

A Framework for Community Engagement in the Operation & Maintenance of Infrastructure

Regional Development Project (Phase II)

Community Mobilisation and Environmental Awareness, Loan No: 2170

Ministry of Housing, Transport and Environment, Maldives



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Executive Summary

The environment in the Maldives is being placed under increasing pressure from a growing population, changing lifestyles and living standards. Maintenance of community infrastructure, especially related to solid waste management and sewerage, have been identified as a key component in improving environmental management practices and quality of life for communities in the Maldives. This framework seeks to identify concepts for increased community engagement in the operation and maintenance of infrastructure by promoting community support for the proposed regional utility companies.

The framework links awareness, mobilization and management of environmental infrastructure actions under the RDP II: Environmental Infrastructure and Management. The original drafts of the framework were associated with the concept of 'community management' as described in the RDP II Inception Report as "the community-based approach to management of utility services and facilities, including sanitation and sewage treatment and solid waste management". More recent feedback from the Project management Unit has been that "these facilities will not be considered as community facilities as the policy direction is operation and maintenance works will be done by Utility Companies".

Until recently, infrastructure projects such as water facilities were considered a one-time investment, resulting in poor maintenance and disuse, leading to the need for increased community involvement for the sustainability of such projects (Panthi & Bhattarai, 2008). In response to this the RDP II policy is longer term, linking to ongoing community support for infrastructure (i.e. paying the bills, engaging the community on asset protection, protecting facilities from vandalism, etc.). The responsibilities of the regional utility companies which are being formulated by the new government would have the mandate of regulating and managing electricity, sewerage, water and possibly waste in the provinces. The utility companies to be set up in the provinces will ensure that the community is involved in the billing and collection of tariffs approved by the Government of Maldives.

Maintenance of community infrastructure, especially related to solid waste management and sewerage, have been identified as a key component in improving environmental management practices and quality of life for communities in the Maldives.

While many examples of the importance of O&M are drawn from international text there is limited detail on the situation in the Maldives. The 2004 State of the Environment report provided some insight: they highlight the importance of periodic monitoring and maintenance of water supply services and specifically recommend increased community participation. In terms of waste management, a lack of resources, institutional capacity and public education are identified as barriers (Ministry of Environment and Construction, 2004).

The accelerated move toward environmental infrastructure at the community level, as described previously, has significant implications in regard to O&M. Much of the infrastructure has been put in place without adequate input from communities. It is therefore of increased importance to more effectively engage with the community to make the O&M more effective. With more emphasis on the software side of infrastructure (education, community mobilization, training and social), such issues can be mitigated and O&M can become more effective.

In assisting the regional utility companies in making positive linkages with communities, it must be emphasized that "because of the far-reaching nature of O&M, a well-designed and properly executed program is critical to the overall success of a 'sustainably-designed' facility." As communities are different and organize in response to a variety of stimuli, a criterion to assist in assessing and prioritizing the potential for community organization for maintenance of water and waste infrastructure is an important start. Having the regional utility company sit and discuss the issues so as to develop an appropriate O&M plan with the community is a critical first step in building a strong relationship.

"There is no blue print for O&M, likewise for community management that works or does not work. It has to be put into the context of the society of beneficiaries and adopted to fit their own identified special needs" (Waako & Mwaka, 2001).

The RDP II Semi Annual Report shows O&M costs are an important consideration in the selection of appropriate sanitation, but community ownership and involvement in the selection process should be given more priority, as this will dictate ongoing costs, which can be more significant than set-up costs.

An effective Framework for Maintenance of Community Infrastructure needs to be a balance between the software and the hardware, and the community focus means that participatory approaches are critical to success. Based on our previous work with communities in the Maldives under RDP II, Live & Learn is proposing to adapt the six-step community mobilization model as a useful starting point for the framework to move toward an implementation plan for O&M. The six-step approach to community mobilization includes: Plan, Listen & Learn, Discuss & Develop, Adapt & Act, Support, and Evaluate: this would provide useful prompts for the utility company to work with communities.

This framework has identified a range of considerations for community involvement in the operation and maintenance of utilities, however there are many variables that will impact the direction that should be taken in each community. The following are some broad recommendations that should assist with community engagement in the effective operation and maintenance of utilities in the Maldives.

- Encourage active community engagement and develop local community capacity for management, operation and maintenance of utilities with community management as a longer term goal.
- The approach to utility management, operation and maintenance should be flexible so as to be responsive to the different situations on different islands.
- Utility management should be overseen by an independent regulatory body with enforcement power so as not to place extra pressure on the court system.
- Have government and public forums to discuss the issue of subsidies for utilities with representation from community groups.
- Develop business plans and contracts for utility companies that include specific community involvement criteria.



1

Introduction

The environment in the Maldives is being placed under increasing pressure from a growing population, changing lifestyles and living standards. The islands are predominantly coastal entities and their ecosystems are among the most vulnerable in the world. This environment also places increased pressure on any infrastructure.

The Maldives has a narrow economic base that relies on two critical sectors: tourism and fisheries. Therefore a healthy population and marine environment free from polluting sources is central to any strategy, but present community engagement in managing their environment is low.

Unique geography and vulnerability pose key development challenges for the country. The dispersion of the population across the archipelago raises the cost of delivering social services, as economies of scale are difficult to achieve in service provision. This places an increased need for on-site management of resources and infrastructure.

Maintenance of community infrastructure, especially related to solid waste management and sewerage, have been identified as key components in improving environmental management practices and quality of life for communities in the Maldives. It will also assist the government in meeting the Millennium Development Goals. This framework seeks to identify concepts for increased community engagement in the operation and maintenance of infrastructure by promoting community support for the proposed regional utility companies.

The Maldives has a narrow economic base that relies on two critical sectors: tourism and fisheries. Unique geography and vulnerability pose key development challenges for the country.

Regional Development Project II

The Government of Maldives and the Asian Development Bank (ADB) have funded the Regional Development Project Phase II (RDP II) to promote regional development and support equitable access to social services relieving the intense population and environmental pressures on Male'. The project goal is to increase the standard of living in the Central Regions. The project objective is to improve environmental and land management through a community-centered approach. The project will help

The RDP II objective is to “improve environmental and land management through a community-based approach.”

safeguard public health and the environment, support community and private sector participation in waste management and sanitation, and increase public awareness of responsible environmental management practices.

The RDP II objective is to “improve environmental and land management through a community-based approach.” Project outputs and activities have been separated into two components to allow for easier monitoring and evaluation of the activities by Live & Learn and the implementing agency against the component objectives. On 6th January 2008, a contract (174-F/AGR/2008/01) was awarded to Live & Learn Environmental Education to deliver Environmental Awareness and Community Mobilization subcomponents of the RDP II project. Making relevant links to the infrastructure development is a key component of the project. There has been a strong focus on enhancing community awareness and this has been done inline with a community mobilization approach. The Community Mobilization & Environmental Awareness (CMEA) Strategy serves as an overarching strategy for the Framework for Operation & Maintenance of Community Infrastructure (OMCI).

The framework links awareness, mobilization and management of environmental infrastructure actions under the RDP II Environmental Infrastructure and Management. Specifically, the original drafts of the framework were associated with the concept of ‘community management’ as described in the RDP II Inception Report as “the community-based approach to management of utility services and facilities, including sanitation and sewage treatment and solid waste management”. More recent feedback from the PMU has been that “these facilities will not be considered as community facilities as the policy direction is operation and maintenance works will be done by Utility Companies.” As such, the revised objective of this report is identifying concepts for community support to, and linkages with, the utility companies’ operation and maintenance of infrastructure.

In some islands, the communities have a history of managing their infrastructure, and as such the role of regional utility companies may need to be adjusted based on the strength of the community. Ultimately, the strongest approach is for the utility company to support the community, not for the community to support the utility company. More information is needed on the specific role of the utility companies and issues such as fees, subsidies and enforcement need to be considered.

This document intends to provide a framework for the utility companies in involving communities in operation and maintenance plans related to water, sanitation and waste. A framework is a basic conceptual structure to address complex issues, in this case involvement of the community in the maintenance of infrastructure. The framework may help to guide a community approach, but the details of any O&M plans require more technical input and ongoing community dialogue.



