant maintenance problem. In *katchi abadis*, they sold in the market for Rs.60-90. Drug addicts and loiterers are the main culprits. Welfare Colony is one location where this problem is particularly bad. Pumping facilities are normally out of order and there are perpetual problems of maintenance and repair. Jamila Street Pumping Stationn experienced a major breakdown during 1998-9. All of Karachi South is dependent on the sewerage out-flow by pumping. Lyrai is badly affected.

Planned schemes where occupancy was delayed now show perpetual problems of operation and maintenance. Surjani Town is an example where there was a gap of nine years between infrastructure development and occupancy. Other planned low-income settlements such as Shah Latif Town will face the same problem in the future.

In old city settlements such as Lyrai and environs, the response of KWSB/KMC towards maintenance is very poor. No heed is paid to the complaints regularly lodged by the affected and their organisations.

Densification of low-income settlements has led to an increase in sewage volume. In Liaquatabad this is a common problem on most blocks.

Solid waste management

Removal of solid waste requires support from the respective municipality/local institutions. Despite the initiatives taken by the community, the collection of garbage from neighbourhoods is not provided by DMC. In Mujahid Colony, the local community members mobilised a programme of collecting garbage from house to house. They constructed a *kundi* with the help of SKAA to store the garbage. However, as the DMC did not regularly collect the garbage from the locality dumping point, a large heap built up leading to unrest and problems within the community.

Locationally, it is difficult to build a *kachra kundi* in a low-income settlement. There are several reasons for it. None of the residents agree to locate the *kundi* near his or her house. In most cases, very little common purpose land is available in the low-income settlements. Lyrai is an example. In *kundis* located inside the locality, the frequency of collecting the garbage by municipal collector vehicles is non-existent.

A normal practice observed is the dumping of solid waste into open drains. Choking immediately results. In the case of adjacent commercial areas, the shopkeepers find it a convenient option to throw their garbage into the open drains. It becomes a filthy space that affects the entire locality.

Due to jurisdictional problems, the residents of the low-income settlements suffer. For instance, the Clifton Cantonment Board and DMC South collect garbage from the adjoining planned strip Shah Rasool Colony. However, no agency wishes to take responsibility of the *katchi abadis*.

Roads

As in low-income settlements, there is no control of any agencies or body; the influential individual and groups occupy road space. It leads to many problems. The possibility of laying underground infrastructure is constrained. The mobility of service vehicles entering the area is greatly reduced. In emergency situations lorries or fire engines cannot enter. Roadside encroachments lead to unwanted densification in low-income localities.

Due to the absence of maintenance funds, capacity and commitment on the part of local institutions, the roads are not maintained on a routine basis. The wear and tear makes them inaccessible for common traffic in turn leading to social degradation.

Spill-over and stagnation of sewage water damages the road and lane surfaces. In Lyrai, Baldia, Welfare Colony and Liaquatabad this occurs freqently. Road cutting and lack of repairs renders the roads unusable. Most older low-income settlements face these problems.

Conclusions: The outcomes of pilot studies clearly show that where the communities took initiatives, support came through from various local agencies and research institutions such as OPP. Thus, actions related to O&M will only emanate when communities realise the significance of maintaining the components of internal infrastructure themselves.

Sustained maintenance and the performance of internal infrastructure depend on links with the secondary infrastructure. Wherever this has been made possible, the system has worked. Community groups are the only vehicles of local improvements with respect to O&M of infrastructure. When they are energetic, motivated and properly guided, they are able to convince the local people as well as local authorities to participation in O&M. In Welfare Colony, this has been adequately demonstrated.

Table B2.17 Bilal Colony

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	KDA – main lines KWSB – pump	Two valve operators and machine operator – a foreman does repairs Water mains, pumps and valves are property of KMC	Main lines have never been repaired People do minor repairs on internal lines	Main lines are dilapidated, significant water loss, common breakdown in services
Sanitation	KMC/KWSB	KWSB, however residents look after the system themselves DMC East Households	Sweepers hired for maintenance of manholes	Older lines are dilapidated, houses often flooded by sewage
Solid waste management	There is no *kachra kundi* in Bilal Colony		Vehicle lifts garbage once a month CBO and people have hired 10 sweepers to serve 2000 houses	Generally poor sanitary conditions, children have skin conditions and all are affected by the smell

Table B2.18 Shah Rasool Colony

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	Councillor who hired a contractor, with OPP advice, people purchased own house connections	One valve man, an overseer, supervisor and sub-divisional officer		Suggestion that those in charge 'do not attend their business'
Sanitation	KWSB through a contractor, people made own household connections	KWSB	No work has been done on the existing lanes No sweeper from the DMC collects the rubbish	People pay to use a de-watering pump
Solid waste management		DMC South/KMC		Private sweepers are hired by people at the lane level

Table B2.19 Singhu Lane – Lyrai Karachi

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	KDA before 1970 and after KWSB (pumping stations, water mains, pumps)	KWSB – two executive engineers and 21 junior staff		Contamination of water with sewage lines, poor quality of infrastructure
Sanitation	KDA	KWSB	Shortage of staff, leaking pipes not repaired, blockages in the lines, performance of O&M is better in the richer Garden East Area	Epidemics of water-related disease, manholes overflow, blockages in the lines
Solid waste management		DMC South	System not functioning (except in Garden East)	Rubbish littered around, rubbish from the manholes left

Table B2.20 Mansoor Nagar

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	World Bank funded	KWSB although as there is no water supply no institution takes responsibility	No water supply	Vandalism and damage to the pipes
Sanitation	Awami Welfare Association/OPP	DMC West/KWSB	Local residents take on cleaning of the lines, replacement of manhole covers, and repairs	People take responsibility for internal lines, as KWSB fails to
Solid waste management		DMC West	No regular system for disposal	Local CBOs encourage environmental sanitation

Table B2.21 Metroville III

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	Owned by KWSB	KWSB	Scarcity of water means people are buying it from vendors/ install-ing suction pumps on lines	Lines are damaged
Sanitation	KWSB	KWSB but no staff are designated to work in the area	Residents clear stagnant water/ clear blocked lines on a self help basis	KWSB system collapsed (it was laid by a contractor)
Solid waste management	*Kachra kundi* constructed by DMC East	Area residents manage their own solid waste	Hire sweepers	People resorted to self help

Table B2.22 Karim Baksh Para

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	World Bank/ Public Health Engineering Dept.	PHED	Broken lines, mixing of water and sewage, shortage of water – leaking pipes	Area residents are forced by buy water from tankers
Sanitation	SKAA/OPP	People look after system on a self help basis	Crisis management – people lack equipment	
Solid waste management	Two *kacha kundis* constructed by DMC East	DMC East	Not emptied regularly	Pollution and bad hygienic conditions mean people dump waste in streets

Table B2.23 Mujahid Colony

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	KWSB/ SKAA	People look after the lines/valves themselves	Shortage of water	
Sanitation	SKAA	SKAA is helping in O&M	There is no maintenance	Lanes flooded by sewerage water
Solid waste management	SKAA constructed a *kachra kundi*	People either put their rubbish in the *kachra kundi* directly or hire a sweeper	Waste spilling out of *kundi*	

Table B2.24 Welfare Colony

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	KDA/SKAA	KWSB/ Routine maintenance done by people themselves	O&M is satisfactory	
Sanitation	OPP/SKAA	KWSB/ people look after system on a self help basis	Clearing lines, hiring sweepers	Very few problems visible
Solid waste management	Refuse collection bin constructed by DMC East	DMC	Waste is not collected on a regular basis	

Table B2.25 Talib Colony Central

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	KMC	KMC/ DMC staff	No problems with water supply	People are satisfied with the performance of the agencies
Sanitation	KMC	DMC	Condition of line is bad, lines are old, choking of lines	People collect money and maintain the lines on a self help basis
Solid waste management		DMC Central	No service provided	Garbage is either dumped in lanes or *nullahs*

Table B2.26 Talib Colony West

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	No formal supply since the settlement is informal. Awami tanks and rangers supply	People maintain it on a self help basis	Water supply does not match demand	
Sanitation	No sewerage lines, people have dug pits outside homes	Residents perform O&M on a self help basis	Waste water floods lanes	
Solid waste management		DMC West	No service	People throw rubbish into the streets or burn it

The Orangi Pilot Project

Orangi is Karachi's largest *katchi abadi* and has a population of 1.2 million. Dr. Akhtar Hameed Khan, the renowned Pakistani social scientist, established the Orangi Pilot Project (OPP). In 1988 the project was upgraded into four autonomous institutions; the OPP Research and Training Institute; the Orangi Charitable Trust (OCT); Karachi Health and Social Development Association (KHASDA) and the OPP Society which channels funds into these institutions. The OPP considers itself a research institution whose objectives are to analyse the outstanding problems of Orangi, and then through action research and extension education, find viable solutions. These solutions can then be applied, with modifications, where necessary to other settlements and become part of state policies. The OPP does not fund development but by providing social and technical guidance it encourages the mobilisation of local resources and the practice of co-operative action.

The OPP adopted the model of research and extension for small farmers. Its assumptions are that small farmers can and should manage and finance their own farms, but assistance should be given to them in terms of research, extension and provision of reasonably priced services and supplies.

Reducing the cost involves:

- researching simplified designs,
- making standardised steel shuttering,
- surveying and mapping, and
- preparing models, slides, audio-visuals, instruction sheets and posters.

Extension refers to:

- finding activists in the lanes,
- training lane managers and masons,
- providing accurate plans and estimates,
- loaning tools and shuttering, and
- social and technical guidance/ supervision.

Based on these principles, the OPP has evolved a number of programmes (The Family Enterprise Economic Programme, The OPP Low-Income Housing Programme, Health Programme, OPP Education Programmes and the Low-Cost Sanitation Programmes).

The Low-Cost Sanitation Programmes

OPP's sanitation model consists of self-managed, self-financed and self-maintained sanitary latrines and underground sewerage lines. This programme is overseen by OPP-RTI. For this programme, the OPP provides social and technical guidance (based on action research principles), tools and supervision of implementation. The OPP's work has shown that people can finance and build sewage systems in their neighbourhoods. This development is called 'internal development' by OPP. However, people cannot build external development consisting of trunk sewers, treatment plants and long secondary sewers. This is the role of the state. There are four levels of a modern sanitation system:

I. Inside the house – the sanitary latrine
II. In the lane – underground sewerage lines with manholes and house connections
III. Secondary or collector drains
IV. Main drains and treatment plants

Maintenance and Rectification

OPP's work clearly demonstrates that when people lay sewerage lines (80-90% of the work, within OPP's four-tier system) with their own finances and management, they maintain and repair them as and when necessary. The estimated average cost of such per lane/per month/per 20 families comes to Rs. 4.20 to Rs. 9.08. This reflects the quality of work and the cost effectiveness of the programme. The main drains and the treatment plant are the responsibility of a central authority. **Maintenance** can be defined as routine cleaning of sewers, cleaning of sewers when blocked, cleaning of individual manholes. **Rectification** refers to the repair/ replacement of broken manhole covers, repairs and replacement of manholes and the replacement of pipes.

Cleaning of manholes: Solids accumulate in manholes mostly as a result of broken covers and defective house connections. The manholes are cleaned individually by the households connected to the respective manholes, as and when required; thus no costs are required.

Cleaning of sewerage lines: This is a collective effort. When required money is collected on the spot (Rs.5/house) and a sweeper is hired to clean the line. Some lanes hire sweepers on a monthly basis at Rs.10/house. The sweeper's job is to remove rubbish from the lane and to clean the sewerage line. This indicates that there is increasing awareness of preventative maintenance.

Replacement of broken manhole covers: Covers of manholes are replaced both collectively and individually. If one manhole cover needs replacing then the two or three houses connected to the respective manhole make collective contributions or an individual/family contributes and arranges for the replacement. If two or three covers need replacing then collective contributions are made to the active member of the lane. The activist then arranges either to purchase ready-made covers from a *thala* or obtain shuttering from OPP and manufacture the covers. It has been observed that in the absence of proper concrete manholes covers people do not leave the manhole open, but they cover it with chunks of stone to prevent rubbish filling the manhole.

Repair of manholes: The organisational effort is similar to that for the replacement of covers.

Replacement of pipes: This is a collective effort similar to that required when laying a sewerage line. An estimate is worked out with the help of the OPP or a local trained mason. Money is collected and the lane manager manages the work. OPP's supervision and shuttering are required in case of major replacements.

Criticism of the model: The OPP has no regulatory powers but only a advisory role and no provision to make/enforce a master plan. However, it does not desire/ have the capacity to set up parallel services or compete with officials, but rather adopts a supplementary role. It aims to promote popular organisation and popular participation and uses models that people will adopt widely and readily – if evaluation suggests that the model is not acceptable it is revised.

The weak points in the OPP model are the **Design Concept** – Sewerage is discharged into *nullahs*, thus shifting the problem to another part of the settlement together with the problem of clogging of sewage lines. Installing single chamber septic tanks between every connection and sewerage line, thus preventing solids from flowing along the drains and keeping excreta sealed, has averted this in some cases. This has required education, meeting and posters/leaflets about *'handis'*. **The Design Elements** – There has been a problem with the design of manholes, leading to the development of cylindrical, 'cast in-situ' manholes of manageable size, with no need for artisanal skill. There have also been problems with the KMC design of manhole covers, notably their expense and weight. Their lightweight meant that vandalism/theft was common. A change in the design made them simple, rectangular concrete slabs, too heavy too lift and cheaper to construct. **Position and depth of sewerage lines** has been criticised because the centre of the line is in the middle of the road, meaning all houses need the same length of pipe to make a connection. However, this may incur problems when the roads are paved and the weight of the road rollers is put on the pipes. The **quality of work** may also be an issue; there may be inferior qualities of concrete, insufficient curing and crooked lines due to insufficient training.

Significance of OPP Programmes

Orangi can be characterised by an existing high degree of social organisation; there are already abundant *anjumans* – associations, societies and clubs. There is also a tradition of informal networks of self-help, which is used to access land, credit, material and advice; in addition there are self-supporting schools and health-care networks. People also rely on the informal sector to support businesses and welfare amenities. However, traditionally these were used for lobbying and not constructive work, thus the OPP presented a departure from the norm. OPP technicians surveyed lanes, prepared maps, plans and estimates and OPP social organisers explained to homeowners the necessity for the project to construct sanitary latrines and sewerage lines. The formation of new co-operative units involved the identification of activists to become lane managers and meetings with residents, create consensus, settle disputes, collect individual contributions and supervise work.

People clearly saw the problems of poor sanitation and drainage and the damage done to their health and property, but did not attempt to resolve these problems. OPP saw that there were *Four Barriers to the Acceptance of the OPP Concept* for taking on the responsibilities for internal infrastructure and the other social sector initiatives. These barriers are i) **The Psychological Barrier:** Communities feel that building a house is their responsibility but the development of infrastructure and the lane is the responsibility of the government. ii) **The Social Barrier:** People have to come together to form some sort of an organisation to build infrastructure and take over the lane and open spaces. The organisation should be large enough to be effective and small enough to be cohesive. In Orangi the organisation has been lane-based and consists of 20 to 40 households. iii) **The Economic Barrier**: The cost of development of infrastructure should be low enough for people to afford. This requires technical research and the development of cost effective community based procedures of building. iv) **The Technical Barrier:** People do not have the technical expertise or tools to design, build and supervise underground sewage and water supply systems. To do this they need tools, technical advice and managerial guidance. Thus, in order to achieve success, a project needs to be four-pronged in it's efforts to improve sanitation.

Lane lines and sanitary latrines have been built with community's own money, under its own management and are being maintained by lane residents at their own costs. In short people are willing to pay for a higher standard of sanitation and as such are willing to pay to maintain that standard. The intensive training of community members in the technology of sanitary engineering means that the skill base is now much higher in Orangi, and people are becoming less dependent on the OPP for advise and technical guidance. Young people undergo a 90-day training for survey, documentation, designing and estimation of existing and/or proposed infrastructure in low-income settlements. In addition there are young people undergoing a two-year training course to become para-architects. The R&E approach has mobilised managerial and financial resources, which lay latent in householders. In addition, as householders are responsible for 80% of the cost of the four levels of sanitation, it is within the capacity of the municipalities to undertake the remaining 20% of costs involved in the maintenance of the external development tasks, i.e. main drains and treatment plants.The OPP research, programmes and their documentation have provided NGOs, CBOs and government agencies with successful models for overcoming the physical, social and economic problems faced by low-income settlements and communities. These have been successfully tested through government/OPP/community participation projects. The infrastructure development models in particular reduce capital costs, ensure good quality work (since communities acquire skills for building internal infrastructure), and ensure maintenance and supervision of government

work on external infrastructure. This in part creates a more equitable relationship between government agencies and poor communities. Increasingly, the OPP is getting involved in policy issues and promoting macro-level solutions, based on its models to sanitation, health, housing, and economic issues. In Orangi, people have invested Rs78.79 million on internal development (including 405 secondary sewers) in 5, 987 lanes consisting of 90,596 houses (there are 104, 917 houses in Orangi). The Sindh Katchi Abadi Authority (SKAA) is replicating the programme in seven cities of Pakistan by NGOs and CBOs and in 49 settlements in Karachi. The OPP concept has been applied to the development plans of the Karachi Municipal Authority and SKAA.

