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# Purpose

## Introduction

This guidance note aims to assist program managers with the design of sustainable rural water supply services in Rwanda. The guidance note focuses on small piped water systems and provides advice on issues concerning service management, how the quality of a service should be assessed, important considerations for a system’s design and the role of national and local government agencies in supporting service provision.

This document has been developed following a study of rural water supply services in Rwanda in 2014. The study was commissioned by the Norwegian Red Cross Society to learn from the International Federation of Red Cross and Red Crescent Societies’ significant investment in rural water service provision in Rwanda, and to further guide future initiatives in the country.

This guidance note has been drafted in response to the need for a clear framework to guide the design of sustainable rural water supply services. This focus has allowed for a degree of specificity that is not currently provided for in existing guidelines.

A framework has been developed that identifies the key conditions that need to be in place to support sustainability. Each condition has a dedicated chapter that explains the practical issues and considerations that program managers need to address when designing a rural, small piped water system.

The intended application is not limited to Rwanda. This guidance note uses the case of Rwanda to illustrate the issues and challenges facing program design. It remains broadly applicable and can serve as a guide in any country where a rural, small piped water system is being planned.

## Associated Guidance Notes

This document should be read alongside the following guidance notes and reference materials:

* Gender in Water, Sanitation And Hygiene Promotion
International Federation of Red Cross and Red Crescent Societies, 2012
* Water and Sanitation for Disabled People and Other Vulnerable Groups

Water, Engineering and Development Centre (WEDC), Loughborough University, 2005

* Realising The Human Rights To Water And Sanitation: A Handbook By The UN Special Rapporteur

UN Special Rapporteur on the human right to safe drinking water and sanitation, 2014

* Water Safety Plans: Managing Drinking Water Quality from Catchment to Consumer

World Health Organisation, 2011

* Key Determinants of a Successful CBDRR Programme

International Federation of Red Cross and Red Crescent Societies, 2012

* Briefing Note 1a: Life-Cycle Costs Approach
IRC International Water and Sanitation Centre, 2011
* Literature Review: The Effectiveness and Sustainability of Rural Water Supply Systems in Development Contexts
Norwegian Red Cross Society, 2014
* Determinants of Service Sustainability:
Small Piped Water Schemes in Rural Rwanda

Briefing Paper, 38th WEDC International Conference, Loughborough University, 2015

# Guiding Framework

## Goals

In essence all water supply programs are seeking to achieve the same aim: that the target community receives access to a supply of safe water and that this access is sustained over time.

This aim has been adapted into a goal statement, but with a critical change – the emphasis is on sustaining measurable service levels over time. These service levels include functionality but also capture broader aspects of service quality that can influence whether a community is prepared to pay for a service (whether through levies or tariffs).

A second goal is also proposed: that service levels will *improve* over time. This ideal goal looks beyond the initial investment to longer term system upgrades (such as household connections to piped water) and improvements in the capacity of service providers (such as responsiveness to breakdowns).

*Goal: A basic level of service is maintained over time*

*Ideal Goal: Service levels improve over time*

## Conditions

What conditions need to be in place to ensure that these goals are successfully realised?

There are a number of drivers behind a services’ sustainability. These drivers include the local government’s technical capacity and financial support for the rural water sector, the service provider’s ability to recover costs and repair breakdowns, the system’s technical suitability and the community’s ongoing satisfaction with the system’s design and the service’s performance.

A 2014 study into the factors underlying the sustainability of rural water supply services in Rwanda indicates that five key conditions need to be met:

**Basic levels of service are in place.** The definition ofmeasurable service levels serves two functions. Firstly, they allow a basis for clarifying expectations, tracking performance and establishing accountability. Secondly, they assist monitoring agencies to understand why a community may choose not to pay for a service, sending warning signals on the service’s long term financial viability.

**A supportive enabling environment exists.** The context within which services are delivered is important. The financial and political decisions made by government agencies can have a significant influence on the water supply sector through, for example, prioritising public investment in the rural water sector and regulating tariffs and levies.

**A plan for cost recovery is in place.** An ongoing source of finance for water supply services is necessary for sustainability. Cost recovery plans are needed that clearly define the costs that will be covered by a Red Cross Society, the costs that are expected to be covered by a service provider and any costs that are expected to be covered by the local government.