2

Operation & Maintenance

Definitions

For the framework to be practical it needs to have a technical foundation. This section defines the concepts of framework, monitoring, operation and maintenance activities to provide a starting point for justification of the need for O&M and a description of some existing approaches.

Framework, or more specifically conceptual frameworks, are “used in research to outline possible courses of action or to present a preferred and reliable approach to an idea or thought” (<http://en.wikipedia.org/wiki/Framework>, 2009).

Monitoring “is vital to systematically assess performance, identify problems and deal with them before they get out of hand, in order to ensure continued functional facilities” (Watsan Uganda, 2001).

Operation is the controlling of something or the managing of the way it works; it is defined as “control: the acts of making something carry out its function, or controlling or managing the way it works” (http://encarta.msn.com/dictionary_/operation.html, 2009).

Maintenance includes “all actions which have the objective of retaining or restoring an item in or to a state in which it can perform its required function. The actions include the combination of all technical and corresponding administrative, managerial, and supervision actions” (<http://www.efnms.org/efnms/default.asp>, 2009).

O&M “are the activities related to the performance of routine, preventive, predictive, scheduled, and unscheduled actions aimed at preventing equipment failure or decline with the goal of increasing efficiency, reliability, and safety” (FEMP, 2009).

Utility Company is a newly conceived approach from the government and the full definition has not been clarified; however they are described by RDP II as companies owned by the government and responsible for institutional arrangements and project service delivery.

The Maldives has a narrow economic base that relies on two critical sectors: tourism and fisheries. Unique geography and vulnerability pose key development challenges for the country.

Based on these definitions the framework objective is to develop a preferred approach to engage communities in the operation and maintenance of water utilities, sanitation systems and solid waste management. Annex 1 also provides a description of and context for communities in the Maldives.

Community Operation & Maintenance Rationale

O&M is essential for: “Cost-effective, efficient, and sustainable operating systems, and health and well-being of the community” (O&M, 2004). The general rationale for operation and maintenance is to maximize the benefit of any machinery or infrastructure by increasing its efficiency and working life. This is further described by the United Nations Capital Development Fund as:

“The purpose of infrastructure investments is to yield social and economic benefits or services to users. These include health services from clinics, education from schools, drinking water from wells, transport access from roads, etc. While these investments and the assets they produce are usually necessary to generate such service benefits, they are not sufficient in themselves: for infrastructure assets to generate benefits or services of value to users, they must also be adequately operated and maintained on an ongoing basis” (UNCDF, 2005).

Until recently infrastructure projects such as water facilities were considered a one-time investment, resulting in poor maintenance and disuse, leading to the need for increased community involvement for the sustainability of such projects (Panthi & Bhattarai, 2008). In response to this the RDP II policy is longer term, linking to ongoing community support for infrastructure (i.e. paying the bills, engaging the community on asset protection, protecting facilities from vandalism, etc.) . The responsibilities of the regional utility companies are being formulated by the new government. Such utility companies may have mandates for providing electricity, sewerage, water and possibly waste management in the provinces. It will be important for the utility companies to ensure that the community is involved in the billing and collection of tariffs approved by the Government of Maldives.

This hardware approach to infrastructure has led to negative long term impacts on infrastructure. Overall “30-60% of water supply and sanitation services are



non-operational,” but constraints to O&M include: “low profile and poor accountability, poor design of systems, poor management, lack of finance and misuse of funds, low level of technical support, lack of spare parts, lack of training, and political interference,” (O&M, 2004). Many of these issues may be mitigated by the regional utility companies, but without community support this will not be possible.

A lack of community engagement in the development of infrastructure often ultimately results in a lack of ownership and responsibility for O&M. “Adoption of cost efficient technology needs to be coupled with effective, community-based maintenance” (RWSN N.D.). There are many international examples of how a lack of O&M impacts infrastructure projects. Lessons can be learned on how to effectively engage communities in O&M from other approaches and experiences around the world, a selection of which are shown in Annex 3. Community engagement is an important consideration for effective O&M, but it is a piece of a complex puzzle: community engagement without planning, skills and resources will not be effective. A more holistic approach is required for effective O&M. The regional utility companies need to be holistic in their approach: being responsive to and working with local communities in order to promote partnerships.

Operation & Maintenance of Infrastructure - Maldives

While many examples of the importance of O&M are drawn from international text, there is limited detail on the situation in the Maldives. The 2004 State of the Environment report provided some insight: they highlight the importance of periodic monitoring and maintenance of water supply services and specifically recommend increased community participation. In regard to waste management, a lack of resources, institutional capacity and public education are identified as barriers (Ministry of Environment and Construction, 2004).

The accelerated move toward environmental infrastructure at the community level, as described previously, has significant implications in regard to O&M. Much of the infrastructure has been put in place without adequate input from communities. It is therefore of increased importance to effectively engage with the community to make the O&M more effective. Still, there are some very positive examples from communities across the Maldives and how they have responded to water and waste management, shown in Annex 2.



The limited guidance and lack of(?) ongoing support in the locating, set-up, monitoring and maintenance of rainwater tanks in many parts of the Maldives has contributed to water quality issues, which were highlighted under RDP I. Similarly, waste management centres filled too quickly due to the lack of simple separation of waste, creating increased pollution and pest issues for some communities. A lack of community engagement combined with a lack of infrastructure has reduced the effectiveness of some existing environmental management actions. With more emphasis on the software side of infrastructure (education, community mobilization, training and social), such issues can be mitigated and O&M can become more effective.

Waste management is mostly a private or community affair in the island communities, and the institutional basis is weak or missing. Waste collection is a household/business responsibility, either through self-transport to the disposal site, or through private-to-private relationships between households and businesses and small-scale collection operators, usually using hand carts or the household's own wheelbarrows. On the different islands there are a variety of arrangements for fee collection, monitoring and compliance.

In general the only services available, and thus the main services paid for by users, are waste collection and pick-up services where households hire people to carry their waste in a wheelbarrow to the Island Waste Management Centre (IWMC) on a regular basis. The fees are collected by the service providers themselves. Private-to-private arrangements are made by the islanders themselves. In B.Maalhos the people are lucky to have the boat lift out much of the difficult waste streams from the island.

The newly formed Maldives Waste Management Corporation (WMC) has the mandate for waste management planning and implementation at a national level, with a mandate to promote appropriate integrated waste management systems throughout the Maldives. While the corporation exists, it is not yet active, and the current document for implementing the mandate is an Action Plan, which has a short implementation period of one year. This is because the operating context is in its early development stage, with the WMC only recently formed. A joint venture partner is being sought at this time (no information was made available to the consulting team on who or what kind of partner), and the medium to long-term capacity and direction of the WMC remain unclear. At the end of the year, a full analysis of the steps required to further waste minimization and recycling will be undertaken, along with a review of the WMC and its needs into the future.

Community O&M Considerations

In reading a selection of materials for this report, one stood out not for its comprehensiveness but simply for the logic in what it said. In their paper on Community Management: Sustainability Myth or Reality, Waako & Mwaka (2001) discuss some key issues, including: committees should not be voluntary as this has been shown not to work, transparency and accountability are critical, **systems are too big and too complicated, capacity of the community limited, support from government or others is low, different approaches from different donors, and political interference** Regional utility company plans should include the following issues as priority considerations: community incentives, transparency, simplicity, capacity building, ongoing support and dialogue with the community, consistency, and vocalizing expectations.

In assisting the regional utility companies to make positive linkages with communities, it must be emphasized that "because of the far-reaching nature of O&M, a well-designed and properly executed program is critical to the overall success of a 'sustainably-designed' facility. Such a program should:

- Set demanding performance goals on both a daily and ongoing basis;
- Measure performance so that the building can be benchmarked against other buildings;
- Adjust to changing occupant needs by modifying the HVAC, lighting, electrical, telecommunications, safety, housekeeping, and building automation control systems, as needed;
- Repair, upgrade, and recommission building systems to ensure that they are working to meet current needs;
- Extend the useful service life of materials and equipment;
- Prevent disruptive failures in the building and its systems; and
- Promote greater productivity" (Bobenhausen, 2008).