Faisalabad

Faisalabad is now the third largest city in Pakistan with an estimated population of about 2 million in an estimated area of 12,200 hectares. Within the municipal limits almost 40% of the area is used for residential purposes, 18% is under agricultural use and open spaces and about 10% is used by the industrial and commercial sector.

Faisalabad has some of urban Pakistan's worst living conditions with two-thirds of the population living in largely unserviced areas. Half the population has no piped water and less than a third have access to sewerage. Extensive rural to urban migration, to meet the needs of industrial development, means most people living in the city still possess the ethos and norms common to rural areas.

The concept of mixed residential and commercial development predominates. The provision of low-cost housing has not kept pace with the demand. According to a survey carried out by Faisalabad Development Authority about one third of the city population is living in slums and *katchi abadis*. The service provider agencies have failed to deliver services to these settlements in light of this rapid phase of development. Between 1947 and 1998, Faisalabad's population has increased by 1.9 million; this has created a need for 200,000 housing units. The majority of the resulting *katchi abadis* are on state land but a good number have developed on agricultural land. The Katchi Abadi Improvement and Regularisation Programme was established in 1978. The programme consists of providing a 99-year lease to individual houseowners and providing services, e.g. water, sewerage, gas, electricity and road paving.

Katchi abadis can be regularised if they are on government land, however there are similar unserviced areas on private land – in most areas they have acquired legal/illegal water and electricity.

Table B2.27 Infrastructure and services in Faisalabad

Service	No. of households	Percentage
Water		
Piped water	85,071	42
Community taps	7,431	3.7
Handpumps	109,710	54
Wells	243	0.3
Sanitation		
Sewerage	64,724	3.2
Septic tank	97,361	48.1
Night soil	33,871	16.7
Others	32	
Energy		
Gas	64,016	31.6
Electricity	167,071	82.5

Source: Greater Faisalabad Master Plan (1986)

The operation and maintenance of the existing services has become a major challenge for these agencies. Thus, ways in which O&M of services for the urban poor can best be managed, need to be explored.

In terms of availability of infrastructure services, the 1985 FDA survey results (the last comprehensive survey) are summarised in Table B2.27.

The agencies involved in development in Faisalabad are the:

- Faisalabad Development Authority (FDA)
- Faisalabad Municipal Corporation (FMC)
- Water and Sewerage Authority (WASA)
- Cantonment Board

In inner-city *katchi abadis* and semi-serviced areas, development tends to be dome through FMC Councillor Schemes. FMC Councillors are permitted to develop open-paved drains, brick-paved streets and street lighting.

Work is funded by grants from FMC or funds allocated for schemes by Annual Development Plan (ADP). This leads to haphazard, unco-ordinated and substandard work. Work is done in a piecemeal fashion over years because funds are small. Thus, drains built under this programme do not function, water does not reach the extremities of the distribution system and road paving is substandard; in effect the money has been wasted. If communities have better organising and building skills, they can get the contractor to do a better job. In many settlements communities hire sweepers at Rs 15-20 per household/month to keep the streets clean and move the solid waste.

The mandate of water and sanitation agencies is to develop, operate and maintain water supply, sewage and drainage systems within the jurisdiction of Faisalabad Development Authority. Until 1978 Faisalabad Municipal Corporation was responsible for supplying drinking water and sanitation services, but in 1978 WASA was created as a separate entity.

The quality of WASA's activities is constrained by the increasing demands of a growing population. The sanitation services are particularly poor and the sustainability of the present level of services provided by WASA has become a major challenge.

WASA has a Master Plan but due to financial constraints and political pressure, work is done on an emergency and ad-hoc basis. There is no co-ordination between WASA activities and the Member of National Assemble (MNA)/Member of Provincial Assembly (MPA) and Councillor Projects.

In *katchi abadis* WASA has trunk sewers adjacent to the settlements but secondary sewers to the WASA trunks do not exist. Thus, many neighbourhoods have laid an underground sewerage system/water system on a self-help basis.

The issues relating to O&M and sustainability have been highlighted as:

- No control over illegal connections
- Cumbersome procedures for new connections
- Weak law enforcement particularly in revenue collection
- Corruption
- User dissatisfaction with level and quality of service
- Lack of civic responsibilities
- Improper use of facilities by beneficiaries

Anjuman Samaji Bebhood (ASB) is a local NGO in Faisalabad established by Nazir Ahmed Wattoo. In collaboration with OPP and WaterAid, ASB has been involved with adapting OPP's model of community managed sewerage and water projects to communities outside Karachi. ASB's and community-built sewers and main water lines are financed through revolving funds received from the community.

The following tables present perceptions of key stakeholders on issues related to operation, maintenance and sustainability of urban infrastructure.

Table B2.28 Perception of stakeholders

Issues	Sanitary workers	Officers at WASA	NGOs/CBOs
Meaning of O&M	Performance of routine tasks, e.g. desilting of sewage lines, removal of blockages in sewage lines, placing covers on open manholes	Covers every step to run a system or keep a system in running order	Covers every step to run a system or keep a system in running order
Indicators of O&M	Dry streets, co-operative people, properly desilted sewers, no overflow, all the manhole covers placed properly		O&M is a joint venture between WASA and communities – achieved through: Public awareness, training staff, mobilising CBOs, motivating staff, effective monitoring and evaluation systems, continuity of policies and adequate staff
Importance of sustainability of O&M	"Very important, very much vital, entire importance and O&M is predominant for the sustainability of the system". O&M described as backbone of the system	"It is like running a car that needs periodical oil change and parts replacement" "The system will collapse without O&M, no system can run without O&M"	The importance of O&M is 100% of the sustainability of the system (some workers and officers perceived O&M as less than 100% necessary)
Definition of O&M	With reference to work "the system will be sustainable if we perform our duties regularly"	Sustainability defined in terms of continuity and smooth running of the system; "the sustainability of the system requires that all parts within the system remain operational throughout its designed physical life"	

Table B2.28 Perception of stakeholders (continued)

Issues	Sanitary workers	Officers at WASA	NGOs/CBOs
Elements within sustainability		Staff training, generation of funds through revenue, co-ordination, maintenance, user education and feedback and monitoring	
Schedules for O&M		Desilting schedule is the only form of planning because of shortage of staff, funds, apathy, irregular power, blockages in sewers and poor monitoring	Not aware of the specific department within WASA responsible for O&M
Complaints	Aware of local complaint sections of WASA in 18 different localities. People can complain by telephone, letter and personal visits. Complaints are passed from the complaint clerk to the relevant sewerman	"The complainants are apprised in most of the cases through return letters" "The record keeping of the consumer data is not very good" and "we do not have the proper record in the revenue branch"	Complaints from NGOs are dealt with quicker than from individuals, who may have to repeat complaint many times before action is taken. People complain about wrong billing, late billing, delivery of bills to wrong address or bills not delivered.
Budget for O&M		The O&M budget is allocated on previous years expenditure, revenue position, inflation and salaries, not actual requirements. "If funds properly used without corruption, I think, these are sufficient" "Allocation of funds is not proper. Misuse of the budget is very much"	

Table B2.28 Perception of stakeholders (continued)

Issues	Sanitary workers	Officers at WASA	NGOs/CBOs
Community linkages		"Meetings are not carried out due to the reason that the expectation of the public may rise and we apprehend that we cannot fulfil our commitment made in meetings" One officer used the analogy of a mother giving milk to a crying child to describe the role of WASA at public meetings	Staff at WASA behave in an autocratic way and NGOs suggest WASA should take steps to involve the community
Management of WASA	Satisfied with job, it is secure and permanent and there are pension benefits but they have no safety equipment and must pay for medical costs out of own pocket. Some sewer men do private work for colonies out of office hours. The attitude of officers to sewer men is reported as good	"The top management of WASA is always borrowed from other departments and they have less interest to take the necessary steps to improve the situation, there is no continuity of policy it stops as the Managing Director gets changed." There is also political interference	
Complaints from WASA about communities	Community needs to be educated and motivated not to throw shopping bags, vegetables and other solid waste into sewers	Misuse of sewer system, installation of motor pumps on water connections, use of low quality sewage pipes, theft of manhole covers	

Table B2.28 Perception of stakeholders (continued)

Issues	Sanitary workers	Officers at WASA	NGOs/CBOs
Roles of CBOs	There is a need to help people establish CBOs to develop co-ordination between community and WASA	Generally positive about the services laid by communities on a self-help basis, but under technical guidance of WASA. "CBOs can be inducted gradually from operation and maintenance and right up to planning and project conception stage". NGOs can be useful in highlighting problems, suggesting remedial measures, assisting WASA in O&M	
NGO managed systems		WASA saw many weaknesses: lack of funds, systems laid without planning and consultation with WASA, little technical know-how, low quality materials, no maintenance, lack of leadership and no regular billing	CBOS/NGOs have developed a system for collecting funds, but it is difficult making people contribute and so is a burden for them. Most fundraising is problem orientated i.e. "only those contribute which are affected by some sewer overflow". However NGOs/CBOs mobilise resources, educate and motivate people and solve local problems in O&M
Privatisation of WASA	Sanitary workers were against privatisation. "If WASA is privatised I will be with others as nothing will be left as a choice"	WASA officers saw the benefits of privatisation as O&M activities improved, recovery improved, more revenue and higher salaries	Privatisation may lead to better quality of work and better service delivery but higher costs and unemployment

Anjuman Samaji Bebhood, ASB, is a local NGO in Faisalabad. It's formation and evolution are very closely tied to the career of its co-ordinator Nazir Ahmed Wattoo. It was conceived of as a welfare organisation to meet the problems in Dhuddiwala caused by urbanisation.

Table B2.29 Key event in Dhuddiwala

	Situation in Dhuddiwala
Early 1960s	■ Open fields used as latrines ■ Water comes from deep bore wells and irrigation channels
Late 1960s	■ 50% of households built soak pits and installed handpumps in homes ■ Waterlogging, soak pits overflowed, disease and environmental degradation increased ■ "Anti Waterlogging Programme" – installation of deep tube wells along main irrigation channel and pumping water back into canals ■ Water levels fall, handpumps become inoperative
1987	■ Mr Wattoo visits OPP

Table B2.30 Number of households

Location	Households
Dhuddiwala	1,010
Hasanpura	1,000
Rasool Nagar	200

- Identification of Project Area – Hasanpura was chosen because of its severe water problems

- Identification of community activists – the two most respected and active persons are a shopkeeper and caretaker of the mosque. The activists talked to individuals concerning the programme to gauge their reaction. Once it was felt the idea was supported, a community meeting was held.

Table B2.31 Approximate cost for services

Item	Cost in Rs. for 1,000 homes/year
Water bought from water vendors @ Rs.5 for 35 litres	1,800,000
Electric pumps	1,460,000
Soap needed for washing in brackish water	672,000
Health care	200,000

- Financing the project – WaterAid was asked to provide a revolving fund for the water project of Rs.200, 000 for laying 1,100 running feet for the main line. Individual lanes then lay their own distribution line and households pay their share of the costs.
- Organising the work – An OPP team visited Dhuddiwala and trained the team in mapping and surveying, estimating and planning of the water supply line. Application for a No Objection Certification for making a connection to a government water service was made.
- Connection with WASA main line – The work was done clandestinely, due to official WASA refusal, using two WASA fitters who were hired informally and a WASA pump.

Table B2.32 Key features of Hasanpura

Item	Results
Total number of streets in Hasanpura	84
Total number of houses	1,000
Total area	25 acres
Total length of these streets	13,500 RFT
The streets where the water pipe has been laid	42
Length of main lines 3 to 6" diameter laid in 42 streets	8,510 RFT
Legal connection provided	326
Applications for connections in process	10
Expenses incurred in Rs.	194,901
Main Lines 1925 RFT, 6 and 4" diam	
Lane Lines 6, 585 RFT 3" diam	468
Connection charge at Rs.600/house	195,600
ASB Service Charges	15,400
Total costs up till 30-09-2000	1,349,336

Table B2.33 Cost of infrastructure

Location	No. of lanes	RTF	No. of houses	Cost of tertiary lane in Rs.	Cost of internal fittings	Total cost
Dhuddiwala	27	3,573	161	60,440	93,800	154,240
Hasanpura	51	7,664	540	455,580	756,000	1,211,580

The Sanitation Project

ASB and OPP undertook investigations into sanitation and drainage issues in Dhuddiwala. The majority of households dispose of sewage in paved/ unpaved open drains in streets, causing households to be affected by damp and erosion. The credibility of OPP and ASB had already been established in the community and so social organisation and mobilisation of the community was easy as contacts were already established and activists identified. Procedures and Costs: The sewage system could only be built if it could be connected to WASA trunk sewers

- ASB decided to lay a collector sewer that could connect to the WASA trunk sewer. The cost was recovered when households were connected to collector sewer at Rs.600.
- Construction of lane sewers by the community was carried out at their own cost and under their own supervision and management. Rs.700 – Rs.900/ household. While the connector sewer was laid, work was stopped when it reached a lane intersection, where the lane would be asked to lay the lane sewer and connect to the collector sewer.
- Installing a latrine pot and P trap in homes costs Rs.750 per household
- The average cost per household for the entire system was Rs.2,050 – Rs.2,250. Every household also had a small one-chamber septic tank to prevent solids choking the sewer.

The ASB is by far the most successful of the OPP replication projects outside Karachi. The failures of replication projects can be put into two broad categories, i.e. projects that never developed or projects that fizzled out.

As a result OPP has decided to choose its partners more carefully:

- An initial small start-up grant will be provided and if the programme shows promise then an agreement is made with WaterAid
- OPP has found that CBOs relate to the OPP's model better than NGOs, whose staff and leadership belong outside the project area
- The methodology for building up a team of sociological and technical people has been developed

Table B2.34 Perceptions of key organisations

Agency	Perception of ASB
WASA	■ ASB had helped WASA generate large amounts of revenue by bringing on-line new consumers ■ WASA felt bound to take over new infrastructure and be responsible for all O&M costs ■ Questions over ASB's technical capability, e.g. materials and specifications not vetted ■ Rather than changing government delivery system ASB acts independently ■ There is no guarantee of the reliability of ASB's intervention ■ Concerns regarding the sustainability of ASB sustainability ■ The roles and responsibilities of NGOs and WASA need to be well defined ■ WASA may have a great deal to learn form NGOs
FDA	■ Little knowledge of ASB or OPP at FDA, they knew none of the details and area they worked in
FAUP	■ ASB very small in scale and restricted to only one location ■ FAUP's work has covered four localities and four times as many households ■ FAUP is a government project; they want communities to work with government, not without it as ASB ■ FAUP's work is multidimensional and includes health education which ASB does not ■ ASB is thought to be a service provider not an NGO involved in community welfare and empowerment as defined by FAUP ■ The importance of auditing and accountability is stressed ■ ASB projects ask communities to provide full costs whereas FAUP asks for 50% contribution, yet both use the same OPP model for infrastructure design ■ FAUP undertake tertiary and secondary infrastructure and concerns were expressed over ASB's ability to scale-up its efforts ■ FAUP thought of itsself as an institution and ASB as a one-man show

Table B2.35 Some other projects

	Name of organisation	Activity	Action	Result
Projects that never developed	Okara Development Programme (ODP)			
	Okara Community Development Concern (CDC)	Given 10 days of technical training by OPP and Youth Commission for Human Rights	No construction work took place following the training CDC	CDC has a history of lobbying and found the shift to project implementation difficult to make
Projects that fizzled out	Youth Commission for Human Rights	Supported with training and guidance for sanitation as well as micro-credit scheme	Involved in government's social action plan and given grant	Changed emphasis to education and health
	BASWO	Physical training on sanitation	No work took place	Co-ordinator accused of misappropriating funds, which divided the organisation
	Organisation for Participatory Development	Undertook OPP training for sanitation and also micro-credit	The project initiated was very successful but then started to decline	Sanitation programme closed because residents could not afford services and felt the work was better carried out by local government

The ASB model consists of:

- Community-built and financed sewers and water supply distribution lines in lanes
- ASB-built collector sewers and main water lines financed through a revolving funds, recovered from the community
- WASA developed trunk sewers and disposal points and water source development and main line
- ASB model provides a means of acquiring water and sanitation systems for a rapidly expanding population
- The process is demand driven and an organisation like ASB costs very little to run
- The model through the support of OPP, develops technical skills within the community and as such promotes self-reliance and promotes a more equitable relationship between government agency and local communities
- The success of ASB has been in adapting the OPP model. The ASB adapted the OPP model to its context, changes have been made to the methodology of motivation, financing of external development and taking on service provision for maintenance of infrastructure
- The ASB did not begin by holding meetings for motivating communities. It identified respectable community elders with whom it held a dialogue and they in turn spoke to people to gauge their opinion. When the process was completed a meeting was held.
- The inauguration of the water line was by an elder, with banners and a gathering. The development of the water supply was turned into a community event
- In Faisalabad the ASB is dealing with a solid and homogenous society, with an agricultural base, whereas in Karachi there is a migrant population whose traditional values and organisations no longer exist.
- The incorporation of local celebrities, through which the ASB has been able to lobby for support in government agencies and who can spread the message of ASB.
- The ASB's decision to build the external infrastructure with a loan and then recover it from the beneficiaries is also a departure from the OPP model. The decision was made on the basis that local pressure could be exerted to recover the costs.
- The decision of ASB to organise the maintenance of the sewer system and to provide a service for it is again a major departure from OPP work. OPP has always asserted that it is not a service provider, and that work should be organised, undertaken and financed by the communities themselves or by entrepreneurs.