**A technically appropriate system has been built.** The importance of a technically appropriate design for a water supply system has not changed over time. Designs need to incorporate a range of factors, including the present and future population size, energy sources for conveying water and the local market for spare parts, in order to ensure basic service levels are maintained over time.

**The service provider possesses sufficient capacity to maintain a basic level of service.** The agency responsible for managing the service must have the required skills to operate and maintain the system, to collect and manage revenues and to plan for long term repairs, extensions and upgrades. The agency must be responsive to customer complaints and should be monitored for compliance with regulations and performance standards.

**Basic levels of service are in place**

**A supportive enabling environment exists**

**A technically appropriate system has been built that can service population growth**

**The service provider possesses sufficient capacity to maintain a basic level of service**

**A plan for cost recovery is in place**

# Defining and Monitoring Service Quality

### Condition: Basic levels of service are maintained.

The quality of a service has a direct impact on the sustainability of a service. If consumers are going to provide a sustainable source of revenue for operations and maintenance then the service provider must maintain sufficient demand for the service to ensure that consumers are willing to pay.

**Figure X. The links between performance and sustainability.**

Monitoring the service levels over time is critical. Well defined service levels can assist agencies to understand why a community may choose not to pay for a service, sending warning signals on the service’s performance and potential long term financial viability.

In order to track the performance of a service a set of measurable parameters and standards for service quality are required. Table X presents a framework that defines two levels of service that are measured against five parameters. A ‘basic’ level of service has been defined with reference to established industry standards. A second, higher level of service, defines a measurable improvement on those standards.

The five service quality parameters are:

* **Accessibility**: the extent to which the beneficiary community can easily access water near to their home
* **Affordability:** the extent to which the community can afford to pay charges for the service
* **Reliability:** the extent to which the service is able to provide a reliable supply of water
* **Source of Water:** the extent to which the source of drinking water has been improved
* **Water Quality:** the extent to which the water supplied is safe to drink

Program managers should review these service levels and ensure that they inform the design objectives for a new system. It is also important to conduct baseline and endline surveys to track any change in the quality of the service received by the community (note: a budget for monitoring activities should be included in the program design).

One cross cutting issue to bear in mind is the **acceptability** of the service. Acceptability as a concept is difficult to define, but in the context of rural water supply acceptability encompasses, at minimum, the community’s satisfaction with the location of water points and vulnerable community members’ satisfaction with the design of the water points (for example, is an individual that is dependent on a wheel chair for mobility able to easily reach and use the water point). Both of these aspects of acceptability can be strongly influenced by the extent to which the community participates in the design, implementation and evaluation of a water supply service.

**Table X. Service Quality Indicators (adapted from Triple-S, 2011; WHO and UNICEF, 2012; and WHO and UNICEF, 2014).**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Service Level** | **Accessibility (distance)** | **Accessibility (time)** | **Affordability(scale, 1 – 5)** | **Reliability(breakdowns)** | **Reliability(spot check)** | **Source** | **Water Quality** |
| Improving | ≥ 50% of households have access to piped water on site | ≥ 50% of households have access to piped water on site | 4 – 5 | ≤ 1 day | 80 to 100%fully functional | ≥ 50% of households have access to piped water on site | Progressively satisfies national regulations |
| Basic | < 500 metres | < 30 minutes | ≥ 3 | ≤ 2 days | No more than 30% are non-functional | Public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs and/or rainwater collection | Satisfies WHO guideline values for E.coli, fluoride and arsenic |

## Technical Notes

**Accessibility:** This indicator measures access using two dimensions, distance and time. The distance standard of less than 500 metres draws from the Sphere Project standards for access to a water point. The time standard of less than 30 minutes to collect water (a return trip, including queuing time) for the target beneficiaries draws from the proposed new JMP monitoring framework for the Sustainable Development Goals, which states that a basic level of service must ensure that water collection takes 30 minutes at most, including queuing. Given that this is a rural context, the framework proposes that equal to or greater than 50% of the population with access to water onsite would provide a clear indication that access to water is improving.

Access should be measured through a combination of focus group discussions and measurements of the distance between randomly chosen households and a functioning water point. Note that it is also important to check which water sources are being used by the community to collect drinking water in order to confirm that water is being collected from the system’s water points and not another substitute (such as another system nearby or surface water).