As communities are different and organize in response to a variety of stimuli, a criterion to assist in assessing and prioritizing the potential for community organization for maintenance of water and waste infrastructure is an important start. Having the regional utility company sit and discuss the issues and develop an appropriate O&M

plan with the community is a critical first step in building a strong relationship.

- There needs to be a review of existing community actions, as this provides an indication of mobilization potential. The regional utility companies may need to be more responsive to active communities and more supportive in weaker communities. All communities need to understand what is being proposed and why.
- Assess the existing community structures and activities and note any: CBOs & NGOs, Participatory Actions, Active Community, Points of Motivation, Change Agents and ongoing Community Support. Some communities will have 'change agents' (people of influence, with whom more effort may be needed to ensure they understand the reasoning). The issue of politics can creep into this stage so good conflict resolution skills are needed.
- Listen to their ideas, be responsive where you can or explain why you cannot. Then start to ask questions to guide the next actions:
 - > Does the community have a good base level for understanding the environmental situation?
 - > Are the communities aware of practical solutions relevant to their issues?
 - > Does the community understand their needs, or are these wants?
 - > What is working in the community, what else is happening?
 - > Are other stakeholders involved in community actions?
 - > Do leaders in the community seek and respond well to feedback?
 - > When is the best time to start the action?
 - > What support will be necessary? Provide training and resources.
 - > Evaluate the approach and adapt it as necessary for next time.

Ultimately, for community activities to be effective:

- > Roles and responsibilities of stakeholders must be clear
- > High commitment is required of the community
- > High community organization is required
- > WTP and ATP need to be clear

- > Spare parts should be locally available
- > O&M funds should be kept in an appropriate place.
- > Committee members need to be well trained
- > Committee needs to be elected in transparent way, traditional management
- > Simple procedures and systems should be in place
- > The community is well sensitized and has high ownership spirit (Watsan Uganda, 2001).

The most important lessons learned are that there are barriers associated with total community participation, which are linked to available resources and are of a monetary nature. There is danger of creating 'dependency syndrome' within a community when subsidies are provided, and it can be a barrier to a 'feeling of ownership' by the community members (Bhadra, 2008). The regional utility companies need to be fair and transparent in the collection of fees. Fees need to be collected regularly and if this is not happening there needs to be significant follow up.







3

Framework for Operation & Maintenance

“There is no blue print for O&M, likewise for community management that works or does not work. It has to be put into the context of the society of beneficiaries and adopted to fit their own identified special needs,” (Waako & Mwaka, 2001).

The RDP II Semi-Annual Report shows O&M costs are an important consideration in the selection of appropriate sanitation, but community ownership and involvement in the selection process should be given more priority, as this will dictate ongoing costs, which can be more significant than set-up costs.

The purpose of the Framework for Maintenance of Community Infrastructure (FMCI) is to develop a preferred approach to engage communities with the regional utility companies in the operation and maintenance of water utilities, sanitation systems and solid waste management. This has been developed through a brief review of existing approaches to community organization for environmental management in the Maldives and internationally.

The framework provides a guide to the regional utility companies for the overall implementation of operation and maintenance activities for three focus communities. The regional utility company contracts should reflect an obligation that they work with communities in certain ways as outlined in this framework. The implementation will include training of key stakeholders including relevant NGOs or CBOs where appropriate. Such training should be linked to the promotion of participatory approaches and the identification of incentives for effective O&M at household and community levels. There will also need to be more technical training on how the systems work and key indicators for monitoring. How this will be integrated with the proposed utility companies is an area that will require consideration at the policy level.

People from outside the community who do not ‘live’ the many challenges experienced by the people within the communities themselves are often the decision-makers for the implementation of utilities.



Development of the Framework for Maintenance of Community Infrastructure (FMCI) includes the following activities:

- Review of existing approaches employed by community organizations for environmental management in the Maldives.
- Develop a preferred approach to organize communities for operation and maintenance of water utilities and solid waste management.
- A methodology based on strategic criteria will also be developed to identify and prioritize other opportunities for community-based operation and maintenance of water and waste from other communities.

Ultimately, the communities should have the greatest motivation working with the regional utility companies to effectively operate and maintain water and waste infrastructure; however, some past approaches have disempowered rather than empowered communities and created 'dependency syndromes' in many communities. There are stories where people will not even change a light bulb – putting up with the dark instead of changing it themselves.

The development of the framework has taken into consideration that many communities in the Maldives, post-tsunami, may have observed and hopefully participated in the design, development, monitoring and evaluation of water and waste infrastructure for their

communities with international and national agencies. The maintenance of water and waste utilities is of direct benefit to the communities but to date they have lacked a role in their functioning.

People from outside the community who do not 'live' the many challenges experienced by the people within the communities themselves are often the decision-makers for the implementation of utilities. But the design and maintenance is ultimately more efficient if it can be done with the communities in which infrastructure exists. The post-tsunami activities have been an important catalyst, as many have sought to promote community participation.

Community participation is key to meaningful operation and maintenance. Too often communities have no opportunity to improve practices and operation of their local utilities. With some guidance, communities are well placed to monitor the operation of water and waste utilities, as they will experience any changes first-hand.

The framework has been designed to minimize disruption to people's lives and to ensure that it is meaningful to communities. The process must also be careful not to build expectations or disempower communities by dwelling on negatives. There needs to be simple and positive actions that can be achieved while working towards increased involvement of the communities in the operation and maintenance of water and waste infrastructure.

As a starting point, the framework includes training sessions on the involvement of communities in the monitoring of key environmental issues. The final recipients of the

training will include island offices, women's development committees, island development committees, health centres, community based organisations, youth clubs and schools.

Based on the preferred approach for organizing communities, the framework includes the development of training of trainer (ToT) sessions that have been developed for and will be conducted with Project Implementation Unit (PIU) and Project Management Unit (PMU) staff on selected islands on community operation and maintenance of infrastructure. The final recipients of the training will include island offices and the other influential groups and respective institutions at the island level.

In this framework Live & Learn will seek to look at the delivery of outcomes and outputs, as outlined in the project summary. In particular, the framework has been designed to identify ways to increase community involvement with the regional utility companies in the operation and maintenance of water and waste infrastructure.

- Effectiveness - the extent to which water and waste infrastructure are serving the needs of the community.
- Impact- the extent to which the water and waste infrastructure has had a positive or negative impact on target groups.
- Sustainability - the extent to which maintenance will increase the operation of the water and waste infrastructure.
- Capacity- the increased skills in community members associated with utilities.
- Empowerment- the increased engagement of community members.

The primary role and responsibility for undertaking monitoring, evaluation and reporting activities under this project was originally with the responsibility of the Project Management Unit with collaboration from the different stakeholder groups. Delays and a redirection in the approach have impacted levels of strategic support. For specific RDP II or any other infrastructure projects in the Maldives, ongoing O&M and M&E will need to be integrated into government responsibilities, project work plans and regional utility company contracts. Community members and stakeholders should be encouraged to participate in the M&E activities.

O&M Framework Methodology

An effective Framework for Maintenance of Community Infrastructure needs to be a balance between the software and the hardware, and the community focus means that participatory approaches are critical to success. Based on our previous work with communities in the Maldives, Live & Learn is proposing adopting an existing model and adapting it as needed rather than trying to start with a new model. We see the six-step community mobilization model as a useful starting point for the framework to move toward an implementation plan. These six steps link with and can incorporate the key considerations for community engagement, and as such can serve as a plan for utility companies to follow.

The six-step approach to community mobilization has been developed by Live & Learn and adapts and simplifies many other community mobilization approaches. It includes: Plan, Listen & Learn, Discuss & Develop, Adapt & Act, Support, and Evaluate. This will provide useful prompts for the utility company to work with communities. The phases of the project were designed and detailed based on this six-step approach. The original approach will be adapted through strategic reflection so as to make the O&M framework more effective. The following table is an example of what the framework may look like, but it should be based on participatory methodology and discussed with the key stakeholders.