Table B2.36 O&M of services

Service	Constructed by	Responsibilities for O&M	Status of O&M	Evidence of facilities cared for
Water	ASB & Community of Hasanpura	Community/ households ASB WASA	Adequate	Clean streets Meetings in lanes Tree planting Street sweepers Collection of solid waste Reduction of water-related diseases
Sanitation	Community of Dhuddiwala and ASB/OPP	Community/ households WASA ASB	Adequate	Mostly running sewers

Table B2.37 Intervention and outcome

Location	Pre-existing	Intervention	Outcome	O&M	Agencies
Hasanpura	Households threatened by lowered water table and hand pumps inoperative	ASB identified settlement for water project. An adaptation of OPP model	Connected to WASA main line and household connections	Adequate cleaning of manholes, sewage lines, replacement of broken covers, repair of manholes and replace-ment of pipes	OPP ASB Community Water Committee WASA
Dhuddiwala	Households built soak pits and have open drains in streets	Replication of OPP low-cost sanitation model by ASB	Collector and lane sewer, laid by community, connected to WASA trunk sewer		OPP ASB Community WASA Committees Household

- Wattoo's personality and experience have been pivotal in the success achieved by ASB. He has the advantage of 25 years of experience of interacting with politicians and communities and knew the nature of government institutions and procedures before becoming involved with OPP. He also knew how to motivate communities and use them for his cause. All decisions are taken collectively in ASB with the involvement of all community members, ASB accounts are transparent and available to communities to examine, which builds trust and confidence.

ASB's major achievement is low overheads and small staff. This makes management easy and creates a greater understanding between it and communities; the staffs are all drawn from the community as well. Against a total investment of Rs.1,571,208 for staff salary, operational costs, office equipment and training, the community has been able to invest Rs.4,558,794.

Cuttack

DFID is funding an urban services improvement programme, focused on the urban poor, in the Indian city of Cuttack. This includes improvements to water supply and sanitation. Cuttack's slums cover about one-third of the city's population. Significant proportions of slum dwellers have insecure livelihoods. Health problems are exacerbated by poor environmental conditions, e.g. poor sanitation, lack of clean water, regular flooding. The project aims to improve the access of 143,000 slum dwellers from 106 slums in Cuttack, the largest city in Orissa, to municipal services that are responsive to their needs. The project aims to reduce morbidity and mortality by providing more water and sanitation facilities in the slums and better drainage of floods and wastewater from the slums. The project is distinguished from the earlier slum improvement projects (SIP) by a more participatory approach to identified priorities. Community contributions to O&M will promote ownership, empowerment of communities through CAP and VGP (vulnerable group programmes), which may also encourage communities to demand attention to O&M from service providers. Emphasis is placed on up-grading in-slum water, sanitation and drainage facilities and linking these into citywide networks whenever possible (separate arrangements are made where these do not exist), and to associated health and hygiene promotion programmes.

Project preparation studies and previous experience from DFID urban projects elsewhere in India indicated that operation and maintenance of the assets created would be problematic, and that it was essential to bring O&M to the fore. Common problems include:

- Inadequate information and accounting systems make actual performance assessment difficult
- O&M work programmes are not based on actual needs
- A lack of transparency in the subsidies being directed at the operation of a small sewage scheme, which benefits better-off residents. This has a distorting effect because cost-recovery proposals for the urban poor are very hard to justify unless these hidden sewage subsidies for the better off can be dealt with
- The set levels of cost recovery do not allow for adequate expenditure on O&M

Such problems are being addressed as part of the main programme; a study of the situation analysis has been produced as well as a phased development plan for improving O&M over the lifetime of the project. Both institutional performance and community perceptions of O&M have been investigated.

Completed infrastructure work will be handed over to the corporation in a phased manner – O&M costs will increase on a sliding scale over the life of the project and after the corporation has agreed to allocated funds in the annual budget. The project will be sustainable only if the corporation begins to make provision from the outset for O&M. CkMC does not charge any households for the use of communal water and sewage facilities or for primary health and education services, so there is very little scope for cost recovery. Communities will make some small contributions to O&M of in-slum assets in cash or in kind. Financial viability is therefore dependent on the general revenue positions of the corporation. Training will be provided to engineers in areas such as participatory techniques, community partnering and O&M. CkMC responsibility for funding community organisations is hoped to increase the probability of institutionalising participatory planning process. The heightened level of awareness created by the project should also increase the beneficiaries' expectations as to the level of services to be provided.

By the end of the project, actions will have been taken in conjunction with the local project partners both at the city and state levels to improve performance of O&M. This will take at least five years to achieve.

The problem relating to the missing 'maintenance culture' within the CkMC will also be tackled. This will be done by raising awareness of the financial and operational benefits of carrying out O&M on a regular basis, intensive training and study tours (visits to poverty reduction tours in South Africa to observe how O&M is carried out and to Bhubaneswar to review maintenance arrangements that have been set up).

There is a need to ensure that Operations and Maintenance issues for the Cuttack Urban Services Improvement Project (CUSIP) are effectively and efficiently addressed in both design and ongoing use so that they contribute to the overarching goal of sustainable improvements. The general institutional responsibilities in Cuttack are as follows. In relation to the poor communities and CUSIP, the CkMC is the most important organisation, followed by PHED.

General statistics for the total infrastructural assets of the city indicate that there will be a major increase in the infrastructure asset base, which correspondingly suggests an increase in the O&M activity required.

Table B2.38 Organisational context of urban infrastructure and services project

Institution	Resposibility
Cuttack Municipal Corporation (CkMC) New works, operation and maintenance	Roads and pathways Storm and sullage drainage Sanitation (public toilets) Tube wells Street lighting Municipal buildings Parks
Orissa State Public Health Engineering Department (PHED)	Reticulated water supply (renewal and maintenance) Operation of deep tube wells Operation of sewage
Cuttack Development Authority (CDA) New works only	Sites and services infrastructure on CDA land
Gridco New works, operation and maintenance	Power supply
Orissa State Public Works Department New works, operation and maintenance	Roads; mostly major roads
Orissa State Irrigation Department New works, operation and maintenance	Roads on department land

Existing expenditure on O&M is difficult to determine because the municipal reporting system does not distinguish between expenditure on capital works and on O&M. Information from engineering contract files is not reported as part of the

Table B2.39 Infrastructure asset

Infrastructure asset	Current status	Increase through
Surface drains	427km	38%
Main storm drains	54km	0
Black top roads	306km	16%
Cement concrete roads	28km	37%
Deep tubewells	67km	0
Hand pump tube wells	2,700	6%
Water reticulation	260km	19%
Water connections	21,068	unknown
Sewage	to be confirmed	unknown
Sewer connections	25	unknown
Public toilets	36	0
Street lights	10,248	unknown
Solid Waste bins	700	95%
Solid waste collection vehicles	26	60%

departmental reporting system. Municipal reports do not include the actual performance of the technical functions such as drain cleaning and solid waste collection, thus performance indicators are difficult to compile.

The two indicators of O&M that could be estimated are the repair of surface drains with an annual maintenance expenditure of 3.6% and BT roads at 3.3%, and yet the CkMC and PHED have a large, unskilled human resource at their disposal.

An important operational development at CkMC is the move towards a major decentralisation to the ward level. There is now a clear association of CkMC staff at each ward (i.e. engineers, tax collection staff, health officers, sanitary inspec-

Table B2.40 CkMC – available human resources

Function	Staff numbers	Human resource indicator
CkMC drain coolies	140 (4 hours working day)	1 per 3km of drains
CkMC sweepers	1232 (4 hours working day)	1 per 0.5km of road 2 per garbage bin
CkMC lighting section	120	1 per 85 street lights
CkMC junior engineers	11	1 per 3 wards 133 contract per JE Rs. 152 lakh work per JE
PHED water distribution system	142	1 per 148 connection 1 per 1.83km of pipeline
PHED operations	130	2 per borehole

tors, sweepers and drain coolies), and a store of supplies/resources for O&M. These wards are also maintaining complaints registers and requests for works from local societies. The councillors of these wards are responsible for allocating local works in capital and O&M. Junior engineers prepare the necessary plans and let the work. Supervision of works such as solid waste disposal and sweeping has not been formalised but is done by the councillor on their daily rounds. There are also moves to create asset registers at the ward level, which will involve measuring roads and the enumeration of facilities like tube wells.

Community perceptions

Local community's involvement in O&M includes:

Water supply	Tap replacement, reporting of leaks, minor repairs, report faults
Sanitation	Daily cleaning, annual pit emptying
Drainage	Regular sweeping, cleaning in front of the house
Access/Paving	Minor hole patching, reporting of defects
Lighting	Reporting of defects
Solid waste collections	Collect and deposit household waste and road sweepings
Community halls	Management, cleaning, and repair

Surveys were carried out in the following areas to determine what O&M activities are currently undertaken and by whom, and to investigate user perceptions concerning the delivery of O&M:

- Chattra Bazar (improved in preliminary stage)
- Kannagar (improved in preliminary stage)
- Pattapol Muslim Sahi (improved in preliminary stage)
- Kadam Rasool (unimproved in preliminary stage)
- Muradha Khan Patna/Samadhi Patna (scheduled for main phase)

A range of problems has been identified, some of which are linked to a lack of O&M services provided much earlier; CUSIP is augmenting services which are already there. The lesson from this is that users are concerned with the quality of

Chhatra Bazar, Beherasahi Slum, Cuttack

This is a representative example of the studies made in Cuttack; however there is potential to improve ownership. Special efforts could be made to improve the awareness of slum dwellers regarding O&M of basic infrastructure and facilities. It is suggested that CUSIP establish a monitoring cell to evaluate the process of maintenance of the community assets through the CMG. In cases of exemplary achievement an award could be given to provide an incentive to encourage inhabitants to maintain the community assets and healthy surroundings.

The Beherasahi slum is located on one side of the Taladanda canal. The first settlement was established in 1930. Since then the rate of migration has been increasing and the settlement is growing. Nearly 80% of the slum dwellers are illiterate. The majority of slum dwellers are engaged in fishing and in fish trading. Most households have an average income of less than Rs.11,000.

1) **Water supply**: Water supply consists of three tube wells and two standposts. LWS is found to be responding to approaches from the community to repair tubewells, commu nity members have also been helping O&M practice in terms of labour and finances. Recently some community members have received training from CUSIP for minor repair work, in order to be able to reduce the time taken for repairs and reduce dependence. Communities have also fixed brass taps and remodelled the tube well apron with marble tiles. They did this with the profits of the community contract awarded to them (although the regular repair of aprons is not done as often as required).

2) **Sanitation**: The community is pleased with the construction of eight community latrines by CUSIP. In general women use the latrines more than men do, most men have not been persuaded from open defecation by the canal. Children are also not using latrines but prefer open defection in the roads and canal sides. Community members have not been involved in O&M of the latrines (using phenyl, cleaning of soak pits, spraying of anti-mosquito oil). Though a sweeper is employed for these tasks, he does not perform them regularly and so the toilets are typically unsanitary and smell. The community have also engaged a sweeper at Rs.300 per month, from household contributions, but considering the heavy use of the latrine both day and night, his hours are not enough to keep the latrines clean. People were suffering from skin diseases, since they bathed in the canals, now they have a bathing complex with a water connection.

3) **Drainage**: The LWS and CUSIP have in total constructed seven drains – five covered and two uncovered. Maintenance of the drains relates to the periodic cleaning, spraying of mosquito oil, plastering of aprons, use of bleaching powder etc., this is done by both the municipality and the community irregularly. Community requests to the municipality have not been successful in an improved O&M regime. In addition house holders use their drains for solid waste disposal and for children to defecate in, leading to blockages. The community is becoming convinced of the need for individual drains to connect with *'pukka'* drains, and thus to city main drains; instead of the Taladanda Canal.

4) **Flood protection**: *Kacha* road linking Cuttack malgodown gets flooded with water in the rainy season, which causes clogging and silting. Community members have made many approaches to the Municipality, CUSIP, LWS and the local councillor for construc tion of a 'pukka' road but no action has been taken. Other requests have been made to protect *kacha* houses that are affected by the lack of flood protection, but again no solution has been forthcoming.

5) **Paving**: Two CC, CUSIP, LWS and the community have constructed one BT, one brick and two *kacha* roads respectively. Minor maintenance work and sweeping of CC and BT roads is done by the community members. Women usually sweep the pavement in front of their house. But the community does not participate in their overall maintenance. All slum dwellers demand that the roads be upgraded.

6) **Lighting**: CUSIP has six electric poles for street lighting. CUSIP replaces fuse bulbs in the community but has yet to implement a switchboard, meaning wastage of energy and bulbs. The streetlights remain on through day and night because there are no switch boards. Only eight out of 86 households have made illegal connections.

7) **Solid waste management**: Of the three dustbins provided by Cuttack Municipal Corporation, two are damaged and one is unused. Slum dwellers revealed that they are not interested in using garbage bins, most are accustomed to throwing rubbish into the canal.

8) **Community building**: LWS constructed a community building, however the community made an immense contribution in terms of labour and finance. Community members are taking care of the community centre by; whitewashing, regularly cleaning the floor, replacing fuse bulbs, carrying out minor electrical work and safe-guarding the property. The temples are just as well cared for.

9) **Plantation**: The community has planted 8-10 banana and papaya plants, whose produce is sold to fund the construction of temples. The community maintains the plantation by watering, cutting grass, guarding, etc.

the overall service, *whether it works or not*, rather than who is responsible for the different components of the system. There is thus a need to address overall service provision, as opposed to the construction and operation of one aspect of project-related infrastructure. There are also issues raised with regard to the coverage of the programme, in areas where service has not improved. Perceptions of improved services are also linked to expectations, if during planning a wish list from local communities has been sought they are likely to be dissatisfied when budget constraints means this is impossible to deliver.

With regard to sanitation, there is a need to promote the use of latrines rather than open defecation, particularly with respect to children. However, there are instances of residents contributing to the cost of hiring a sweeper; residents are managing the systems themselves. Although for communal latrine blocks these activities are not sufficient to keep the area clean when heavily used and there are no full time attendants.

There is not much evidence of formal O&M activities by CkMC or PHED; the presence of sweepers does not necessarily mean that waste collection is regular – it depends on the management of the ward councillor and the location of waste bins.

There are a number of examples of good community-based initiatives in relation to O&M, which indicate their ownership and care for systems installed.

There is a lack of initiatives for drain cleaning, for example, which is important considering the performance of CkMC in this respect. There is also room for a clearer understanding of institutional responsibilities; since community members were reported as approaching authorities to perform certain task but with little success.

Table B2.41 Example of initiatives in settlements

Location	Initiative
Pattapol	Replacement of handpump washers and nuts Household contribution of Rs.5 per month for latrine sweeper Community hall
Chhatra Bazar	Minor repairs to handpump Collecting money for tube well maintenance Training by CUSIP for standpost repair Replacement of standpost tap Tiling of standpost apron Engage a sweeper Road sweeper in front of house Replacement of street lighting Cleaning community hall Maintenance of plantation area Financing construction of temple and maintenance
Kadam Rasool	Minor patching of access ways Drain cleaning in front of house Maintenance of temple
Murdha Khan & Samadhi Patna	Person trained in tube well repairs by LWS Limited cleaning of pond Minor repairs to latrines Contributions to mechanical and electrical repair work for latrine Contributions to construction of *katcha* road Road sweeping in front of houses Maintenance of temple and club house
Khannagar	Replacement of water taps Cleaning of open wells Occasional cleaning of *katchi* drain Minor repairs to access way Temple maintained by women's organisation

Table B2.42 Example of no response from the municipalities

Location	Community approach to	Outcome
Pattapol	CkMC & CUSIP for garbage collection, drain cleaning, lighting, tap repairs	Nothing yet
Chhatra Bazaar	CUSIP & LWS to improve unpaved access	Nothing yet
Kadam Rasool	CkMC, CUSIP, LWS for drain cleaning CUSIP regarding street lighting CkMC for water supply, clean the pond, for waste bins	Nothing yet
Murdha Khan & Samadhi Patna	CkMC for waste bins, drainage, sanitation improvement	Nothing yet
Khannagar	CkMC & CUSIP for shallow well, latrines, garbage collection	Nothing yet

A review workshop of the existing system highlighted three options to improve existing O&M. The nature of the planning process is the key to each of these models.

