

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.

SECTION A1: INTRODUCTION

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.

PART A: SUMMARY FINDINGS AND LESSONS LEARNED

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

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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.

PART A: SUMMARY FINDINGS AND LESSONS LEARNED

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

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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.

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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

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- 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 Behood (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

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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 sewer men 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 rates
- 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

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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.

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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.

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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.

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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

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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.

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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:

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- 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

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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

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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.

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Table A3.1. Systematic approach to maintenance		
Management procedure	Responsibilities	Constraints
Local government institution	<ul style="list-style-type: none"> ■ Main lines with piped water ■ Trunk sewerage 	<ul style="list-style-type: none"> ■ Lack of long-term planning ■ Little capacity for O&M ■ Consumers do not pay bills/ ■ Illegal connections ■ Rent-seeking politicians
Community managed	<ul style="list-style-type: none"> ■ Stand posts ■ Lane lines of sewage ■ Communal latrines ■ Taps at communal latrines ■ Manholes ■ Stormwater drains 	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ Own latrines ■ Emptying individual septic tanks ■ Individual water lines ■ Individual water connections ■ Common bathing areas ■ Water bills 	<ul style="list-style-type: none"> ■ 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

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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

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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

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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 Bebhod 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-

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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.

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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

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- 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.

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- 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).

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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

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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)

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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

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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-

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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.

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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.

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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.

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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.

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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

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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.

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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 documenting 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.