Step	Activity	Considerations
PLAN	Identify potential community groups needs, options and timeframe. Look at potential community links: how can they get involved and what is their willingness to be involved?	Be realistic about what might be achieved before building expectations. Start from where the community is at.
LISTEN & LEARN	Learn about what activities the community has or is doing in regards to environmental management. Collect literature on appropriate infrastructure. Collect baseline information (RAP).	Become informed and be open minded and responsive where possible. Use this opportunity to build a relationship with the community – share a meal!
DISCUSS & DEVELOP	Increase community understanding of O&M options through educational activities and draft O&M plan with the community.	Create a two-way dialogue with the community. Do not rush the process; take time to gain real community feedback.
ADAPT & ACT	Incorporate the discussion and feedback into the development of an O&M plan. Ensure clear responsibilities and ways to measure outcomes.	Develop skills through training. Continue adapting your approach based on feedback and outcomes.
SUPPORT	Identify resources needed to encourage increased community involvement. Provide incentives and training.	Supply resources if necessary, but ideally seek sustainable and capacity-building solutions in which communities develop the necessary means to address problems.
EVALUATE	Take time to evaluate the O&M plan with the community based on key performance indicators. Discuss findings and lessons from evaluation reports and propose ways to improve the process.	Report on the findings of the O&M plan evaluation and discuss among key stakeholders. There needs to be some flexibility built into the regional utility company contracts to allow for responsiveness to community issues.

To more effectively engage communities in O&M there first needs to be more community participation in the planning process. Detailed planning that incorporates consideration of the O&M implications of different infrastructure options should be conducted from the outset. Planning meetings should involve all the stakeholders in defining roles and responsibilities for effective O&M of community infrastructure. Such roles and responsibilities may also be used to develop an agreement or memorandum of understanding among the key stakeholders in regards to ongoing plans and resources for O&M.

In response to the move towards utility companies, effort should be made to provide opportunities for an open discussion on issues regarding the management, operation and maintenance of utilities. Ideally, intensive efforts should be made to involve the community in the choice of system, fully disclosing and explaining the different options.

From the very first steps the community will need to have a more comprehensive understanding of how the infrastructure will work. An objective summary of the pros and cons of different infrastructure systems, including accurate estimates of the life of the infrastructure, typical issues and ongoing costs for O&M should be provided to communities. This will help to develop stronger operation skills among the community and a stronger relationship between the community and regional utility companies.

Appropriate operation, combined with routine monitoring and preventative maintenance will greatly help to increase the efficiency of infrastructure; though there will still be times when the infrastructure breaks down. The overall O&M plan needs to be developed with the community and consider the operation and maintenance plans for the infrastructure and for each piece of equipment.

RDP II – Operation & Maintenance

Under the current proposal, utility companies are responsible for institutional arrangements and project service delivery. In-line with government policy and the RDP II approach, community participation and involvement should be key considerations for utility companies.

There are several critical considerations for the regional utility companies to effectively engage the community in O&M. The following has been adapted from Cotton (1998) (<http://www.lboro.ac.uk/well/resources/consultancy-reports/task0034.htm>). There should be:

- Full discussion from the outset of O&M implications of different infrastructure options;
- An O&M checklist for different service options for use by the community and Project Implementation Unit;
- Exploration of user perceptions of the nature and frequency of O&M activities necessary to achieve the desired level of service;
- Assessment of the willingness and capability of the communities to perform tasks in order to increase the effectiveness of community infrastructure;
- Focus on RDP II community engagement activities that are linked to the Environmental Monitoring Program;
- Exploration and documentation of best practices for community involvement in O&M which should be shared with other communities, though what suits one may not suit another;
- Community training and needs assessment in relation to O&M actions.

Starting points may include simple actions like sweeping and cleaning of pathways and drains, shared and communal latrines and observation of environmental indicators. It is important to:

- Inventory and survey the condition of all infrastructure to be included
- Survey community perceptions
- Assess resources - incomes and other contributions
- Assess financial needs – identify the cost of O&M for all equipment and infrastructure
- Assess time requirements – identify frequency and timing for O&M. Calculate the upper limit of community contributions for O&M of infrastructure



Water Management O&M

The importance of considering a combination of options such as: “rainwater tanks, recycling of sewage after appropriate treatment, preserving quality of freshwater lens with proper sewage treatment, conservation of water with environmental education and legal framework, desalination of sea water for public taps,” has been highlighted in the RDP II Semi-Annual Report (2008). The primary water infrastructure has been rainwater tanks and basic plumbing to link such tanks to service supply needs (check to make sure this is what you mean—has basic plumbing been part of the infrastructure or is it needed?).

The O&M plan will need to link with the water infrastructure. This requires technical inputs from the engineers and should link with maintenance plans for the infrastructure. Communities can assist by: monitoring the supply and quality of water, identifying leaks, and ensuring there is no vandalism or contamination of water infrastructure. Locally appropriate and enforceable fee systems need to be developed. One of the key concepts may be to group all utility fees together including electricity.



Sewerage System O&M

ADB funded sewerage systems are being installed in Adh Mahibadhoo and L. Fonadhoo. The RDP II states that the Adh Mahibadhoo and L.fonadhoo site will be managed by utility companies. Sewerage systems should preserve the quality of ground water and options be based on the following:

- Per capita water supply
- Topography and other physical features including depth of the groundwater table
- Capital costs
- O&M costs
- Minimization of chances of pollution to groundwater

The O&M plan will need to link with the sewerage system being implemented. This requires technical input from the engineers and should link with maintenance plans for the infrastructure. RDP II has suggested that the community may be able to participate in O&M of the sewerage system in the following ways:

- Forming consumer groups and keeping the utility company informed of any Operation and Maintenance issues
- Providing local manpower to be trained and employed by the utility company
- Forming a company to work as sub-contractor of the utility company for Operation and Maintenance of sewerage system
- Taking responsibility of collection of bills for the utility company

Waste Management O&M

As well as the waste management centers, some island offices will be supplied with a range of equipment for their effective functioning including: generator sets, crusher (can/glass), shredder (plastic), vehicle/truck, vehicle mounted hoist, batch composter, Jib Crane, wheelie bins (120/240L), and Commercial Bins (660L) (RDP II 2004). The O&M plan will need to link with the waste infrastructure being utilized. The fees for waste management may be grouped with other utility fees. This requires technical input from the engineers and should link with maintenance plans for the infrastructure. The waste management approach is directed towards separation as a priority with up to 80% organic matter. In general the RDP II will seek to achieve:

- Minimization of waste.
- Segregation of waste at household level.
- Composting or waste energy schemes.
- A regional strategy to take into account the island waste management requirement.

O&M Implementation Considerations

It is clear from the information collected in developing this framework that effort should be made to include communities in the operation and maintenance of infrastructure, but it is also evident that there is no generic way to achieve this. In terms of sustainability, the greater the role the community has, the greater the capacity and motivation of the community to take on the O&M of the infrastructure will be and the more likely it is that the utility will be run effectively and efficiently. The O&M costs for infrastructure without community input may be overwhelming and result in an unviable system.

The following table is from UNCDF (2005) and highlights issues for consideration in community based O&M.

Issues in community-based O&M

Issues	Remarks
Representation in O&M arrangements	This can be complex and will vary considerably depending on the type of investment. For example, customary authorities may need to be represented on a small-scale irrigation scheme, in order to take account of land tenure and labour mobilization issues.
Appropriate management structures for O&M	There is a tendency for LDPs (or LGs) to promote committees at all levels, regardless of the management issues. In some cases, it may not be necessary to establish committees, but simply to ensure that one or more individuals take responsibility for dealing with O&M. A shallow, hand-dug well might be an example of the kind of investment that does not need a formalized committee for successful O&M.
Appropriate management practices	O&M for amenities such as hand pumps has certain financial implications, as funds will be needed to buy spare parts. In such cases it is worth keeping things as simple as possible – there may be no need to use sophisticated and costly methods. Users may not be required to make regular monthly contributions to ensure O&M but simply be prepared to contribute funds as and when necessary.
Appropriate oversight	A key issue in community-level O&M involving financial management accountability is the extent to which local ‘managers’ are subject to local oversight, which may come from both the local community and LGs.