1. ***Municipal Management Option***: CkMC could undertake all activities, either through the existing large direct labour force employed by CkMC, using the present tender contract system to involve micro-contractors and local labour or by using private sector involvement in the form of term contracting services. There is a link at the municipal level between better O&M planning and improved financial management. The problem is that there is no real link between the supply of services by CkMC and payments by residents, thus residents can exert no financial leverage to improve services.

2. ***Community Management***: This depends on a willingness to participate and the capacity of the residents. Where major repairs are required a degree of technical and contractual input, and therefore risk, is necessary and communities may not be prepared for this. Communities will need a clear definition of roles and responsibilities. Communities are concerned with service delivery, which means at the planning stage the provision of new facilities and their operation and maintenance needs to be worked out. Whilst some of the O&M tasks may be simple, e.g. cleaning drains, the problem of motivating the communities to do it may be more difficult. There is also the issue of raising community finances, when people may not be willing to pay for something that does not result in new infrastructure.

A longer term vision for O&M management in Cuttack envisages bringing together municipal management and community management at the ward level into a framework for:

3. ***Municipal – community partnering for O&M***. The extent for statutory responsibility for O&M is negotiated between: the CMG, the ward co-ordinator, the CkMC ward-level staff, and the CUSIP, which results in a Memorandum of Understanding for a particular settlement, which can develop roles and responsibilities. The ward corporation is the focus of O&M activities, performance and monitoring. The ward complaint register provides the mechanism for reporting problems and auditing. User satisfaction surveys can be carried out at this level and the CMG is accountable to its residents through the targets set out in the memorandum. CkMC should develop strategic and annual plans against the new budget line for O&M using asset registers, infrastructure condition surveys and user satisfaction surveys. Households in improved slums are included on the list

of registered holdings and are liable for property tax. *Planning with the communities* incorporates a full discussion of the O&M implications of different infrastructure options from the outset and includes all stakeholder's roles and responsibilities, explores user perceptions of the nature and frequency of O&M activities and assesses willingness and capability of CMG and CkMC to perform tasks. Focus should be on CMG's resourcing and managing of simple activities like sweeping and cleaning of pathways and drains, etc. A regular city report card is produced which describes how well the city is performing and is based on user satisfaction as well as technical and financial indicators. The card may also describe the performance of the community in relation to the partnering agreement, with incentives for all stakeholders to perform well.

There is a minimum level of action that is essential for improvements to the management of O&M

- Agree improved MIS to enhance O&M planning.
- Improve financial management and reporting procedures to enable strategic planning for O&M to be carried out.
- Introduce an internal reporting system which classifies engineering works into capital and maintenance.
- Develop and test a performance reporting tool; prepare a works register of works undertaken in a budget period with a one-line description, the estimated costs, the accepted tender price and the completion cost. Link these works to infrastructure asset registers.
- Maintain a work register at ward level and send a periodic summary to CkMC.
- Maintain a ward complaints register and prepare periodic summaries for inspection and audit.
- Introduce a pilot performance-monitoring scheme for routine operational activities, to be carried out largely by residents in relation to ward level services.
- Develop ward-level infrastructure asset registers.
- Activate the new budget line for O&M for the next financial year.
- Define infrastructure hand-over procedures.
- Review staffing levels and structure in relation to O&M.

Table B2.43 Kadam Rasool

Service	Item	Constructed by (in one year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Water supply	Tube well (5)	Municipality (5) Individual (1)	Community	Community Municipality	Replacement of minor spare parts frequently used in tube wells	Municipality	Community vigilant and approach municipal authorities	In all cases the bases of tube wells are damaged due to continuous use. Water logging is a common feature, due to semi-broken bases, and groundwater gets polluted In most cases, the water contains iron particles and flavour. People use the water for drinking as they have no alternative.

Table B2.43 Kadam Rasool (continued)

Service	Item	Constructed by (in one year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
	Standposts (8)	PHED (8) Individual Connections (47)	Community	Partially maintained by community	Galvanised iron (GI) piping replaced by residents with their knowledge and resources	PHED, Municipality, CUSIP	Community maintained water supply	Standposts are damaged. Pipes do not havetaps and detach from the structure and base. Most of the PHED pipes run along side the main drainage pipe. In case of a rupture, the water gets contaminated resulting in stomach and skin diseases. As the pipelines are very old, they contain a high degree of silt and residue. The flow of water is cut off.

Table B2.43 Kadam Rasool (continued)

Service	Item	Constructed by (in one year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
	Open well (10)	Individual (10)	Individual Household	Individual Household	Renovated once a year by individual households	Individual	N/A	Seven open wells have no concrete base. Water is not chlorinated regularly. When it is raining all the muddy water in the area drains into the wells.

Table B2.43 Kadam Rasool (continued)

Service	Item	Constructed by (in one year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Sanitation	Pond (1)	During Moghul period	Community	Partially maintained by the community	During 1993-94 it was renovated once with the contribution of municipality and community	Municipality Community	Renovation only once so far	People are using the pond for both bathing and washing purposes. At present the water is highly polluted, and causes skin diseases. No initiatives for cleaning Open well left unused
	Individual latrines	Individual	Individual	Individual	As and when required maintenance is done by the household	Individual	Nil	Around 40% of population use their latrines, the rest of the population defecate in the open.

Table B2.43 Kadam Rasool (continued)

Service	Item	Constructed by (in the year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Drainage	Open drains	Municipality	Community	Municipality and community	Drains cleaned by municipality once or twice a month	Municipality	People may clean the part of the drain outside the front of their house if it is blocked.	During rain there is severe water clogging. All the drains fill up and drain water pours into the houses flooding roads and making open defecation difficult.
Paving	BT roads (3) CC roads (6)	Municipality	Community	Municipality	BT roads patched up twice so far	Municipality	Nil	All the *kacha* by-lanes connecting to sub-lanes and main road of the slum need to be cemented as they get muddy during rain.

Table B2.43 Kadam Rasool (continued)

Service	Item	Constructed by (in one year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Lighting	Light post (18) Individual electricity connection (90)	OSEB Individual	Community Individual	Municipality & OSEB Individual	Tube lights and bulbs are replaced as and when required Major and minor repairs done by each household as and when required	Municipality OSEB Municipality OSEB	Nil Individual	90 households using authorised meter electricity. 60 households have illegal connections hooked up to the main line. The remaining 50 households depend on kerosene lamps.
Solid waste management	Garbage bins	Nil	Nil	Nil	Nil	Municipality	Nil	

Table B2.43 Kadam Rasool (continued)

Service	Item	Constructed by (in one year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Community buildings	Kadam Rasool Mosque	Moghul period	Community	WAKF board and Kadam Rasool managing committee and municipality	Construction of boundary Lanes and sub-lanes inside Kadam Rasool and graveyards 12 electric poles and 1 tubewell provided by municipality Shrine painted and mosque white-washed from time to time	WAKF Board, Kadam Rasool Managing Committee, Municipality and Devotees	All the construction work done inside Kadam Rasool is directly supervised and implemented by the community	Due to religious and historical importance, irrespective of religion people contribute to the development of the Mosque and its surroundings
	Durga Temple	Hindu devotees	Hindu devotees	Hindu devotees	White washing once a year	Hindu devotees	For cleaning and white washing	No electricity connection inside the temple

Table B2.43 Kadam Rasool (continued)

Service	Item	Constructed by (in one year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
	School Primary (1) Balwadi (1)	Municipality	Community	None	Nil	Municipality	Daily cleaning and keeping locked	Both the school buildings are in devastating condition. The interiors are stuffy and unhygienic; no regular white washing takes place.

Table B2.44 Operation and maintenance in Patapol Slum

Service	Item	Constructed by (in one year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	
Water supply	Tube well (4)	CMC –1 CUSIP- 3	Community	Community CMC	Replacement of minor spare parts frequently used in tube wells Cleaning tube wells' base and its surroundings	CMC	Community collects some amount and repairs the tube wells	The base of the tube wells were not finished so the sides of the tube wells are muddy and they smell bad. Water clogging is a common feature and because of the semi-broken bases the wells groundwater became polluted.

Table B2.44 Operation and maintenance in Patapol Slum (continued)

Service	Item	Constructed by (in one year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
	Standposts (5)	CMC – 3 CUSIP – 2	Community	CMC	Occasionally the taps have been replaced by the community	PHD, CMC, CUSIP	People installing taps and clean the ground around the standposts	As the pipe lines are very old, they contain a high degree of silt and residue. The pipes do not have taps and detach easily from the structure and base. The water pressure is very low in the standpost.
	Open well (1)	CMC-1	Slaughter house		Renovated once a year by individual households	Community		The open well is not covered. People do not use the water regularly as it is used by the slaughter house.

Table B2.44 Operation and maintenance in Patapol Slum (continued)

Service	Item	Constructed by (in one year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
	Individual water connection (15)	PHD	Individual Household	Individual	Not yet been done	PHED, CMC, CUSIP		
Sanitation	Shared Latrine	CUSIP	Community	Community	Community paying Rs.50 per month to the sweeper Daily cleaning by the users	CUSIP, CMC, Community	Each household contributes Rs.5 per month	The latrines are cleaned by the sweeper but not using bleach or phenyl. The latrines are inaccessible.
	Individual Latrines (12)	Individual	Individual		Individuals clean their latrine	Individual		

Table B2.44 Operation and maintenance in Patapol Slum (continued)

Service	Item	Constructed by (in one year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Drainage	Uncovered drains (4)	PHED	Individual Household	Individual	Community cleans latrines occasionally	CMC	Occasional cleaning by community	In the rainy season it is difficult to cross the road, and people ask CMC and the councillors for help.
Paving	BT roads (1) CC roads (3)	CMC	Community	CMC	Very occasionally the roads get repaired	CMC		Municipal people are not cleaning the road regularly.
Lighting	Poles (11) Bulbs (8)	CMC, CUSIP	Community	CMC	Bulbs are replaced very occasionally	CMC, CUSIP		People complain to CMC and CUSIP but action is unusual

Table B2.44 Operation and maintenance in Patapol Slum (continued)

Service	Item	Constructed by (in one year)	Used by	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Solid waste management	Garbage bins (3)	CMC	Community people of Kilkhan – 1	CMC	CMC clear the garbage	CMC		People are throwing garbage outside the dustbins, on roads and in drains.
Community buildings	Pukka buildings (1)	CUSIP	Community	CMC	Community people cleaning regularly	CMC community		Irrespective of the religion, the centre is used by everybody in the community.

Table B2.45 Operation and maintenance in Chhatra Bazar

Service	Item	Constructed by (in one year)	Used by households	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Water supply	Tube well (3)		88	LWS and community	Three repair jobs so far	CUSIP, community and LWS	Community repair with LWS	There are no problems with the tube wells.
	Standposts (2)	CUSIP	136	CUSIP and community	Irregular repair of base and taps	CUSIP and community	Replacement of taps and fixed marble tiles by community	
Sanitation	Community latrines (8)	CUSIP	156	Sweeper	Use of phenyl daily	CUSIP and community	Pay a sweeper Rs.300 a month. Rs.5 is collected from user families	
	Bathing *ghat*	CUSIP	166			CMC and CUSIP	Approach LWS, CUSIP for construction of bathing complex	There are problems with contaminated water.

Table B2.45 Operation and maintenance in Chhatra Bazar (continued)

Service	Item	Constructed by (in one year)	Used by households	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Drainage	Partially covered drain (5)	LWS, CUSIP	86		Irregular cleaning and use of bleaching powder and anti-mosquito oil	CUSIP, CMC, MS and community		Clogging and silting of pukka drain water and contamination of canal water. Community members approach municipality, CUSIP and LWS but action not taken.
	Uncovered drain (2)	LWS	86		Irregular cleaning and use of bleaching powder and anti-mosquito oil	CUSIP, CMC, MSand community		Clogging and silting of pukka drain water and contamination of canal water. Community members approach municipality, CUSIP and LWS but action not taken.

Table B2.45 Operation and maintenance in Chhatra Bazar (continued)

Service	Item	Constructed by (in one year)	Used by housholds	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Paving	CC roads (6) BT roads (3) Brick roads (1) *Kacha* roads (2)	CUSIP CUSIP LWS Community	86 86 86 86				Community members approach CMC and CUSIP	Children use the *kacha* road for open defecation and rubbish is also thrown on this *kacha* road.
Lighting	Poles (18) Individual (8) Community centre (1)	CUSIP/ CMC	86 8		Bulbs not replaced and wastage of energy and bulbs	CUSIP	Community approach CUSIP for bulbs and switches but none supplied	Some households make illegal connections, no switches are provided for lights, bulbs are on all the time andpoles are inadequate.
Solid waste management	Garbage bins	CMC	Not used (two out of three are damaged)			CUSIP, CMC		People approach the municipality, but no action is taken, and people prefer to dispose of rubbish in the canal.

Table B2.45 Operation and maintenance in Chhatra Bazar (continued)

Service	Item	Constructed by (in one year)	Used by households	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Community buildings	Pukka (1) Kacha (1) Temple (3) Plantation (1)		86 1 86 86	Community Community Community Community	White washing the building	Community Community Community Community	People white wash the building regularly	
Community assets	Fan ceiling (1) Plastic chairs (2) Wooden table(1) Water filter (1) Cupboard Carom board Ludu, chess Videocon BW TV (1) Dari (1)							
Flood protection			12			Municipality, CUSIP, LWS		Not all families have access to flood protection and the flood protection is not maintained.

Table B2.46 Operation and maintenance in Khannagar Slum

Service	Item	Constructed by (in the year)	Used by households	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Water supply	Tube well (1)	Municipality	None	Municipality, CUSIP, community	None – unsafe drinking water	Municipality, CUSIP, LWS, community		Community approached but no action taken.
	Individual household water connections 14	Community	14					
	Standposts (2)	CUSIP	40	Municipality, CUSIP	Community/ municipality replaced taps	Municipality, community	Community repair	
	Open well (3)	Municipality and community	42	Municipality, CUSIP, community	Irregular use of bleaching for water	Municipality, CUSIP	Irregular use of bleaching by community	

Table B2.46 Operation and maintenance in Khannagar Slum (continued)

Service	Item	Constructed by (in one year)	Used by households	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Sanitation	Individual latrines (37)	LWS	32					Used for sleeping, in keeping and storing firewood, etc.
	Shared latrines	CUSIP	8		Not cleaned after use	CUSIP		Community informed DFID but no action taken .
Drainage	Open drains	Municipality		Municipality	Irregular spraying of oil and irregular cleaning	Municipality, CUSIP, LWS		
Paving	BT roads (1) CC roads (2) *Kacha* roads	Municipality CUSIP	32 25 37	Municipality, CUSIP, Community	Irregular cleaning of roads and *kacha* road is damaged	Municipality, CUSIP, Community		Community members approached municipality.

Table B2.46 Operation and maintenance in Khannagar Slum (continued)

Service	Item	Constructed by (in one year)	Used by households	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	
Lighting	Light post (18) Individual electricity connection (90)	GRIDCO 5	35	Municipality, electricity line man	Bulbs not replaced regularly	Municipality		Community members approached Municipality
Solid waste management	Garbage bins	LWS and PMU	50	Municipality and community	Irregular disposal of rubbish	Municipality and community	Community dispose of rubbish by burning	Not available for 27 families
Community buildings	Pucca building Temple	LWS	All	Custodian	White washing, regular cleaning	Custodian		Communities informed municipality of problems with bins.

Table B2.47 Operation and maintenance in Mudradakhan Patna and Samadhi Slum

Service	Item	Constructed by (in oneyear)	Used by households	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Water supply	Tube well (13)	CMC 11 Community – 2	390	CMC, LWS, CUSIP	None – four tube wells are defunct	CMC, LWS, CUSIP		Community approached CMC through their councillor but no action has been taken.
	Individual household water connections (115)	Private households	103					
	Standposts (14)	CMC	231	Municipality	No taps on standposts because they are stolen very often	CMC	Community repair	
	Pond (5)	Community	62	CMC, LWS, Community		Youth Club members approached the CMC to renovate the pond		
	Open well (47)	Municipality and community	206	CMC, community	Irregular use of bleaching for water	CMC	Community renovate the well once a year	Open wells have no cover and have a damaged base. Community approached the CMC.

Table B2.47 Operation and maintenance in Mudradakhan Patna and Samadhi Slum (continued)

Service	Item	Constructed by (in one year)	Used by households	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Sanitation	Individual latrines (141)	CMC	181	Household		CMC LWS		Latrines were built without roof or walls.
	Shared latrines	CMC	214	CMC	Cleaned by sweeper and users	CMC, sweeper and users		Women face problems using the community latrine. Shared latrine was constructed on an open drain.The latrine is not private.There is inadequate water supply to latrines and no adequate O&M.
Drainage	Open drains (16) Household Link drain (23) *Kacha* drain (13)	CMC	281	CMC	Irregular spraying of oil and irregular cleaning	CMC	People approach CMC for help	Inadequate drainage creates unsanitary conditions and people dump rubbish into the drains.