There is an expectation from many islands that they will be provided the same level of service as on Male’, and while the government is seeking to do this, economies of scale will result in a service disparity. The large population in Male’ means that the per capita cost is significantly reduced. The smaller the community the higher the per capita cost is likely to be, making the provision of services more costly. The typical income in Male’ is higher than on the islands (especially the smaller islands), so in effect the most expensive infrastructure costs will be in places that can least afford them. Some form of subsidy or an appropriate fee structure will be needed. Without such mediation and community input, communities may become antagonistic towards utilities and rally against them. The system for the billing of utilities will need significant consideration. As mentioned above, there are disparities in the cost and ability to pay in different locations, but there are also issues of enforcement to consider. It is not feasible to cut off one household’s sewer service if they are not paying. It will be more effective to work with the community to identify ways to ensure compliance and to identify those in the community that might require additional support. There are also non-financial factors that will influence willingness to pay and the level of community participation for O&M, one of the most notable being misunderstandings about the utility, fairness compared to Male’, a lack of ownership in the process, and the intra island politics.

Significant consideration needs to be given to how to balance the commercialization of utilities with the involvement of communities. The concept of public-private partnership is a positive theoretical model but in practice this relies on both groups having good capacity and greatly benefits from a third party or regulator to assist in conflict resolution. There is already a case where a community and a utility company are in court to resolve a disagreement. Ultimately, a level of flexibility is needed in the structure for O&M so that it can be responsive to the capacity and motivation of the community.

There are models and strategic approaches that can be recommended, but the most important consideration is that different communities will be involved in different ways. As mentioned in the document, there is no blueprint that will suit all communities. The full role of the proposed utility companies is not known, but it is important to identify the need for such companies to make an active effort to work with communities. As such the utility companies will need to have skills in working with the communities. There should also be specific criteria and utility companies should be compelled to meet key requirements in regard to working with communities. Some of these criteria are proposed in the following recommendations.

The draft Framework for Maintenance of Community Infrastructure requires detailed discussion and feedback from the RDP II project staff and consideration of the implications to regional utility provider contracts. Based on the aforementioned considerations, the proposed implementation for the Framework for Maintenance of Community Infrastructure is highlighted in the table below, which also includes an overview of the timing for

community organization activities. This draft framework is a note to stimulate discussion among the key stakeholders in the process of moving toward linkages to community O&M for regional utility companies.

Sonia Chirgwin, in her 2010 Scope Study on the Potential for Recycling of Waste Materials on Islands in South and North Ari Atolls, describes the institutional context as follows:

"[The waste management institutional landscape] is an area of recent and ongoing change. The following overview outlines the structure of waste management roles and responsibilities as of January, 2010.

The Environment Protection Authority (EPA) is an autonomous unit, under the Minister for Housing, Transport and the Environment. There is a Waste Management Section within the EPA, whose role is the development of policy, regulation and guidelines for the sound management of waste in the Maldives.

The EPA was recently the Environmental Research Centre (ERC) within the Ministry structure. As part of various initiatives, staff within the waste unit have had a lot of experience in waste management planning and community mobilisation. Their role is now shifting to one of regulatory and policy development, as well as being the agency to enforce these standards. This is a move away from an implementation role, and as such the EPA will require ongoing capacity building to undertake their new functions.

The Waste Management Corporation is a newly formed Government Enterprise. They have the mandate to plan and implement an appropriate waste management system for the whole of the Maldives. They are currently working with the International Finance Corporation (IFC) in an Expression of Interest (EOI) process seeking a joint venture partner. This partner will bring expertise and direct experience in the waste management sector, as well as investment capital to improve the waste management systems and infrastructure. The initial EOI process closed at the end of January 2010, with a short list process to follow, and then an analysis of more detailed proposals from the short-listed companies.

The Thilafushi landfill was developed and managed by the Male' Municipality. Originally a reef and lagoon system, it has been reclaimed through landfilling to create an island now known as Thilafushi. With landfilling of waste commencing in 1992, the site now caters for a wide range of industrial uses, most situated on land reclaimed through landfilling waste. The overall management of the site has been handed over to a separate Government Corporation, the Thilafushi Corporation. Like the Waste Management Corporation, they are also in the process of seeking joint venture partners. The Thilafushi Corporation now manages the industrial estate, leasing the land to the existing tenants and undertaking the planning for future leasing as the space increases. They have no direct involvement in waste management, but simply act as the land owners. The landfill facility currently managed by Male' Municipality, is in the last stages of a process of handover to the Waste Management Corporation. This transfer includes infrastructure, machinery and staff."



4

Recommendations

This framework has identified a range of considerations for community involvement in the operation and maintenance of utilities; however there are many variables that will impact the direction that should

be taken for each community. The following are some broad recommendations that should assist in effective operation and maintenance of utilities in the Maldives.

Encourage active community engagement and develop local community capacity for management, operation and maintenance of utilities with community management as a longer term goal.

- Establish and provide incentives for representative community utility committees.
- Develop education materials for understanding and training for skills development.
- Follow a mobilization approach in working with communities to integrate in the proposed RDP II O&M manual.

The approach to utility management, operation and maintenance should be flexible so as to be responsive to the different situations on different islands.

- Develop a range of potential models that can be adapted to variable situations, including community groups as sub-contractors or contractors for the utility company.
- Develop case studies based on the RDP II pilot islands.

Utility management should be overseen by an independent regulatory body with enforcement power so as not to place extra pressure on the court system.

- Learn lessons from international examples to develop potential approaches.
- Develop responses to different scenarios.

Have government and public forums to discuss the issue of subsidies/incentives for utilities with representation from community groups.

- Scenarios of cost per capita for utilities from large, medium and small populations.
- Identify subsidy/incentives potential for higher per capita costs from lower per capita costs.

Develop business plans and contracts for utility companies that include specific community involvement criteria.

- Scenarios for the cost benefit for utilities in large, medium and small populations.
- Identify approach for utility companies to be responsive to communities.





5

Annex 1: Community

In order to understand the concept of community you must first have a sense of the boundaries to that concept. The word '*community*' reminds us that humans are social animals. You need to know as much as possible about the social, environmental and cultural aspects of the community. This shouldn't just be facts: a community is how these aspects are linked. Brown emphasizes that community is a word that encompasses many different types of social groups, organizations, and/or institutions, and may include locations such as villages or groups of villages, community councils, church groups, youth groups, women's groups, community banks, or kinship groups, (2001). Whereas Bartle further describes community as a collection of individuals that is changing as they enter and leave by birth, death and migration, (1999). It should be emphasized that just by defining a group as a community it does not mean generalizations can be made. In the Maldives this is very apparent, as island communities in quite close geographical proximity still exhibit distinct variation.

The MDG country report 2007 shows that the Maldives are excelling in most areas but falling behind in meeting two important Millennium Development Goals.

Communities are influenced by a range of factors, including the cultural, environmental and societal forces that they are found within. The following section seeks to provide a cultural context from which to better understand community. The complimentary concepts of community mobilization and community engagement are considered from a theoretical and then a more specific Maldivian perspective. The community engagement section specifically provides examples of traditional, social and environmental community activities.

Cultural Context

There is a growing base of information to gain a more in-depth understanding of the cultural context of the Maldives. Rather than replicate this work we acknowledge the existing materials and use these to highlight a relevant cultural context. The following section is based on three key documents: The Maldives Study on Women's Health and Life Experiences (Fulu, 2007), Millennium Development Goals: Maldives

Country Report 2007 (Ministry of Planning & National Development, 2007) and the Maldives Study on Women's Health and Life Experiences (Fulu, 2007).

Millennium Development Goals: Maldives Country Report 2007 (Ministry of Planning & National Development, 2007):

"The environmental sustainability goals present us an entirely different set of issues. The causes of the significant threats we face are beyond our control and occur outside our national boundaries. The option for us to tackle global climate change and sea level rise is adaptation" (Hamdun Hameed, Ministry of Planning & National Development, 2007).

The MDG country report 2007 shows that the Maldives are excelling in most areas but falling behind in meeting two important Millennium Development Goals namely (i) *Goal 3 Promote Gender Equality and Empower Women* and (ii) *Goal 7 Ensure Environmental Sustainability*. The report also highlights that in considering localization of MDGs much of the data required for these indicators is not available.