Table B2.47 Operation and maintenance in Mudradakhan Patna and Samadhi Slum (continued)

Service	Item	Constructed by (in one year)	Used by households	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Paving	BT roads (5) CC roads (17) M. roads	CMC Community	All	CMC	Irregular repair of roads	CMC		
Lighting	Light post (43) Individual electricity connection (172)	Electricity Board	172 Legal connections	CMC and GRIDCO	Bulbs not replaced regularly	Municipality		Community members approached municipality.
Solid waste management	Garbage bins (6)	LWS-3 CMC-3	All bins are damaged	CMC	Irregular cleaning of bins	CMC	People burn own rubbish or approach CMC for help	
Community building	Yubak Sangha 1 Mahila Samiti 1 Temple 5 School Buildings 2 Gita Bhawan 1 Dispensary 1	Municipality LWS Community CMC Community Donated	All All All All All All	CMC				

Table B2.47 Operation and maintenance in Mudradakhan Patna and Samadhi Slum (continued)

Service	Item	Constructed by (in one year)	Used by households	Maintained by	Maintenance work done so far	Responsibility as perceived by the community	Community contribution	Remarks
Solid waste management	Garbage bins	LWS and PMU	50	Municipality and community	Irregular disposal of rubbish	Municipality and community	Community dispose of rubbish by burning	Not available for 27 families. Communities have informed municipality of problems with bins.
Community buildings	Pukka building Temple	LWS	All	Custodian	White washing, regular cleaning	Custodian		

Table B2.48 Community perceptions in Kadam Rassol

	Open well	Tube well	Standpost	Shared Latrines	Drainage	Pond	Paving	Lighting	Solid waste management	Community building
Problems	No base Uncovered Irregular cleaning and use of bleach Insufficient water during summer	Base broken Unsafe drinking water Contamina-tion	Base broken Obsolete pipelines Silting Taps damaged	Insufficient water for cleaning Latrines empty into a main drain No community latrine	Clogging and silting in drains Drains clogged by rubbish and open defection	Contaminated and not cleaned	Irregular cleaning of roads	Kacha Road not electrified	No dustbins, garbage piled in roads and drains	Primary schools and AWC not maintained
Responsibility	Community, CMC, CUSIP					CMC, CUSIP	CMC, CUSIP	CMC, GRIDCO	CMC, community	CUSIP and concerned dpt
Evidence of facilities cared for	Renovated by households and bleached	Minor repairs done by community	Disrupted connection joined and repaired locally by residents	Individually maintained	Nil	Renovated once by community with the support of a councillor	Nil	Nil	Nil	Area kept clean by residents due to religious importance. Effective functioning of Management Committee of Kadam Rasool.

Table B2.48 Community perceptions in Kadam Rassol (continued)

	Open well	Tube well	Standpost	Shared Latrines	Drainage	Pond	Paving	Lighting	Solid waste management	Community building
Evidence of facilities being misused	Nil	Headsets of India Mark II handpumps broken due to misuse Base also destroyed	Taps stolen which causes wastage and low water pressure	Latrines empty into drains	Dumping of garbage by community Open defecation	Lots of people wash and take baths in the pond	Used as base for wood cutting, spice grinding, trunk making Road used for mixing concrete and storing materials	Illegal and un-metered electricity connections through hooks	N/A	Primary school used for meetings because there is no community hall
User mechanisms and approaches used to bring problems to the notice of the CMC	No formal mechanisms exist to redress the community's grievances, even when people approach the local council. Emphasis is placed on the formation of Basic Service User groups and Infrastructure Maintenance Groups									
Potential for promoting increased ownership Mechanisms by which users can become more proactive	The Muslim Women's Welfare Association, which is a education-orientated CBO, should be given added resources to deal with people's complaints about O&M. The people's forum (JANAMANCHA) could be used, together with the local government, to air key issues and possible solutions. Community members should participate in the process of planning, implementation, and monitoring and evaluation of basic infrastructure and O&M services Formation of user groups and community management groups to act as a link between the community and the municipal council/ the service providers.									

Table B2.49 Community perceptions in Pattapol Slum

	Open well	Tube well	Standpost	Shared latrines	Drainage	Paving	Lighting	Solid waste management	Plantation	Community building
Problems	No base Uncovered Irregular cleaning & use of bleach Dirty and contami-nated water	Base broken Not using bleach regularly Misuse by children One tube well is not installed properly – headset has yet to be fixed	No taps which causie water wastage Low pressure Old pipe-lines Standpost water contains iron, dust and silt	Latrines are not cleaned properly and regularly Inadequate number of shared latrines Open defecation	Not cleaned regularly and clogging very often No spraying of anti-mosquito oil Drains are narrow	Irregular cleaning of roads Throwing of garbage onto the roads Road level is higher than house level *Kacha* road gets muddy during rains	Fused bulbs not replaced in time One electric pole is placed in the middle of the road causing inconven-ience for mobility	Garbage bins are not adequate Irregular disposal of garbage by CMC Garbage thrown on the roads and in the drains by community	Out of five plants, three plants are alive	Primary schools and AWC not maintained
Responsibility	Community,	CMC, CUSIP	PHED, CUSIP, CMC	CUSIP, CMC community	CMC, CUSIP	CMC, CUSIP, community	CMC, CUSIP	CMC, CUSIP community	CUSIP, Community	CMG

Table B2.49 Community perceptions in Pattapol Slum (continued)

	Open well	Tube well	Standpost	Shared latrines	Drainage	Paving	Lighting	Solid waste management	Plantation	Community building
Evidence of facilities cared for	Open well renovated	Minor repairs such as bolt replacement done by community	Taps replaced by community in some times	Community is the custodian, occasional cleaning by the sweeper engaged by the community	Nil	CC roads are cleaned by the community	Nil	Nil	Watering the plants, removing grass around the plants, safe guarding, etc.	Regular cleaning, white washing, electricity maintenance, running and managing of Balwadi health centres
Evidence of facilities being misused	Nil	Children playing with tube well	Washing utensils, washing clothes and bathing		Dumping of garbage in the drains by community Open defecation	Storing house-building materials such as sand, bricks on the BT road Used as a playground	Illegal connections through hooks	No	No	No
User mechanisms/ approaches to bring problems to the notice of the CMC	No formal mechanisms exist for redress of community's grievances, even when people approach the local council, CMC, PHED, GRIDCO, CUSIP									

Table B2.49 Community perceptions in Pattapol Slum (continued)

	Open well	Tube well	Standpost	Shared latrines	Drainage	Paving	Lighting	Solid waste management	Plantation	Community building
Potential for promoting increased ownership	Formation of a people's forum in the slum to meet with people from CMC and government to bridge the gap between people and institutions. The Community Management Group should also be more empowered									
Mechanisms by which users can become more pro-active	Training, awareness and orientation, etc.									

Table B2.50 Community perceptions in Chhatra Bazaar

	Tube well standpost	Share latrines	Drainage	Flood protection	Paving	Lighting	Solid waste management	Community plantation	Community building
Problems	Irregular repair of base	Not regularly cleaned by sweeper No regular cleaning of soak pit	Clogging and silting Irregular use of bleach powder and anti-mosquito oil Pollution of canal	Overflow of canal water causing damage to houses located in low-lying areas of the canal	Kacha road becomes muddy and unusable during rains	Street lights remain lit all day – switch board not provided by CUSIP, bulb fuses wasted	Lack of awareness and proper use of dustbins. The general practice is to throw garbage into the canal	Cows and buffaloes are destroying plantation due to lack of fencing	
Responsibility	All the above are the responsibility of CUSIP during preliminary phase work								
Evidence of facilities cared for	Minor repairs such as bolt replacement done by community Fixing up of brass tap and marble tiles on base walls	Community engaged one sweeper for cleaning on monthly basis, paying Rs.300	Nil	Nil	Nil	Nil	Nil	Watering the plants	Daily cleaning of the floor, white washing once a year

Table B2.50 Community perceptions in Chhatra Bazaar (continued)

	Tube well standpost	Share latrines	Drainage	Flood protection	Paving	Lighting	Solid waste management	Community plantation	Community building
Evidence of facilities being misused					Used for cutting wood, selling fish, rag picking, breaking glass				
Mechanisms to approach the city institutions	Community often approaches CUSIP to solve problems, but CUSIP is not providing the support that community members expect								
Potential for promoting ownership	Proactive involvement of CMG								
Mechanisms to help users	Special efforts should be made to make slum dwellers aware of O&M issues CUSIP should establish a special monitoring cell to evaluate the process of maintenance of community assets and provide an award for exemplary achievement								

Table B2.51 Community perceptions in Khannagar

	Open well	Tube well	Standpost	Shared latrines	Drainage	Paving	Lighting	Solid waste management	Community building
Problems	Contaminated water, no base, irregular use of bleach, well uncovered, Insufficient water in summer and contamination from drains	Unsafe drinking water	Theft of water	Not regularly cleaned Insufficient water to the latrine No functional water tanks Insufficient latrines	Clogging and silting and soil erosion in pukka and *kacha* drains Irregular cleaning, use of bleach powder and anti-mosquito oil	Irregular cleaning of roads, hardly once or twice a week, garbage collects in low-lying areas and drains. Kacha road is damaged in rainy season	Fuse bulbs are not replaced in time No street lighting and electric connection	Garbage bins are not adequate No garbage bins in some clusters Irregular disposal of garbage by community	No
Responsibility	Community, municipality, LWS, CUSIP			PMU, community, municipality, LWS		CUSIP, community, municipality,	Municipality,	CMC community municipality,	Mahila Samiti

Table B2.51 Community perceptions in Khannagar (continued)

	Open well	Tube well	Standpost	Shared latrines	Drainage	Paving	Lighting	Solid waste management	Community building
Evidence of facilities cared for	Minor repairs Use of bleach Open well renovated once in a year			Shared latrine is operated by custodian in the community	*Kacha* drain is cleaned by community, once or twice a month, removing flood water by community	Partial cleaning by community, especially at the front of their houses	Nil	Garbage put in concrete bin and burnt by the community	Cleaning, whitewashing, electricity, maintenance inside the community building etc.
Evidence of facilities being misused		Defunct	Wastage of potable water due to missing taps	Individual latrines used for goat keeping, fire wood store etc	Dumping of rubbish	Storing house building materials and as a base for cutting firewood, sleeping, sitting, washing clothes and grinding spices	Illegal connections	No	No

Table B2.51 Community perceptions in Khannagar (continued)

	Open well	Tube well	Standpost	Shared latrines	Drainage	Paving	Lighting	Solid waste management	Community building
Mechanisms to approach the city institutions	No formal mechanisms exist to redress grievances but community members very often approach city institutions like PHED, CUSIP, Electricity Board								
Potential for promoting ownership	Setting up of a people's forum, officers and representatives of local government should be invited to bridge the gap between institutions and residents								
Mechanisms to help users	Community representatives need to be involved in planning, execution and maintenance of the basic service Common agreement on the maintenance of basic facilities, orientation given to users and functionaries, user management of community assets, with help from providers								

Table B2.52 Community perceptions in Mudradakhan Patna and Samadhi Slum

	Open well	Tube well	Standpost	Pond	Shared latrines	Community latrines	Drainage	Paving	Lighting	Solid waste management	Community building
Problems	Dirty polluted water No cover	Damaged base Defunct	Damaged base No tap	Dirty contami-nated water Irregular renovation	Installation of latrines on the open drains near the roads	Inadequate water supply, irregular cleaning, overhead tank is not sufficient to cater to needs, irregular replacement of motor pumps and bulbs	Clogging and silting Not linked to the city drain Irregular use of bleach powder and anti-mosquito oil Pollution of canal	Damaged BT and CC roads Kucha roads difficult to cross in the rains	Irregular replace-ment of bulbs Street lights are not provided in lanes	Irregular cleaning of garbage bins Inadequate bins Garbage dumped	Damaged school building
Responsibility	Community	CMC	CMC	Community/ CMC	CMC	CMC	CMC	CMC	GRIDCO and CMC	CMC	CMC
Evidence of facilities cared for	Renovated once or twice a year	Occasional minor repairs		Occasional renovation	Construction of boundary wall	Occasional replacement of bulbs and minor repair of pump	Nil	CC roads are cleaned by community	Nil	Nil	Club house temple and Gita Bhawan are looked after by community

Table B2.52 Community perceptions in Mudradakhan Patna and Samadhi Slum (continued)

	Open well	Tube well	Standpost	Pond	Shared latrines	Community latrines	Drainage	Paving	Lighting	Solid waste management	Community building
Evidence of facilities being misused		One tube well taken over by a single household	Two standposts plucked out by the community because of conflict over fetching water		Rubbish thrown into the drain Drains are taken to construct latrines over			Storing construction materials on the roads	Bulbs and tube lights stolen		
Mechanisms to approach the city institutions	No formal mechanisms exist to redress grievances but community members very often approach city institutions like PHED, CUSIP, and the Electricity Board										
Potential for promoting ownership	Setting up of a people's forum, officers and representatives of local government should be invited to bridge the gap between institutions and residents Mahila Samiti, Yubak Sangha and Basti Development Committees should be empowered to bring O&M to the attention of city institutions										
Mechanisms to help users	Community representatives need to be involved in planning, execution and maintenance of the basic service Common agreement on the maintenance of basic facilities, orientation given to users and functionaries, user management of community assets, with help from providers										

Section B3

Analysis of the case studies

Technical sustainability

Did the services provided respond to community needs, in general and in terms of their technical specifications?

The aim of this question is to establish to what extent, if any, communities were involved in decisions about what kind of services should be provided, the technical design specifications and the implications in terms of O&M

Sri Lanka

In settlements improved before 1998, communities were involved in the development process, i.e. planning, implementation and maintenance. MHP followed an enabling approach whereby government played the role of facilitator while the homebuilders were given greater freedom to decide on housing options and methods of construction. The MHP had a range of housing options, such as:

- Site and service projects
- Land regularisation
- Common amenities improvement
- Individual housing improvement
- Housing loans for purchase of plots and construction

In most of the programmes, participatory methods were used to identify community needs. In the Bluemendhal Flats the community participation projects included house extensions, individual water and sewer connections and the construction of wastewater drains. The projects were a response to felt needs; active community members wrote letters to relevant institutions, engaged in

discussions with officers and provided funds to lay main water lines. The community also assisted the authorities by contributing their labour. They applied the same procedure for their drainage system and the sewer line for individual bathrooms and toilets; they explained their situation to concerned politicians and obtained funds from the budget of the ward member. The community was also able to offer their expertise in this field as well as their labour.

Residents tended to take the initiative in determining priorities for action and then seek assistance and funding to realise their plans, e.g. to build individual toilets because of the poor condition of communal toilets. Muslim families in Garden No. 211 have built a bathing area close to the common water tap at their own expense in order to have more privacy. The community also constructed temporary drains to connect the wastewater from the common water taps to the nearest canal – this was done on a self-help basis. In Govipolawatta the CPSU recommended that construction of the drainage system should start in areas where there was less flooding. The community disagreed and decided that priority be given to those families who suffer most. Finally, construction began in that part of the settlement. During construction, one family had to demolish a toilet and uproot two coconut trees. At first, some families refused to co-operate until the CDC explained the benefits of the improvements. The community completed construction within six months.

Community Action Planning methodologies promoted concepts of self-help and beneficiary participation in the planning and construction of houses and common amenities in low-income settlements. The establishment of CDCs facilitated this process of community empowerment and community-based practice. In the Kirulapura settlement a Community Action Planning workshop resulted in a micro-plan for settlement improvements. In this case study CDCs identified the locations to install standpipes and they organised cluster groups within the communities to manage and supervise construction work. When solid waste disposal presented a problem in Kirulapura, the CDC lobbied the district engineer of CMC. Plastic bags were provided by the CMC for weekly collection but the bag system was not working well (people found storage a problem). At the request of the community the engineer agreed to provide plastic bins instead, which are brought by the household to the roadside for collection twice a week. This initiative has since been extended to other settlements. In the Bo-Sevana case study added assistance was provided by the local NGO Sevanatha, who simplified technical drawings and prepared guidelines in the local language so that residents could supervise and monitor the construction work. Other examples illustrate how identification of priority issues such as low water pressure leads to

collective action and to the development of a common management plan. The processes that led to these improvements depend on the building up of community organisations, supported by external funding agencies and the involvement of government agencies.