Community Mobilization

Community involvement doesn't just happen, it must be stimulated and nurtured. If attitudes are wrong, participation will not work, whereas if attitudes are right we can be surprised by what local people know and do (Chambers, 1994). The key principle to enhance the effectiveness of community mobilization is the participation of the community. There are many proposed ways of doing this. The IUCN et al emphasise that "community participation helps ensure that decisions are sound and

all parties will support them," (1991, p60). "In the end, the opportunity for people's participation in any society is determined by the quality of civil and political rights that they are accorded: in a word, political freedom," (Kirkby et al, 1995, p311). As the Maldives moves toward a more decentralized system of governance, with increasingly less centralized decision-making, the participation of the community will have the opportunity to grow.

Empirical evidence on effective environmental solutions globally supports the conclusion that purely top-down, hierarchical approaches do not produce sustainable results (Brinkerhoff and Crosby, 2002). Community engagement encourages citizens to be proactive in their attempts to resolve environmental challenges. Unlike traditional centralized environmental management, which often neglects the political and social dimensions of environmental issues, once it is accepted that the local communities are the major stakeholders in environmental management, the decision-making process starts to become more practical and less political: it is led by the people who are most affected and know the complexity of the issues. Community participation in environmental management includes a range of approaches, such as citizen monitoring of environmental pollution, citizen participation in local planning and resource restoration efforts known as "community based environmental management" (CBEM,).

The centralized and typically top-down approach to make and enforce policy that is used in the Maldives is reflective of most government approaches across the world. However, unlike many other countries the Maldives are actively working towards decentralization. The communities are acutely aware of the longer-term environmental changes that are impacting quality of life and want to see the government act on these issues. The

Goal 3: Promote Gender Equality and Empower Women

Target 4: Eliminate gender disparity in primary and secondary education preferably by 2005 and at all levels of education no later than 2015



Goal 7: Ensure Environmental Sustainability

Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

Target 10: Halve by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation

Target 11: Have achieved, by 2020 a significant improvement in the lives of at least 100 million slum dwellers



communities in the Maldives are varied. Some islands have continued to have a certain level of community autonomy even under the centralized system of government, while others have become very reliant on the centralized government. The government's moves toward decentralization are expected to make significant in-roads into promoting increased community participation across the Maldives. Such a change is not likely to happen swiftly, there is often resistance to change. There will be some transition time, and this is likely to vary between communities.

Community engagement encourages citizens to be proactive in their attempts to resolve environmental challenges.

Community Engagement

As the project is concerned with mobilizing communities for environmental management in the Maldives, the following highlights some examples of community engagement that are drawn from traditional, social and environmental responses to situations. Specifically this will provide a context for developing the framework for community based operation and maintenance of infrastructure.

Traditional Community Engagement

The remote and small size of many of the communities in the Maldives promotes communal activities. There are a range of traditional communal activities, which include: Rayyithunge fenvalhu (communal well); Rayyithunge thaangee (communal water tanks); Goifaalabba or Hinna (communal agriculture plots); and Holhu-ashi (communal sitting area). The traditional communal activities were typically linked to the environmental necessities of water, food and shelter.

The Tsunami has in some ways served as a reminder of the tradition of community cooperation in the Maldives. Communities already have communal use of environmental resources. Water has historically been a resource that is considered in a communal way, with communal wells available at mosques, government offices and even private houses. Waste management was not effectively dealt with in the traditional communal setting and as populations grew there was increased spoiling of groundwater. The tradition of communal water has not stopped but rather adapted and now there are communal rainwater storage sites.

Communal use of water has very strong links to religion and care for water is a tenet that is found throughout the Quran. Traditional shelters known as Holhu-ashi are communal sitting areas found on most islands and are considered places where people can speak their mind with no retribution. What is said there remains there, allowing people a level of personal expression while not disrupting the community as a whole. These sites also serve as a point of hospitality to allow people from other islands to come and rest and, if necessary, stay. Many of the inhabited islands have ports that were traditionally built and maintained as a communal activity. The scale of building required for some of the ports is considerable and shows a high level of cooperation and collaboration at a community level.





Social Engagement

The communities in the Maldives have also been mobilized on social issues such as health and recreation. In regards to health, there are initiatives linked to community mobilization on specific issues. The Ministry of Health is working with other ministries, WHO, UNICEF and UNDP on communication for behavioral impact (COMBI) for dengue fever prevention and control in the Maldives. At a national level the work that Society for Health Education has done on mobilizing a response to thalassaemia, is a very positive example of just what can be achieved.

Many modern signs of community engagement can also be seen throughout the Maldives. Some of these are not apparent when first entering an island but become apparent over time. The Women's Development Committee run a cafeteria and share the business and bookkeeping responsibilities. In preparation for the football World Cup, the ability of many communities to mobilize for an issue became apparent. For example community groups in Guraidhoo (GEM and WDC) raised over US\$30,000 in order to purchase a projector and screen to televise the World Cup matches for the community. There are stories from most other communities throughout the Maldives that also came together to ensure there were communal facilities to watch the games.

Environmental Engagement

There are many ways that the community comes together and mobilizes on specific environmental issues. The aforementioned traditional activities are mostly responses to core needs of water, food and shelter, whereas the social activities respond to health needs and recreation desires. In a modernizing Maldives with increasing population there is growing pressure placed on the environment and this has resulted in some significant areas that require environmental management, particularly in regards to water, waste and energy.

In-line with the government's moves toward decentralization, efforts are being made to localize environmental management, but there are no clear models to follow. The Tsunami, and corresponding influx of donor money, served to accelerate environmental infrastructure at the community level, but this accelerated approach may have some significant side-effects. Water was a key priority and rainwater tanks and plumbing was provided for most communities, but many lack an understanding of the way to locate, operate and maintain these tanks effectively. Waste management centers have also been developed, but there is still a lack of larger transport infrastructure to deal with the waste. This means the waste centers are filling quickly and communities are falling back into poor waste behaviors.

Lessons Learnt

In reviewing the aforementioned examples of community engagement in environmental management it can be seen that they are not really following any model, the communities are responding to an issue. There are considerations that can be drawn from this, but the time and resources to effectively case study each of these approaches is not available. As such we will look at the lessons from the community environmental management initiatives under the ADB - Post Tsunami Environmental Management Project. These can be used to assist future community organization and mobilization efforts in the Maldives from government, local and international NGOs, especially in regard to community infrastructure.

Increasing community awareness without the appropriate and ongoing actions can serve to disempower. With this in mind, the framework will seek to further simplify and focus on small practical actions that may serve to provide a positive platform for future community engagement. It will also be important to link the framework with actions that help to reduce reliance on external support, significantly to reduce expectations that others will come and solve problems. The major focus of the framework is linked to operation and maintenance and this is detailed further in the next section.



6

Annex 2: O&M in the Maldives

Operation & Maintenance of Infrastructure - Maldives

While many examples of the importance of O&M are drawn from international text, there is limited detail on the situation in the Maldives. In the 2004 State of the Environment report, the importance of periodic monitoring and maintenance of water supply services is highlighted and increased community participation is recommended. In regard to waste management, a lack of resources, institutional capacity and public education are identified as barriers (Ministry of Environment and Construction, 2004). The accelerated move toward environmental infrastructure at the community level, as described previously, has significant implications in regard to O&M. Much of the infrastructure has been put in place without adequate input from communities. It is therefore of increased importance to engage with the community to make the O&M more effective.

The limited guidance and ongoing support in the locating, set-up and maintenance of rainwater tanks in many parts of the Maldives has contributed to water quality issues, which were highlighted under RDP I. Similarly, waste management centres filled too quickly due to a lack of simple separation of waste, thereby creating increased pollution and pest issues for some communities. With more emphasis on the software side of infrastructure (education, training and social), such issues can be mitigated and O&M can become more effective.

O & M Infrastructure in Male'

Male' Sewerage Company (MWSC) is a company where the majority shares are owned by the government, and is responsible to its Board of Directors. MWSC is operating and maintaining the water supply and sewerage system in Male' without any budgetary support from the Government of Maldives. This maintenance and operation

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is conducted on a commercial basis with a tariff charged for water supply only. Presently there is no separate tariff for sewerage operation and it can be inferred that waste user charges wholly sewerage operation and maintenance costs.

The new utility companies formed under the framework of the recent decentralization policy, and owned by the government will be responsible for institutional arrangement and service delivery. However, building community participation is a key element of action that ensures community ownership and increased sustainability. Increasing community involvement, raising awareness, and capacity building at the community level can lead to local manpower for the utility companies to effectively manage the infrastructure and the prevention of vandalism at the community level.