Settlers in Kalingamawtha gave first priority under the Million House Programme to the construction of permanent houses, with properly constructed access roads and proper drainage, since they faced severe problems related to environmental health. The settlers were given to understand that common toilets are a health hazard due to lack of proper maintenance. Thus, when each householder made the plans for their house, space was allocated for individual toilets. People received Rs.1,000 from Unicef to construct individual toilets. The CDC was not greatly involved in the construction of the individual water supply and drainage; the work was carried out by the CMC and the community paid costs directly to them. The CDC also requested that the NHDA build a community centre for common activities. The CDC specified the site; the space selected was in the centre of the settlement, meaning it could serve the entire community equally (also considered were maintenance and security issues). The CDC leaders sketched out the design for the centre (considering requirements for meetings, office space and stores). Technical advice was also given by NHDA and they provided the funds for construction under the Community Contracting System. A construction committee was formed to undertake community contracts (this comprised 12 members with various skills – masons, carpenters, plumbers, and electricians).

In squatter settlements where land ownership was not given, the houses were not upgraded; the occupants are not equipped to ask for the services of municipal council or link up with the service delivery institutions – a difficulty illustrated in Garden No. 211.

Karachi

KWSB control and manage the water and sanitation infrastructure, according to the KWSB Act (1996). However, in *katchi abadis* the responsibility for these services lies with the development agencies. In many cases the sewage systems have been laid by the people themselves, however in the absence of any main sewers or on-site sewage treatment facilities, environmental sanitation is poor.

Infrastructure components in *katchi abadis* have developed in a rather haphazard fashion. Water mains, sanitation lines, roads, lanes, streets, etc., are generally constructed below acceptable social and technical standards. The infrastructure works are generally planned, constructed and executed in a process that only

involves the contractor and the concerned government department. The communities have little or no say in the process of estimation, tendering and subsequent implementation.

The priorities of infrastructure services are set according to the availability of funds and according to the perception of need by the government department. Communities are not generally involved as partners in work. However, in Mujahid Colony, local community members mobilised a programme of removing rubbish from houses and constructed a *kundi* to store the rubbish with help from SKAA. Another exception is the work done under the OPP, where people finance, manage and maintain the infrastructure laid down, imunicipality, e.g. in Welfare Colony.

OPP provide social and technical guidance (based on action research principles), tools and supervision. The success of OPP's work is based on overcoming the four barriers to acceptance of the model (psychological, social, economic and technical). The OPP solution (with simplified design, plans and estimates) enables low-income families to construct and maintain an underground sewage system with their own funds and management.

Faisalabad

The Faisalabad Master Plan cannot be implemented due to lack of funds; a major part of the work to be done is in the *katchi abadis*. Almost all the inner city *katchi abadis* and under-serviced areas have WASA trunk sewers adjacent. However, secondary sewers connecting these settlements to WASA trunks do not exist and most laterals are open paved and unpaved drains. The WASA water supply plan will be implemented in 2008, depending on the availability of funds. Many communities have laid sewage systems or water supply distribution systems on a self-help basis or through MNA/MPA programmes. The councillors are only permitted to develop open paved drains, brick paved streets, and street lighting that is funded by grant aid. These developments are therefore haphazard, uncoordinated and substandard. The drains often do not function, water does not reach the extremities of the distribution system and road paving is substandard.

WASA is unable to provide services for all communities. Where services are provided, there is typically no consultation with the communities. There is also some indication that government provided inappropriate services without consultation and possibly with inadequate technical advice (e.g. anti-waterlogging programmes led to handpumps becoming inoperative) that created water and sanitation problems, and exacerbated O&M needs.

The service provider agencies have failed to deliver the services in light of rapid development of unplanned settlements. The Faisalabad Development Authority does not encourage communities to participate in decision-making on policy and implementation. Due to funding constraints work carried out by the FMC is usually haphazard, unco-ordinated and substandard. The work is done in an ad hoc manner and there is no relationship to larger planning considerations.

Some services have been laid by communities on a self-help basis. Community Action Programme is an NGO which acts as a catalyst and support organisation for official, semi-official and CBO work. CAP assists community initiatives and helps low-income urban communities to improve the quality of services. However, WASA is concerned that they may follow poor technical specifications, which will increase later O&M requirements. However, ASB/OPP consulted closely with community representatives in terms of technical specifications. WASA does not take the initiative to involve the community and complains that residents misuse the sewage system, install motor pumps on water connections, make illegal connections and steal manhole covers. Users are reluctant to pay service charges because they are not satisfied with the level and quality of service they receive.

Cuttack

The project aims to balance prescription and choice through offering communities a choice of cost-effective technical off-the-shelf options. The Project Management Unit prepares the standard designs, from which they will produce guideline designs with visual materials. In CAP the in-slum community may opt for a combination which best meets its needs. The communities have the choice of:

- The full package or part of it
- Location of facilities
- Standard of design or level of service, e.g. communal water points may also have bathing area, storage facilities
- Trading off higher standards in one component against lower standards in another within the overall budget and restrictions imposed by government norms

Communities may choose higher standards of service than costed in their budget if they meet additional costs themselves. The maintenance implications of each option are also explained to communities while they are preparing CAPs. The norms for provision of infrastructure were kept flexible except where national

standards are set by the Government of India. The sanitation options presented to communities were limited by the high groundwater table, which made pit latrines a difficult option in areas where shallow wells are in use. In addition the cost of the technically feasibly option of septic tanks makes the cost of individual options very high. Community or shared latrines were therefore promoted.

High priority was placed on the active participation by men and women in representative community-based groups to develop infrastructure; all social groups within the selected slums were involved in community action planning and the particularly marginalised were involved in vulnerable group planning. Vulnerable Group Programmes (VGP) are also intended to reduce poverty and women's practical gender needs were met under VPG and CAP.

Examples of good community-based initiatives in O&M do exist, most prominently in Chhatra Bazaar, the most highly mobilised of the communities studied. Elsewhere, relatively simple problems such as blocked drains are widespread, with no action by residents. Some community groups pay directly for services such as cleaning.

User perception surveys showed a variable level of satisfaction with a surprisingly wide range of responses and problems in the improved areas. In unimproved slums it is difficult to disaggregate inadequate provision of facilities from poor O&M. Formal O&M activities by the statutory authorities in the areas studied are patchy. Instances of community members making requests are quite widespread but with little evidence of successful outcomes. A wide range of problems emerged in the areas studied; there were few problems in Chhatra Bazaar, where the levels of satisfaction were high, but in Kadam Rasool, the serious lack of facilities combined with O&M issues to create low levels of satisfaction. The remaining slums exhibiting varying degrees of satisfaction with facilities improved under the preliminary phase of CUSIP. Some of this dissatisfaction can be linked to a lack of O&M of services provided much earlier. CUSIP is augmenting the services already there, e.g. replacing old standposts in Pattaopol or improving very low water pressure in the distribution system.

What level of technical expertise was required for different levels of O&M?

Sri Lanka

In general, minor repairs appear to be dealt with by communities on an ad hoc basis. Families are responsible for the maintenance of household latrines and water connections/taps and for the repair of 3" and 2" lines. Households may also hire skilled people from within the community for small repairs at the individual house level. The formation of construction committees indicates that skills exist within the community. When repairs are needed on main lines for water or sewerage, to empty the septic tanks, dispose of solid waste or maintain the main storm drains, the CDC contacts the district office of the CMC. Overall, the O&M work left to the community is minimal.

- In Bo-Sevana training on O&M was arranged for key community members, family's and individual's responsibilities were publicised, and local CBOs have been organised to carry out O&M in the settlement.
- In Kalingamawatha, each community member sketched out their plans for their house with the guidance of the Housing Officer of NHDA. Each family also designed their own toilet, kitchen and waste outlet, etc.

People in low-income communities tend to consider that maintenance of services is the responsibility of either the municipal council or the concerned service provision institution. O&M of urban services was not a priority issue of the CDC agenda whereas procurement of services was. However, providing training opportunities to youth and women in skills related to O&M would mean they could also be employed.

Karachi

Generally, the OPP model provides both social and technical guidance, and tools and supervision for communities for 'internal' development (i.e. not major works). This suggests that communities also acquire skills for O&M. There are also examples of 'para-architects' trained by OPP now practising in their localities.

The older settlements studied in the Karachi case study the absence of grassroots initiatives for regular O&M of infrastructure; this is compounded by the lack of interest/contractual obligations for contractors/other agencies towards O&M in such areas. Householders and agencies take common action only in case of emergency, i.e. crisis management rather than routine maintenance. For example, when a drain or manhole overflows a private *kundiman*, KWSB or KMC is

approached for help. At the municipal level pumping facilities are normally out of order and due to an absence of maintenance funds, capacity and commitment of local institutions, the roads are not maintained on a routine basis.

Faisalabad

Sewer men tend to have the expertise to conduct O&M, but usually lack resources to do all work. Normal routine includes desilting sewerage lines, removing blockages in sewer systems, placing covers over open manholes and preventing overflows. Officers at WASA plan for desilting of sewer lines and channels on a monthly basis. Most sanitary workers carry out desilting according to the schedule but sometimes it is not followed (50% of the time according to CBOs). Choking of the WASA trunks adversely affects the functioning of community-built sewers, in some cases communities contribute towards the cost of hiring a sweeper to clear the WASA line. Other NGO/CBO systems have a regular maintenance schedule.

Some of the activity under the umbrella of O&M is more about adjusting community behaviour to prevent blockages in sewers, but WASA officers usually lack the resources to engage in public education and awareness activities. Communities can assist in O&M by not dumping rubbish/solid waste into the sewage system. It is felt that some NGOs do this kind of awareness promotion effectively.

The OPP model adopted by the NGO ASB provides both social and technical guidance, and tools and supervision for communities for 'internal' development (i.e. not major works), which suggests that communities also acquire skills for O&M.

Cuttack

The CkMC and PHED have considerable unskilled resources at their disposal, e.g. drain coolies and sweepers. However, there is not much evidence of formal O&M activities by either CkMC or PHED in the study areas. As such, O&M depends upon how matters are managed by the ward councillor. The presence of sweepers is linked to the existence of established beats which CkMC sweepers are allocated; these may have been extended into slum areas, depending on the ward councillor. Attention under CUSIP was given to developing a maintenance strategy for CkMC and strengthening existing capacity for O&M. CkMC is required to make provision for a specific budget line for O&M. A training specialist was also used to identify training needs, design training programmes and supervise implementation. The objectives of the training which are to develop and strengthen participatory approaches, improve skills and knowledge of

the project area, low-cost building techniques, gender awareness and legal literacy. Completed infrastructure work was handed over to CkMC in a phased manner, as CkMC staff are being trained and a 'maintenance culture' is developed.

Memoranda of Understanding is detailing the type of O&M to be carried out by community are included in individual CAPs. Urban Poverty Office (UPO) will not approve CAP unless MoUs are agreed and signed by CMG. There are a number of examples of good local community-based initiatives in relationship to O&M that indicate both the wide range of activities which can be undertaken and the degree of ownership and care.

Where they exist, community halls and temples are well cared for. O&M activities include:

Water supply	Tap replacement, leak reports, minor repairs, fault report
Sanitation	Daily cleaning, pit emptying
Drainage	Regular sweeping/cleaning in front of the house
Access/paving	Minor hole patching, defect reports
Lighting	Defect reports
Solid waste	Collect and deposit household waste and road sweeping
Community hall	Management, cleaning, repair

In Chhatra Bazaar there is strong evidence that individuals and communities are caring for facilities. Community members approached the LWS to repair tube wells; they also provided help in the form of labour and a little finance. Community members received training from CUSIP for minor repair of tube wells. In the community, sweepers are hired to clean the common latrines with phenyl, clean soak pits, and spray anti-mosquito oil, for which they are paid Rs.300/month, which is collected from households. However, there is a problem with the cleaning of toilets. This is a result of there being a communal latrine block for the whole settlement, which is heavily used. Even with a sweeper coming once or twice a day, it is not sufficient to keep the area clean. The community also performs irregular cleaning of the drains, spraying of anti-malaria oil, plastering the base and using bleaching powder. Minor repairs and sweeping of the CC and BT roads is also performed by community members in addition to the maintenance of the plantation and the community buildings. Yet drain cleaning is an example of a simple task where there is a marked lack of action by residents.

Were the necessary skills and resources available to carry out the O&M by the various parties responsible?

Sri Lanka

Municipal workers are supposed to be the key people responsible for carrying out O&M, but they lack knowledge of how systems work, and their activities can therefore exacerbate O&M requirements. For example, municipal workers who operate gally emptiers do not know the purpose of a filter bed's stones in community septic tanks, and so they tend to remove the stones.

The levels of support and acceptability of community members to O&M of services has been raised in settlements. In some of the cases, for certain services, community members received training to carry out O&M. In the example of Bo-Sevana, the NGO, SEVANATHA, provided training for key community members in sewerage O&M. Women's participation in CDCs and CBOs has also increased opportunities for their active involvement in O&M activities, e.g. in Bo-Sevana 85% of women are involved in the Women's Bank and Govipolawatta settlements. In the case studies, there is evidence that skilled people were present in the

Table B3.1 Operation and maintenance and necessary skills in Colombo

	Water	Sanitation	Drainage
Level (household/ community/ local government)	Household – connections Municipality – mains	Cleaning of the common toilet and small maintenance work	Interior drain – HH Main drain – CMC
Type of O&M (occasional/regular/ at user end/at supply end)	Occasional	Roster-based cleaning Emptying of septic tank	Occasional
Level of expertise for each type of O&M	Minimal	Minimal for small repairs only	Communities mostly involved in cleaning
Necessary skills?	Obtain services of skilled persons	Tips paid to CMC workers tends to get a more reliable job	Obtain services of skilled person for small repair works

communities when more elaborate repairs were needed. Community-evolved O&M systems do exist in different settlements on different issues; it can also be used as an income-generating activity. However, in general there is no CMC policy for community-based operation and maintenance.

Karachi

It is said residents are becoming less dependent on OPP for advice and technical guidance, having acquired the necessary skills and expertise themselves.

Table B3.2 Operation and maintenance and necessary skills in Karachi

	Water	Sanitation	Solid waste collection etc
Level (household/ community/local government)	Municipality responsible for main lines and pumping stations. Households responsible for internal infrastructure and lane lines	Communities tend to take responsibility for internal lanes/households connections. Lack of O&M at municipal level	Mostly at household level – people throw waste into lanes or hire private sweepers
Type of O&M (occasional/regular/ at user end/at supply end)	Occasional crisis management	Occasional/crisis management	Occasional examples of construction/emptying of *kundi* by municipalities
Level of expertise for each type of O&M	Municipality has trained staff for O&M – foremen, valve operators, etc.	Pool money to pay for repairs or if have technical advise can do work themselves	None
Necessary skills?	Repair of water mains, leakages in lines, defects in pumps, mixing of water and sewage, valve operation	Unblocking sewage lines, replacement of manhole covers, etc.	None

Cuttack

CkMC and PHED have a large, but unskilled labour force, and it is not clear how effectively they carry out O&M tasks. Residents have received some training from CUSIP to undertake minor repair works for the water supply (e.g. for tube well and standpost repairs), yet there is relatively little documented experience of commonly managed O&M in Cuttack. Some residents are paying for operational services such as latrine cleaning. The example of the community latrine in

Table B3.3 Operation and maintenance and necessary skills in Cuttack

	Water	Sanitation	Solid waste collection etc
Level (household/ community/local government)	Orissa State Public Health Engineering Dept. (PHED)	Cuttack Municipal Corporation (CkMC) PHED	
Type of O&M (occasional/regular/ at user end/at supply end)	Reticulated water supply & operation of deep tube wells	CkMC - Public toilets PHED – Operation of sewerage	
Level of expertise for each type of O&M	142 Staff	CkMC Sweepers	CkMC Sweepers
Necessary skills?	Community training for replacement of hand pump washers/minor repairs and standpost repairs. Tiling of aprons. Cleaning of wells/ponds, tube well repairs and tap replacement.	Household contributions for latrine sweepers and minor repairs to latrines	Community road sweeping in front of houses, drain cleaning in front of house

Chhatra Bazaar shows that considerable effort is required; the input from the part time cleaner hired by the CMG for Rs.300 per month is perceived to be inadequate. Some of the most important routine tasks are extremely simple, for example daily cleaning of shared latrines, sweeping and cleaning of roads and periodic cleaning out of surface drains. The problem is motivating people to perform them.

Faisalabad

In the WASA budget for operation and maintenance of water and sanitation, Rs.3,300 (million) is allocated for O&M of the water system, with an actual spend of Rs.1,742. For the sewerage system Rs.10.2 (million) is allocated but only Rs.6,679 (million) was spent in 1994. An NGO, ASB, asked WaterAid to fund a maintenance unit for its community-managed sewage systems. This included a desludging pump, a safety kit (diver's suit and mask) and funding for two

Table B3.4 Operation and maintenance and necessary skills in Faisalabad

	Water	Sanitation	Solid waste collection etc
Level (household/ community/local government)	Utility Half of the population have no piped water; most *katchi abadi*s have handpumps that are later converted to piston pumps.	Utility One third of the population have access to sewerage	Local government
Type of O&M (occasional/regular/ at user end/at supply end)	Occasional user end maintenance	No preventative maintenance. In some cases where sewerage is laid on a self-help basis, systems need constant maintenance	Regular garbage collection (when paid by residents informally). FMC only collects 30% of Faisalabad's rubbish
Level of expertise for each type of O&M	Under trained staff; "I have not taken any training that's helpful to O&M"	Staff not trained in latest knowledge, skills and attitudes. Plans made by sub-engineers with O&M performed by sewer men	Sweepers are paid at Rs.15-20/household/ month to keep the streets clean and collect waste but there are no disposal points
Necessary skills?	Replacement of defective distribution lines Rehabilitation of existing tube wells Pump station and chlorination buildings Well monitoring Repair of special valves Anti water-logging	Tasks involved are desilting the lines, removing of blockages and placing covers on manholes	

sweepers for manual labour. The kit is now available to any community with a sewage committee. WASA sewers serving community-built sewage systems have been desilting at three locations so far. ASB intends to charge Rs.200/hour for service, and this is what a third of communities spend at present. ASB also has requests for de-watering open plots used as sewage disposal.

Institutional sustainability

At what stages were communities involved in service provision (from identification through to monitoring and evaluation)?

Sri Lanka

Table B3.5 Sri Lanka – stages of community involvement

	Identification	Financing	Planning	Design	Construction	Management	Maintenance	Monitoring
Information dissemination		Service providers tend to finance works						
Consultation								
Collaboration	Communities participate through CDCs and NHDA (and sometimes NGOs)	Community collected funds to cover costs of land regularisation Loans from NHDA	Communities participate through CAP methodology, and participate in house surveys and workshops on building guidelines	Communities participate through CAP methodology (e.g. identified location for works). In Bo-Sevana, NGO Sevanatha simplified technical drawings so residents could monitor works.	Communities contribute skilled and unskilled labour for works such as standpipes and drains. The Community Contracting System operates in collaboration with authorities.	CDC/ communities trained to oversee project implementation, Sevanatha strengthened CDC and communitiy's managerial and mobilisation roles	For low-level O&M, cluster groups responsible for collecting money and hiring local skilled labourer to carry out O&M. For larger repairs, CDCs pressurise municipality to respond.	
Empowerment	Requests for development from active community leaders of settlements	Own available funds, labour and materials for inner lines		From workshops able to design own houses, decisions regarding toilets and standposts	Where land ownership is not secured independent initiatives are taken, e.g. Garden No. 211.	Typically, cluster groups formed by CDCs to manage and supervise construction		CDCs and communities

Karachi

Table B3.6 Karachi – stages of community involvement

	Identification	Financing	Planning	Design	Construction	Management	Maintenance	Monitoring
Information dissemination	KWSB/PHED/ KDA/SKAA	KWSB, World Bank, councillor's funds,	Plans can not be implemented due to lack of funds. Only immediate needs are addressed. No procedures for O&M are carried out on a routine basis	KWSB designs	Contractors	Management procedures appear to be weak and corruption is a problem especially with contractors	Crisis maintenance followed	Monitoring and supervision of contractors is not generally carried out. In addition municipality sweepers bypassed low-income communities without fear of reprimand
Consultation								
Collaboration	Communities/ SKAA/ OPP – Welfare Colony, Mujahid Colony, Mansoor Nagar	Communities finance internal developments – e.g. lane lines and household connections	OPP and SKAA in 'teacher and advisor' role	OPP and SKAA did the survey and design	Community lay out the water line. OPP provides technical advice	OPP/ SKAA plays key role		
Empowerment	Ittehad community built Awami tanks to store and distribute water	Community contributions	Community leaders	Traditional method of storing water	Community volunteers	Community institution (e.g.mosque)/ KWSB managed system	Community	Community

Faisalabad

Table B3.7 Faisalabad – stages of community involvement

	Identification	Financing	Planning	Design	Construction	Management	Maintenance	Monitoring
Information dissemination	WASA has a list of new areas to be served with water supply when funds permit	WASA is a dept of the FDA and the main source of revenue is water and sewerage charges	Faisalabad's Master Plan cannot be implemented due to lack of funds. Only immediate needs are addressed. Desilting of sewer lines is planned on a monthly basis by the sub engineer – there are no other plans	WASA designs	WASA contractors	WASA record-keeping is very poor; there is no up-to-date records of consumers data, inefficient billing, corruption and weak management structure	WASA responds to emergencies	Complaints dealt with on a daily basis, but individuals have to complain many times to get complaints dealt with. NGO/CBO can put more pressure
Consultation	Two community representatives identified by ASB consulted with some community members							
Collaboration			WSC liased with WASA. ASB only 'teacher and advisor' role	ASB did water design, but community WSC choice of 4" pipe connections prevailed over WASA	Community lay out the water line. ASB provides technical advice	WSC keeps key role		

Table B3.7 Faisalabad – stages of community involvement (continued)

	Identification	Financing	Planning	Design	Construction	Management	Maintenance	Moniroring
Empowerment		Newly formed Water Supply Committee (WSC) responsi-ble for collecting money and accounts. Credit pro-gramme to enable residents to pay for works		Generally, OPP model makes communities fully aware of costs and benefits of different design options, so that they can make informed choices.			ASB set up a pilot Maintenance Unit, and will in future charge WSCs for usage	

Cuttack

Table 3.8 Cuttack – stages of community involvement

	Identification	Financing	Planning	Design	Construction	Management	Maintenance	Monitoring
Information dissemination	Project area defined by CUSIP							
Consultation		DFID funding; communities could get a higher level of service than budgeted for if community paid the difference		PMU undertakes an engineering study of slum; options are presented to slum dwellers. CMG decides on design package. PMU prepares detailed design		PMU and UPO engineers monitor quality and progress of community/ CMC/ PMU/ specialist agency or contractor		
Collaboration			CAP & VGP involvement in needs identification, gender awareness skills inventories and skills development in anticipation of work		Opportunity for community contracting, CMG asks if wishes to undertake appropriate works, based on skills		Responsibility divided between community and CkMC	CUSIP and communities/CMGs
Empowerment								

What structures and mechanisms were in place that promoted greater or lesser community participation?

Sri Lanka

Community Development Councils (CDCs) were a key structure in the procurement of services and management of O&M. These were formed under the guidance of government agencies from the 1970s until recently. Generally, these CDCs are an institutionalised body and fairly representative of communities (e.g. they are under the direction of the Public Health Department; they have a constitution specifying their powers and functions and members are selected through general meetings in the community). In some cases, NGOs also played a role in strengthening and facilitating the CDCs (e.g. SCF in Kirulapura). A Sevanatha consultation document (February 1999) points out that social heterogeneity (divisions based on race, religion and political affiliation) limits the ability of CBOs to represent and encourage greater community participation. However, CDCs are not linked to ward/district or citywide city structures and their influence has been declining since a national level political change in 1995. There are also smaller numbers of CBOs formed under the guidance of NGOs or as spontaneous initiatives by the people, including Women's Banks. However, they tend to represent only a very small minority of the population. In the Bluemendhal Flats and Garden No. 211 examples, where the communities formed a group to obtain improved services.

Karachi

OPP played a key role in facilitating community participation in service provision. Orangi has an existing tradition of informal self-help networks. OPP was able to draw upon the tradition of self-help, if not the actual network groups, because these groups used to engage in lobbying activities rather than construction.

Faisalabad

The WASA case study describes the "usual" government system of O&M i.e. a purely reactive system. There are local complaints sections in 18 city localities and people report their complaints when a service is not working or has a fault. However, WASA cannot respond to all the complaints, and priority is given to those from NGOs/CBOs or with political backing.

Various NGOs/CBOs have developed systems for providing services and O&M. ASB/OPP played a key role in facilitating their water and sanitation project. They worked with a few community representatives to set up a Water Supply Committee (WSC), rather than working with existing community structures. The WSC

was not representative of all community interests, and ultimately undermined the participation of the broader community. However, ASB/OPP played an important role in resolving problems and conflicts, through mediation between the communities and WASA/MPA. The key strength of ASB may lie in its leader, which suggests that the "ASB service delivery model" is not easily either sustainable or replicable elsewhere.

WASA – community linkages are weak and it was stated that staff behave in an autocratic way and are not co-operative. WASA does not hold any planned public meetings (some casual meetings are held with public representatives on current issues). "I do not recommend too much frequent meetings as these would overload WASA. A mother gives milk to a child when he weeps". Scarcity of funds, WASA staff attitudes and lack of staff training all contribute to the lack of beneficiary participation in water and sanitation projects.

However, WASA officers gave an example of community participation in the development of a park. The community approached WASA for assistance and agreed to construct a boundary wall, grill and tube wells, with WASA's technical expertise, and to provide plants and staff for park development. Some officers were not in favour of the community providing services – self-help systems have many disadvantages in their opinion (others thought it was a good idea if supervised by WASA).

Cuttack

The CUSIP Consumer Perceptions study mentions a number of CBOs, e.g. in Kadam Rasool there is mention of a Basic Services Users' Group, Infrastructure Maintenance Groups and Muslim Women's Welfare Association; in Pattapol Muslim Sahi and Chhatra Bazaar there exist Community Management Groups; in Khannagar an organisation called Mahila Samiti has been formed by women and the Basti Development Committee; and in Muradakhan Patna and Samadhi Patni there exists Mahila Samiti, Yubak Sangha and Basti Development Committee.

However, misuse and lack of care of facilities is a problem (blocked drains due to indiscriminate dumping of solid waste, children defecating in open drains, illegal power connections, latrines not being used and misappropriation of hand pumps).

What methods and tools were used to encourage greater participation?

Sri Lanka

Urban housing programmes recognised the need for improvement of urban low-income settlements. SSP promoted the concept of self-help and the linkage between communities and officials of formal sector institutions. CDCs implemented the project activities and co-ordinated at the settlement level with the community's support; they also supervised construction work and resolved conflicts as well as taking an ongoing role in resolving conflicts.

All the case studies drew upon the Community Action Planning methodology, based on a people-centred approach to development. Guidelines, procedures and forms were developed for communities on a range of topics to assist them in the planning process, from identification of priorities through to monitoring and evaluation. The role of the NGO SEVANATHA in data collection, preparation of initial documents, and relevant training facilitated the process in some communities and with other partners, as did consultative workshops used to identify problems with individual benefits at the household level. Most projects had the ethos of internal and external development – that the users could and should develop and maintain household and lane level infrastructure at their own expense. The government is therefore responsible for secondary and primary services. Community meetings and workshops were held to strengthen community support of CDCs, in addition to exchange visits to study community construction activities, training on Community Contracting Systems and training on the building guidelines. Attention was paid to community mobilisation, and the training of community leaders and weekly progress reviews were held in some settlements. Both the NHDA and CDCs received training in the methodology. However, it was stated that training and support with municipal health wardens to promote more favourable attitudes towards participatory development would reinforce CDC and community participation.

Karachi

The OPP approach involved providing the necessary tools, methods and guidance for communities to address four 'barriers': psychological, social, economic and technical. Meetings were held with residents to create consensus, settle disputes, collect individual contributions and supervise work.

Faisalabad

Discussions with sewer workers, WASA officials and NGOs were used to establish what makes a good O&M system. These provided useful indicators, with sewer workers focusing on the necessary resources for them to carry out technical repairs, WASA focusing particularly on weak cost recovery systems, while the NGOs focused on the institutional framework (i.e. the role of communities and WASA in ensuring functioning O&M). The discussions also highlighted a number of ways to achieve greater participation; frequent public meetings, community suggestions, increased public awareness (pamphlets, posters, sign-boards, slogans, newspapers, radio, TV, workshops, public representatives, etc.), involvement of CBOs in WASA system and social pressure against illegal users. The ASB/OPP project established a small credit programme principally to establish community trust in services project.

Cuttack

Training and support for the Project Management Unit included poverty awareness training workshop, gender awareness training workshops and PALM and CAP training for inter-sectoral teams (planning procedures, documentation, well-being ranking, problem trees, priority ranking, etc.). Activities include on-the-job training and workshops (disciplines, specific and interdisciplinary covering participation and skills development), and national and overseas study tours.

The senior management in CkMC had training to strengthen programme planning and management skills, and monitoring and analytical skills, and to improve knowledge and understanding of current urban planning and the upgrading of skills for O&M of assets. Efforts were also made to improve their skills and awareness related to community management, community partnering and community contracting, financial services, health and environmental health, and skills in the micro-planning processes.

Visits were made to slums by intersectoral teams, to make contact with residents – through slum walks and informal discussions. There were meetings to introduce projects, to carry out physical and social mapping, to different social groups with specific problems/needs and to form Community Management Groups to identify community priorities. Inventories of skills in community were made which were used during implementation and maintenance. Memoranda of Understanding were also signed between PMU/CkMC and CMGs on the division of roles and responsibilities.

What were the roles and responsibilities of key stakeholders in O&M?

Sri Lanka

The municipality has legal responsibility to provide O&M for all services, although not in squatter settlements. However, the Municipality (CMC) has little control over line agencies, which have powers of decision-making for most services.

Table B3.9 Sri Lanka roles and responsibilities

	Communities	CDCs/other CBOs	Municipality	Service provision organisations
Common toilets	User families organise cleaning and maintenance		Do major repairs, including emptying of septic tanks	
Household water connections	Households carry out maintenance			
Common water taps	User families raise money to get local skilled person to carry out repairs (Kirulapura)	CDCs/local CBOs request assistance from district municipal/ or relevant institution (Garden No. 211)		
Common bathrooms	User families raise money as and when repairs needed (Garden No. 211)	For major maintenance, CDCs negotiate with relevant agencies for 'support' (Garden No. 211)		
Main line water		CDCs (and women's bank in Bo-Sevana) request assistance from district municipal/ or relevant institution		
Stormwater drains	Maintain interior drains		Maintain major drains	

Karachi

Table B3.10 Karachi roles and responsibilities

	Communities	New co-operative units	OPP	Municipality	Service provision organisation
Main drains				DMC/KMC responsible except in *katchi abadis*	KWSB/DMCs/ KMC/KDA
Sewers	Communities hire a sweeper to clean the lines as a preventative measure and play a role in replacing pipes	A lane manager (activist) manages the work.	Assist communities to make an estimate to replace pipes	KWSB except in *katchi abadis*	KWSB/DMCs/ KMC/KDA are responsible for the main sewers and on occasions SKAA/OPP have laid lane lines
Manhole covers	Households located nearest clean and replace broken manhole covers	Activists arrange to buy covers, or obtain shuttering from OPP			

Faisalabad

Table B3.11 Faisalabad roles and responsibilities

	Communities	WASA sewer workers	WASA	ASB	Water supply committee
Water and sewers	Communities respond to emergency and report to authorities	Key role in O&M in sewer system. But are under-resourced, under-paid and suffer health risks	Non-elected, policymaking body. Responsible for running O&M. Perceived as poor management, and susceptible to political interference.	Support community	Support

Cuttack

Departmental reporting systems do not provide any details of the actual performance of staff in carrying out O&M functions. It is suggested that decentralisation has brought about a more transparent system of responsibilities of staff for O&M, and allocation of supplies and resources. This system includes a complaints register and procedures for making requests for work.

Table B3.12 Cuttack roles and responsibilities

	Communities	CBOs/ NGOs	Cuttack Municipal Corporation	Gridco	Orissa state departments
Roads	Minor maintenance work and sweeping of CC and BT roads		Responsible for roads and pathways		Public Works Dept. Responsible for major roads; Irrigation Dept. for roads on department land
Drainage			Responsible for storm and sullage drainage		
Sanitation	Communities engaged a sweeper to clean latrines (but considered insufficient to maintain hygiene)		Responsible for public toilets		
Water	Community involvement in repair of tube wells		Responsible for tube wells		Public Health Engineering Dept. (PHED) responsible for reticulated water supply (renewal and maintenance), and operation of deep tube wells
Sewerage					PHED responsible for operation of sewerage
Power			Responsible for street lighting	Responsible for power supply	

How clearly were roles and responsibilities defined?

Sri Lanka

In the Bluemendhal flats, the first generation of occupants thought that it was the responsibility of the municipality to provide and maintain the common amenities. The second and third generations realised that they had to organise themselves and find ways of improving the services.

The quasi institutionalisation of the CDC structures and the CAP processes suggests that at least informally, roles and responsibilities were quite clearly defined. Municipalities are in charge of access roads, septic tank emptying, main lines and the major work on the end-user end of water and sanitation. Communities were responsible for individual water lines, common and individual toilets, interior drains and community centres. However, there is common reference to CDCs acquiring support from politicians to sponsor works, which suggests that systems may work due to more arbitrary factors.

In Kalingamawatha a construction committee was formed under the purview of the CDC, with a signed agreement with NHDA to complete works within a period of time laid out in agreements. It is believed that a system of community contracts would further promote CBO and community participation.

The role of CDCs is clearly defined; the projects helped communities to first organise into a CDC to discuss problems and find solutions with their participation. CDCs are usually also the primary actor in charge of the maintenance of the community centre and collecting money to finance O&M activities. CDC leaders have played an active role in obtaining the support from municipal councils, members of parliament and NGOs.