Community Infrastructure

The following provides some positive examples of existing community involvement in water and waste infrastructure in the Maldives. This provides some guidance on what is currently working so as to direct the framework. While this section highlights some of the more positive responses to environmental issues, there are also a range of anecdotal comments of just how dependent or disempowered some communities have become. Many of these stories revolve around households that wait for government staff to replace light bulbs or water taps, but there are also many pieces of machinery for environmental infrastructure that are lying idle, including desalination plants, waste crushers and waste shredders.

Community Based Water Management - Examples



Case Study:

Installation of RO plant - Sh. Komandoo

In February 2004, in order to supply drinking water to the community, the Island Development Committee of Sh. Komandoo initiated and set up an RO plant which generated 25,000 liters of water per day. In 2006, the island started generating 5,000 liters of water per day. Later, a third plant was set up, which generated 10 tonnes of water per day.

In 2004, the water storage capacity of the island was 20,000 liters. However, in 2006, in order to increase the water storage capacity of the island, the Ministry of Environment, Energy and Water provided financial support (56% of the total cost) to the island. Thus by January 2007, a storage capacity of 80,000 liters was built in the island. Advantages of the initiative which was launched in 2004 include:

- the seasonal spread of diseases decreased immensely
- there is always enough drinking water for the community, even during droughts
- there is easy access to water for construction purposes
- there is easy access to water for fishermen and travelers
- starting in 2006, there is easy supply of water to the resorts near the community
- there is easy supply of water to communities near Komandoo at times of need (for example, in 2007, Komandoo supplied water to nearby communities during a scarcity at the request of the Ministry of Environment, Energy and Water)



Case Study:

Water Quality Monitoring - Isdhoo Kalaidhoo

Kalaidhoo (Isdhoo)- One of the health workers from Isdhoo-Kalaidhoo was very surprised that during the training her rainwater went black (showing fecal contamination...) She justified it by thinking that it might be due to a crack in the tank or due to overhanging branches from a water apple tree. She was getting water from communal tanks that were clean while alterations and cleaning of her rainwater system were being done. She tried emptying the rainwater tank, and replacing and moving the gutter to the other side of the roof where the tree branches and fruit would not affect it. She is also fitting a first flush system. She explained that after the training she understood that perhaps the branch overhanging the roof would attract rats and birds. These animals may defecate on the roof and this would go into the tank. This is a very significant behavior change observed and since she is a key health worker in the community this will have a significant impact on the community members she is working with.



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Case Study:

RDP II Water management - A. Dh. Mahibadhoo

A. Dh. Mahibadhoo was one of the 9 islands selected for the Environmental Awareness Community Mobilization (EACM) component of the RDP II project during the first phase of the project in the year 2008. In August 2008, a community facilitators training program was conducted in Male', where 2 candidates participated from each of the 9 project islands. The community facilitators went back to their communities and conducted community awareness training on water and waste management. It was in mid October 2008 that community training was conducted in A. Dh. Mahibadhoo.

The training was very successful, and there was an impact of the training on the behavior of the participants. Rather than training each and every person on the island, the ripple effect of the behavior changes of the participants of the training program was an effective method of getting messages across to the larger community.

Before the training many of the community members were hardly aware of the amount of water that they were wasting. But after the training, they started to let the less contaminated water dispose to the ground for recharging ground water. They started this with the water they use for rinsing after washing.

The participants have never in their lives been so conscious not to waste water. They have even started to collect the water that they use for ablution and use this water for other purposes.

Community Based Waste Management - Examples



Case Study:

RDP II Community Environmental Management - A. Dh. Mahibadhoo

Participants have started composting in their garden. Now they don't throw away the garden and kitchen waste but use it to develop "Kaadhu" manure for their plants.

Before the training, no one separated waste before taking it for disposal. But now many people on the island of Mahibadhoo separate household waste everyday. They separate organic and inorganic waste, crush cans and bottles to reduce their volume, and take them to designated areas for waste disposal. Separating waste at the household level has made it easier to dispose of the waste at the disposal sites.

Because of the training, the participants have understood the negative impact of plastic bags to the environment. They have learnt that in the case of plastic bags, most of them find their way to the sea and become a menace to the coral reefs and to endangered species such as turtles. So they have decided to reduce the use of plastic bags. The alternative they are using is the cloth bag because they have learnt that cloth bags are more biodegradable than paper bags and also will produce less waste because they are reusable.





Case Study:

Community waste management centre - Rimbudhoo - South Nilandhe (Dhaalu) Atoll

The Island Waste Management Centre (WMC) of Rimbudhoo is one of the most well kept, well maintained centres in the country. Plastic and metal compartments are completely packed and other compartments are also full to the capacity. The residual bay is partitioned and is used only for plastic and metal items; organic materials are not taken to the centre.

The local community is well aware of good waste practices of separating waste at the household level and the 3R method. All kitchen waste are thrown into the sea and yard waste and other organic waste is burnt. Plastic and metal items are taken to the WMC.

Despite the fact that Waste Management Centre of Rimbudhu is one of the most well kept centres in the country, it is compacted to the capacity and the community is seeking other means to manage the ever increasing waste. So far they handle the situation well by taking only non-degradable items to the WMC. However, in three months the residual bay (the only available space) will be full.

The shore line of Rimbudhoo is well kept; women and children often go to the beach for leisure in the evenings. One could observe women gossiping and children playing on the beach during the later part of the day.

The Environment Club of Rimbudhoo School is one of the most active environment clubs in the whole country. They have been very active in keeping the community clean. They have kept standard size dustbins (12kg) in different areas of the community; including the harbor, shops and the school compound. These bins are used only for recyclable items. The members of the club empty the bins once a week.



Case Study:

Community based waste management, Thaa Madifushi - Minarat and Hiythiri shop

After an awareness programme run by ERC Waste Management Section, Mohamed Hussein (Mohamed Didi), the owner of Minarat Shop, decided that he would not give away plastic bags freely; instead he charges 50 laris for each plastic bag. This encouraged locals to bring their own bags for shopping. Mr. Mohamed Didi said that majority of people who shop in his store bring their own bags for shopping.

Mohamed Rasheed, the owner of 'Hiythiri' on the same island, decided that he would give a discount if people brought their own bags or the reusable bags that ERC provided during the awareness programme. This resulted in a considerable amount of reduction in the consumption of plastic bags in the island.

An awareness programme was held in Madifushi on 30th July 2008. Mohamed Rasheed stated that before the programme, his shop gave away about 200 plastic bags per day, but after two months this amount was reduced to only 50 bags. That is staggering 150% reduction.



Case Study:

Polluter Pays – Financing O&M for Waste Management

In Noonu atoll Holudhoo, a 'Polluter Pays' system has been established since 2005. Island Chief Mohamed Rashid explains "from July 2005 we have implemented a system in this island where fees are being collected from households, businesses, government owned and private owned properties and unused housing plots. The fees range from 5 to 30 rufiyaa per month, and the amounts were decided as a result of a survey carried out with a total of 423 households in the island. The amounts were identified from the survey, and were further verified by the island office upon further consultations with the community members. The money collected from the community is used to carry out the waste management activities on the island.

The need to consider the cost of waste management services has been included in the Island Waste Management Planning guidelines developed by the Environment Research Center. The guidelines outline where the costs for providing waste management services come from:

- Costs of collection systems on the islands (i.e. taking the waste to the island waste management center);
- Costs to operate the Island Waste Management Centers (including staff costs/running costs e.g. diesel to operate shredders/can crushers etc);
- Costs of transporting waste off the islands to the nearest regional waste management facility; and
- Costs of disposing of waste (including staff costs/equipment costs).

Whilst the introduction of a 'Polluter Pays' scheme will help to cover the costs of waste management services in the Maldives, the primary purpose of introducing such a scheme is to promote waste reduction, reuse and recycling practices on our islands. By levying a fee for the amount of waste produced, there is an incentive to reduce the amount of waste. Therefore, community members will have an incentive to reduce and reuse waste and separate out recyclable waste, such as plastics and metals. The amount of waste requiring disposal will be less and this will reduce the overall costs of waste management services to the whole community. In this way islands will be working together - sharing the costs and benefits of better waste management.



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Annex 3: International O&M issues

A lack of O&M has been identified as creating key infrastructure problems from locations around the world. The following three examples from Cambodia, Malawi and Ethiopia provide a representation of some of the issues.

These examples have been drawn from the UNCDF report from 2005 *Delivering the Goods - Capacity to Achieve the Millennium Development Goals: A Practitioner's Guide from UNCDF Experience in Least Developed Countries*

Cambodia: "Project maintenance is a perennial problem for all rural infrastructures, and this is especially true in Cambodia. The evaluation team visited many projects that had been constructed to an acceptable standard, but were deteriorating after only one or two years without adequate maintenance. Roads become impassable after a couple of rainy seasons, fences around ponds fall down, and water pumps break."

From: CARERE - Final Evaluation Report (2000).

Malawi: "The maintenance systems for boreholes and schools were partly functional. In either case, the committees have special funds created with the purpose of facilitating maintenance processes if need arises. The problem, however, mainly for boreholes, is that the committees never collect adequate funds to ensure prompt maintenance in the event of a breakdown. The funds are often inadequate, especially

in cases of frequent borehole breakdowns arising from overuse. Spare parts are very expensive and as a result, the committees tend to resort to repairing old spare parts, which often leads to persistent breakdowns. The other problem is that there is widespread shortage of local expertise in borehole repair and maintenance. The deficit is pronounced because only a few people are trained in the basic repair and maintenance skills upon project completion."

From: *Malawi Decentralization Impact Assessment Report (2002)*

Ethiopia: "Within less than a year, two of four taps at one water standpipe facility had been broken, reducing by half water access and increasing waiting time, to the evident frustration of several women standing by; but after several months, no action to replace them had been taken. Water users claimed that no one in particular was responsible for maintaining the facility, and that no cost-recovery mechanism had ever been discussed whereby new taps might have been purchased; nor had they any clear idea of where taps might be bought."

Observations from: *Woreda Development Fund Technical Review Mission (2000)* (As shown in UNCDF 2005) (http://www.uncdf.org/english/local_development/docs/thematic_papers/0510_Delivering/UNCDF_LDG2.pdf)

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Annex 4: Engaging Communities in O&M

Engagement of communities is necessary for the effective and efficient operation and maintenance of community infrastructure. An O&M Framework developed in Uganda highlights the following potential benefits: efficiency, improved health and less dependence on external organizations (Uganda, 2001). The level of specific actions that can be conducted by the community may vary significantly but the more engaged the community is the more chance of success. In response to the growing awareness of the need for more community engagement for effective and longer-term benefit of community infrastructure, a variety of approaches have been developed.

Community Based Maintenance System

In Uganda the importance of O&M led to the development of a country level Operation and Maintenance Plan. Through their investigations one of the management options for O&M was Community Based Maintenance System (CBMS), which is widely endorsed and regarded as one of the best options; however, community participation and involvement at decision-making level right from the beginning of the water supply development is a pre-requisite (Uganda, 2001). Furthermore, continuous community sensitization and mobilization is required. In developing the Operation and Maintenance Plan for Uganda they highlighted that it should comprise the following components: “description of the water facility, management structure, description of O&M activities, O&M budget, strategy for increasing household latrine coverage, regulatory issues, and environmental issues (Watsan Uganda, 2001). By incorporating a community based maintenance system within a holistic O&M plan this approach is given better chances of success.

Community Managed Water Supply Schemes

The Community Managed Water Supply Scheme is based on the following seven steps: start up activity, sensitization and identification phase, planning and designing of scheme, training & capacity building, implementation and commissioning, execution of community managed water supply scheme capital works, and post execution activities. The enabling framework for community managed water supply schemes in India highlights the following four fundamental reform principles:

1. *Adoption of a demand-responsive approach along with community participation based on empowerment of the community to ensure their full participation in the project through a decision making role in the choice of the drinking water scheme, planning, design, implementation, control of finances and management arrangements;*
2. *Community's full ownership of the assets through Community Water and Sanitation Committees (CWASCs);*

3. *Community to bear full or partial capital cost of community asset on a sharing basis amongst themselves. This may be either in cash or kind including labour or both. 100% responsibility of operation and maintenance (O&M) with the community;*
4. *Shifting the role of Government from direct service delivery to that of planning, policy formulation, monitoring and evaluation, and partial financial support (Mudgal, 2006).*

Community Driven Development

The World Bank (2005) describes Community Driven Development (CDD) as giving "**control over decisions and resources to community groups**" and describes this as "**a way to provide social and infrastructural services, to organize economic activities and resource management, to empower people, improve governance and enhance security of the poorest,**" they also highlight 4 types of CDD as follows:

Enabling Environment	Participatory Elected Local Governments	Community Control and Management of Investment Funds	Community Control without Direct Management of Investment Funds
Policy and institutional reforms oriented toward increased control of decisions and resources by community groups and/or by participatory elected local governments.	Elected local governments make decisions on planning, implementation, O&M in partnership with different neighborhood or community groups.	Community groups make decisions on planning, implementation, O&M and community management of investment funds.	Community groups make decisions on planning, implementation, O&M, without directly managing investment funds.

There are five basic principles or pillars described within Community Driven Development, which include:

- “Empower communities: participatory diagnosis and decision making, resources and authority to implement; co-financing
- Empower local governments: fiscal and administrative decentralization, block grants
- Re-align central agencies to ensure service delivery at the local level: from direct service delivery to policy, standard setting and enforcement; facilitation and training, monitoring and evaluation
- Ensure transparency and accountability at all levels
- Make it a learning by doing process and build capacity and partnerships along the way,” (World Bank,2005)

Sustainable O&M

Sohail et al provides some recommendations on how O&M can be more sustainable through the collaboration of communities, NGOs and municipalities. These include:

- “No system/technology should be installed unless a proven maintenance system, approved by all stakeholders, is established to support it;
- Even the poorest of communities have capacity to pay for minor O&M, provided appropriate technology has been chosen;
- Commissioning ceremonies to formally hand over projects to communities have symbolic, legal and practical significance;
- There is a need for ‘de-projectisation’: maintenance of facilities and enthusiasm beyond the typical project cycle;
- Communities should be helped to formalise O&M procedures by developing manuals, stock lists, work sheets and records of faults and repairs; and
- Legislation is needed to create an enabling environment for community engagement in O&M.” (Sohail, Cavill & Cotton, 2001)

Community Led Total Sanitation

The CLTS approach focuses on community engagement as the priority, the design for the sanitation is a secondary consideration. It seeks to place more emphasis on software than the hardware but is ultimately reliant on appropriate sanitation design, but if the process is too focused on software there may be a loss in technical skills (WWW, 2008). Ultimately, it is about finding the appropriate balance between software and hardware: between community engagement and appropriate technology.

O&M Audit

The O&M Audit is a systematic community-based activity, which uses participatory methodologies like interactive discussions, interviews, and guided walks along all structures of the facility. The audit is based on 5 steps including: planning and preparation, audit visit, report preparation, community de-briefing, and follow-up. The proponents that have used this approach found a high degree of responsiveness and that it stimulated positive actions. As such it shows some of the important considerations.

Community Managed Water Supply Scheme

Community Mobilization for Execution & Management of Water Supply Schemes (Mudgal, 2006). This highlights seven strategic phases for implementation including: start-up activity, sensitization and identification phase, planning and design of scheme, training and capacity building, implementation and commissioning, execution of community managed water supply scheme capital works, and post execution activities.

Environmental Monitoring

Any approach to involving communities in O&M should also include levels of environmental monitoring, as adapted from the EIA Regulations 2007. Environmental Monitoring plans should include:

- Site characteristics (show site, sensitive areas and location of infrastructure)
- Technical specifications (water and waste infrastructure)
- Parameters to be monitored (should be developed with technical input)
- Monitoring methodology (how it is done, by whom and how often)
- Monitoring locations (map locations for collection of regular data)
- Monitoring controls (provide baseline data set to compare against)
- Capacity (base skills of people monitoring)
- Reporting (standard reporting procedures)
- Resources (what is required to conduct monitoring)
- Contacts (who to contact and when)
- Contingency (in case of emergency)

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