Karachi

According to the KWSB Act 1996 the water supply system and the sewage system are controlled and managed by the KWSB. However, in practice management and maintenance is performed by a variety of agencies (since the infrastructure has been laid by different agencies in different settlements). In *katchi abadis*, the responsibilities for water supply remain with the agency related to development work, e.g. SKAA. For sewage systems the DMC and KMC are responsible for the operation and maintenance of stormwater drains where sewerage is discharged. Internal drains of low-income communities have also been laid by a variety of agencies, e.g. the KDA or OPP/SKAA. Although trunk sewers are the responsibility of KWSB, this is not relevant for *katchi abadis*. Again, solid waste management is the responsibility of respective municipal agencies or cantonment

boards, however the case studies highlight an irregular system for rubbish collection. In cases where KWSB has been unable to meet its responsibilities, communities have taken on the role of service provision often with the assistance of OPP/SKAA, after which they are responsible for the O&M of this internal infrastructure.

Faisalabad

It is suggested by WASA that the roles and responsibilities between them and NGOs/CBOs like ASB were not clearly defined, but it appears to be in WASA's interest to promote this in future collaboration. A suggestion that ASB had to bribe WASA officials to get them to agree to connections to the WASA main line depicts a weak relationship between ASB and WASA.

Some NGOs/CBOs perceived that models which co-ordinated activity with WASA-laid systems with planning, sought the technical know-how, used good quality materials and were more replicable/sustainable than those which acted independently. In addition, the case studies suggest that the management of WASA needs to improve planning, implementation and monitoring activities and WASA officers and workers should be adequately trained. The top management of WASA is taken from other departments and changes frequently, which leads to a lack of continuity in WASA's policies and operations.

Some sewer men take on private jobs, and have contracts with private developers and they take monthly wages to work in these areas. Some sewer men worked in private colonies after office hours for Rs.30-40 a day.

Cuttack

Recent changes in the legislation governing CkMC's power and roles following the 74th Constitutional Amendment reinforce this as CkMC now has a legal obligation to safeguard the interests of the poor when addressing economic and social development issues. CkMC's main obligation is to take over responsibility for maintenance of infrastructure created under the project immediately upon completion. Thus, the responsibilities on the part of CkMC are becoming more clearly defined. Attention was given early in the project to developing a maintenance strategy for CkMC and strengthening existing capacity for O&M. The Corporation is already giving attention to O&M of existing infrastructure. CkMC is required to make provision for a specific budget line for O&M from the outset. However, the instances of community members approaching the different statutory authorities are quite widespread but with little evidence of successful outcomes. In general, there was no clear understanding of divisions of institutional responsibility.

There are examples given of community-based initiatives for O&M in the case studies and the Memoranda of Understanding signed between PMU/CkMC and CMGs outlines roles and responsibilities in the future maintenance of completed works. Yet, in Khannagar, there is a lack of understanding by slum dwellers of the plans and programmes under the PMC-CUSIP intervention; not enough attention was paid to the involvement of the community during planning and implementation leading to a lack of accountability and ownership. In addition, people were not aware of the appropriate authority to approach with O&M problems. There is no clear-cut understanding between the authorities and people with regard to shouldering individual responsibilities. It was suggested that PMC-CUSIP schemes are not thoroughly understood by officials or field functionaries either. The community indicated that it would appreciate some form of backstopping or simply a continued interest in the community after the intervention; this would also be helpful when distinguishing individual responsibilities of each actor, e.g. users, facilitators and providers and thus make them accountable.

Financial sustainability

What policies/practice were established on cost recovery or cost sharing with communities for the services as a whole and O&M in particular?

This question attempts to discover whether any exceptions were made for poorer or more vulnerable groups or whether any cross-subsidies were raised, e.g. for water charges to pay for waste disposal.

Sri Lanka

Generally, the community members and leaders contribute to the cost of small-scale O&M, while for larger scale works, CDCs aim to get the assistance of outside agencies, including politicians (but in some cases, e.g. Bluemendhal Flats, communities make unofficial payment to workers to get the repairs done). Community contributions tend to be made only in response to specific repair needs and such community-based initiatives in O&M are said to be less costly. In Kalingamawatha, the community collected the funds required to cover the cost of the land regularisation process. Communities could also apply for housing loans of Rs.20,000 for individual families. Loan agreements from NHDA had to be signed by two independent witnesses. The housing loans were provided in four instalments of Rs.5000; the first is for the foundations, the second for the walls, the third for the roof and the last was for finishing the house. 26% of houses had been constructed with upper floors for which settlers used their own funds. Before households had legal rights, which prohibited any investment in housing, people spent money on recreation, gambling and the purchase of luxury items. After land regularisation, people spent their available funds on their house. The NHDA provided Rs.96,000 to build the community centre. The profit from the community contract to build the community centre was spent on buying furniture, and community charge money to hire out the centre, which was spent on maintenance.

Table B3.13 Sri Lanka cost recovery and/or sharing

	Cost recovery/sharing policy (service as a whole)	Cost recovery for O&M
Household toilets	NHDA provided loan of Rs.1,000 to families to install toilets (Bluemendhal Flats) US Save the Children assistance (Kirulapura) NHDA provided a loan of Rs.1,000 to families for septic tanks Sevanatha obtained funding from the Japanese Embassy for the construction of a sewer together with household contributions of Rs.450	Residents pay unofficial tip of Rs.200/300 to district office to have septic tanks emptied (Kalingamawatha). Other cases where communities make unofficial payments to receive a better service from CMC staff
Common water standpipes	Paid entirely by communities	
Common bathing facilities	Paid entirely by communities in some cases; in Garden No. 211 the community got funding from a council member Community contributed 20% of the repair costs and labour in Govipolawatta (80% covered by CSP)	User families collect money as and when repairs required. Rs.20-30 collected from families to make repairs to common bathing well every six months in Govipolawatta
Water main lines	Constructed by NHDA, payment for which varies (sometimes paid for by local politicians – Kalingaamawatha) or the decentralised budgetary allocation of the Hon. Minister of Housing and Urban Development. Bo-Sevana community paid a concessionary rate for individual connections. Individual connections paid by household, Rs.4,000 and contributed labour and materials (Kalingamawatha) Community contributed 20% for the costs of individual water connections in Govipolawatta (80% covered by CSP)	In case of Govipolawatta, NWS&DB meets full O&M costs. Costs of O&M of the main lines is covered by NWS&DB

Table B3.13 Sri Lanka cost recovery and/or sharing continued

	Cost recovery/sharing policy (service as a whole)	Cost recovery for O&M
Interior water drains	Paid for entirely by community in Garden No. 211 (different systems in case studies for collecting money/raising revenue). Community contributed Rs.80,000 towards the construction of drains (Govipolawatta)	Money is collected from the community as need arises
Community centre	Fundraised for by CDC from NGOs, well wishers and local politicians (Bo-Sevana)	Rs.10,000/month collected from rent – part used for O&M (Kirulapura, Bluemendhal Flats)
Stormwater drains	Main drains constructed and paid for by the municipality (Kirulapura), community contributed Rs.80,000 towards construction of drains (Govipolawatta)	Communities raise money as and when O&M needed on interior drains (Govipolawatta, Kirulapura)

Karachi

Communities cover 80% of the costs of sanitation .The general OPP principle is that communities use their own finances to construct and maintain facilities, and that the costs compare well because they draw on local, skilled labour, instead of bringing in outside contractors. Unwillingness on the part of the community to pay for O&M is based on the assumption that O&M is the responsibility of the civil agencies. OPP does not fund development but does provide social and technical guidance. The OPP model encourages the mobilisation of local resources and the practice of co-operative action. Although households should manage and finance their own sanitation, OPP reduces the cost by simplifying the design, survey, preparation of maps, and plans and estimates.

Table B3.14 Karachi cost recovery and/or sharing

	Cost recovery/sharing policy (service as a whole)	**Cost recovery for O&M**
Main drains	Communities do not contribute to main drains work	No cost recovery from communities
Sewers	Community bears the cost	Communities cover full costs of sweepers, and replacement of pipes
Manhole covers	Community bears the cost	Cleaning is no cost to individual families; collective contributions are made to cover full costs to replace covers from neighbouring households

Faisalabad

Table B3.15 Faisalabad cost recovery and/or sharing

	Cost recovery/sharing policy (service as a whole	Cost recovery for O&M
Water and sewage	Percentage of service(s) covered through bills to WASA ASB/OPP did thorough calculations of direct and indirect costs. Communities required to pay full costs of labour and infrastructure	WASA O&M funds not ear-marked, so tend to be very insufficient to cover neces-sary O&M In practice, people may pay a sewer man informally, or pay a private company to carry out repairs ASB/OPP: set up Mainte-nance Unit and will charge WSCs Rs.200 per hour

It is suggested that there is some kind of corruption and misuse of funds within WASA. The funds allocated for O&M are based on the previous year's expendi-tures, revenue position, inflation and salaries. Generally, financial requirements for O&M are not taken into account in the budget. WASA relies on sewage/water charges for a main part of its revenue, yet nearly half of the WASA service users are not paying their bills. Users are not willing to pay because they are dissatisfied with the level of service; the law enforcement/disconnection against defaulters is difficult and illegal connections are common.

Although the ASB/OPP project made excellent cost-recovery calculations, they failed to recover the loans in practice. The Maintenance Unit model will cost less than one-third of what communities spend at present for de-sludging.

Cuttack

Table B3.16 Cuttack cost recovery and/or sharing

	Cost recovery/sharing policy (service as a whole)	Cost recovery for O&M
Community toilets	Sharing the cost	Communities have engaged sweeper to clean toilets (but insufficient funds to cover necessary work)
Water	Sharing the cost	Some financial and labour contribution for repair of tube wells

Expenditure on O&M is difficult to determine because the reporting system associated with municipal accounts does not distinguish clearly between capital and O&M. The actual performance of services is not measured and it is not clear to what extent demand is satisfied. Financial sustainability is dependent on the general revenue position of the Corporation. The most direct form of user payment for urban services is normally through property tax and the additional levies such as water tax and lighting tax. However, the key features of revenue streams at CkMC is the dominance of the octroi levy which accounts for 95% of its revenue, with property tax accounting only 3%. As such, the O&M services provided are unrelated to user payment through property tax. There is no real link between the supply of services by CkMC and the payments made by the residents. The current structure of municipal finances means that there is little financial leverage that residents can exert.

It was anticipated by the CUSIP that the communities would make a small contribution in cash or in kind to the O&M costs of the in-slum infrastructure. The main purpose of this is to generate some sense of ownership, as the small amount that it will be feasible to raise from them will not meet the full sum required. Communities may choose a higher standard of service than costed into their budget if they meet the additional costs themselves. Micro-planning incorporated full discussion of the O&M implications of different infrastructure options. It advocated corrective and preventative maintenance and CMGs receive a realistic assessment of likely CkMC involvement in O&M. CMGs make a plan of their contribution to O&M, as described in the MoU including activities, cost and financing.

Some O&M activities are financed by users making direct payments to obtain specific services i.e. there are several instances of residents paying for operational services such as latrine cleaning. Here we have residents managing a service and it is a good illustration to help move away from the idea that the poor have to do everything themselves. However, the fundamental nature of O&M presents a problem in that people are often less willing to pay for something that does not result in new facilities.

Were communities consulted on these policies, and in relation to the choice of technical options?

This question aims to establish whether communities agreed to the proposed cost-recovery policy (full or partial). This often depends on their perception of whether the new service provided costs less in absolute terms than an alternative source, but also to the quality of the service (e.g. clean water or a regular water supply).

Sri Lanka

In Bo-Sevana, technical drawing and guidance were made accessible in local languages. In Kalingamawatha, residents were put off the option of common toilets for health reasons, and instructed instead on the need for household toilets.

Karachi

As the cost of development of infrastructure should be low enough for people to afford, this requires technical research and the development of cost-effective community-based procedures of building. OPP social organisers explain to home-owners the necessity for the project. The formation of new co-operative units also serves the purpose of collecting individual collections.

Faisalabad

WASA did not interact much with the community. ASA communities were consulted and information was shared. CBOs were actively involved in community-partnered links.

Cuttack

It is suggested that communities are unwilling to raise funds for activities that do not result in new infrastructure, but the underlying problem could be lack of ownership of infrastructure, leading to disinterest in O&M. Ownership was promoted under CUSIP through the community's participation in the design of technology. Communities may also choose a higher standard of service than costed into their budget if they meet the additional cost themselves. Maintenance implications for each option were explained to the communities while preparing the CAPs, and plans for maintenance of project assets were built into CAPs in the form of Memoranda of Understanding.

What mechanisms were put in place for costs to be recovered? (What incentives to pay and penalties for non-payment?)

This question seeks to establish who recovered costs: individuals, a community representative or community committee, or the municipality or private service provider? Also, how does the system work, e.g. when were charges made. How was money accounted for? Was it perceived to be transparent?

Sri Lanka

CDCs or local CBOs (or user groups in the case of some facilities) raise money for repairs in the communities. The strategy of only collecting money when specific repairs need to be carried out appears to be effective, given some limits in community trust of CDCs to maintain a regular O&M fund. Community-evolved management systems for services have frequently generated local employment opportunities or raised funds, e.g. through renting the CDC committee centre. In this way, some funds raised have been used for O&M (which reduces the need to provide community contributions, and thereby reduce the need to identify incentives to contribute).

Karachi

The formation of organisations which are lane based, and are large enough to be effective yet small enough to be cohesive, suggests that there would be social pressure for households to make payments.

Faisalabad

WASA system: the WASA billing system is characterised by weak management and record-keeping. Disconnections are difficult and rarely carried out. This is primarily because it is difficult to take action against defaulters; law enforcement is poor and political interference often protects the defaulter. In general, the system is perceived as unfair, so there is little incentive for compliance and illegal connections are easy and widespread. Households receive quarterly bills, the billing procedure is weak, and there are often faults in the bills and the distribution sub-system of WASA. There are 18 complaint centres in Faisalabad; complaints can be made by telephone, in writing, or by attending the centre, and complaints are recorded in a register and forwarded to the sub-engineer for rectification.

ASB/OPP: There are no apparent penalties for not recovering costs under the OPP/ASB model and communities tend to distrust WSC to use community funds on the project. The underlying issue may possibly be insufficient community participation in design of the cost-recovery system.

Cuttack

CkMC does not charge any household for the use of communal water and sewerage facilities or for primary health and education services, so there is very little scope for cost recovery. The communities will make some small contributions to O&M of in-slum assets in cash or in kind. Financial viability is therefore very heavily dependent on the general revenue position of the Corporation. One mechanism for raising initial community finances is the surplus generated through community contracts during the implementation stage. During 1997 community members of Chhatra Bazaar fixed two brass taps and remodelled the base of the water supply with marble tiles using profits from the community contract done by them. CMGs are responsible for raising finance and other resources to undertake local activities to which they agreed to in the MoU. In Chhatra Bazaar it seems that there is also a charge of Rs.5 made for use of the community latrines.

What factors affected willingness to pay?

The main factor affecting people's willingness to pay is the belief that it is the government's job to bear maintenance costs. Provision of urban services and O&M of services are often the legal responsibilities of the municipality and service provider organisations. In Sri Lanka, there was no government policy in favour of community-based operation and maintenance and community leaders are beginning to question payment for their efforts. Unnecessary political interference hindered the O&M process initiated in some settlements and reinforced settler's views that O&M is the responsibility of the municipality. Many of the community groups investigated did not collect regular contributions from community members for the use of O&M activities. It was suggested that they do not consider O&M of services a serious issue. People were also unwilling to pay into O&M funds held by CDC (partly due to mistrust and because they had already contributed to capital costs).

In squatter settlements where land ownership was not given, the houses were not upgraded and it is difficult for community leaders of such settlements to link up with service delivery institutions and gain funding.

Appendix

Picture captions

1. An example of a manhole blocked by the dumping of solid waste.
2. The result of inappropriately designed rubbish bins.
3. The view of a sewage holding tank before it is pumped to the treatment works.
4. A further illustration of the effects of inadequate O&M on environmental sanitation: children playing in standing sewage.
5. An instance of damage to pipes leading to sewage mixing with drinking water.
6. Partially treated sewage is released into the Lyrai River.
7. The missing covers of water-valve boxes.
8. The disrepair of the road reveals water and sewerage lines running together.
9. Lack of water supply means the settlement's main water tank stands empty.
10. A meeting of area representatives.
11. Water vendors illegally pumping water from the municipal tank.
12. The pipe system of a (sewage treatment) works.
13. An example of how inadequate operation and maintenance affects the environmental health of residents in low-income settlements.
14. The view of a settlement from a CBO's office.
15. An example of sewage leaking from faulty household sewerage connections.

Appendix

Photographs


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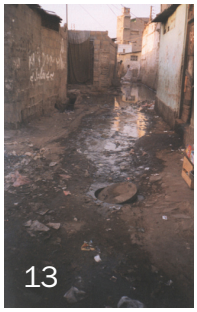
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