A word of caution. It is important to be clear on who benefits from ‘access’ when setting targets. The handbook *Realising The Human Rights To Water And Sanitation* clearly states that water services should be accessible to people when they are at home, at work, at school, in public places and in places of detention. The design of a water supply service should therefore be careful to consider whether local institutions, such as market places and schools, should be included in the coverage of the water system.

**Affordability:** The service framework above proposes a practical approach to measure affordability. A qualitative measure can be used, whereby consumers rate their views on the price of the water tariff or community levy. Use of a Likert scale with a 1 – 5 rating system is recommended (1 = it is expensive, 5 = it is cheap). Note that it is important to examine any variability in consumer views on affordability, as any variability may indicate that some members of the community may not be able to afford to purchase the same amount of water per person as other households. Ideally, information on household income is available and can be used to determine any significant variability in household income and to test any correlation with views on affordability. Data should also be checked against any questions on what sources of water community members are collecting water from, and if they use water from different sources for different purposes, to determine whether the tariff or levy causes some community members to use a cheaper substitute, such as a local river.

**Reliability:** The proposed new JMP monitoring framework requires that a ‘safely managed’ service prevents breakdowns from lasting for more than two days. This has been adopted as one of the measures of the reliability of a service. Measurement should include the views of consumers and the service provider on the duration of the last breakdown. The second indicator requires a spot check of every water point in a system to check whether water is freely flowing from every water point (to be conducted during monitoring and evaluation activities). The two combined will provide reliable information on the functionality of the system.

**Source:** Based on the current JMP definitions of improved sources, this indicator provides relevant information to the government for JMP data reporting. Two standards are proposed. A basic service would represent a source of water that sits within the JMP ‘other improved’ category. Piped water on premises is adopted as a standard for an improving level of service, with the assumption that this is the highest service standard that government should be seeking to achieve. Given that this is a rural context, the framework proposes that equal to or greater than 50% of the population with access to water onsite would provide a clear indication that access to water is improving.

**Water Quality:** This indicator reflects the need to ensure that the water supplied is safe to drink. A basic level of service should ensure that the water meets the WHO guidelines for E.coli, fluoride and arsenic. These particular aspects of water quality are singled out because they are proposed as measures of water safety by the post-2015 JMP monitoring framework. National regulations may be more comprehensive and an improving level of service should progressively satisfy national regulations.

Note that testing of the water source should be conducted during the planning stages for the new system, before construction begins. This will identify any quality issues (such as high fluoride levels) and further provides a baseline against which to monitor water quality over time. Following the construction of the new system, monitoring activities should regularly test water at both the source and at water points to check whether water quality is being maintained and if any contaminants are entering the system along the pipeline. Ideally, these testing procedures are detailed in a water safety plan which should be prepared in cooperation with the local government. Such a plan should clearly define which agency is responsible for ongoing water tests and general monitoring activities.

# An Enabling Environment

### Condition: There is an enabling environment for rural water services.

There is a growing consensus amongst development banks, NGOS and academia that an ‘enabling environment’ has an important influence on sustainability. This environment is created by national and local government agencies, whose financial and political decisions have a significant influence over the conditions within which rural water supply services are delivered.

In practice, the ‘enabling environment’ for water supply is influenced through policies, plans and legislation that define the roles of the various actors in the sector. The environment is further characterised by the priorities for public financing at national and local levels; the institutional capacity of national and local government agencies; and the degree of technical and financial support the government can offer to service providers, such as community management committees.

In the case of Rwanda, there are many positive conditions supporting rural water service delivery. For example, a range of service provider models are promoted, allowing for flexibility in the face of performance issues. Cost sharing arrangements have been put in place with service providers, providing financial support when major repairs are needed. Performance targets have also been set, covering access to water, functionality and cost-recovery.

The significance of government actors has been underlined by the UN Special Rapporteur on the Human Rights to Water and Sanitation, who has identified government as the duty bearer for the right to water. This duty comes with specific responsibilities that concern the extent of official support for an enabling environment (refer Figure X below).

**Figure X. Potential roles of national and local government in support of rural water supply services, adapted from Lockwood and Smits, 2011 and de Albuquerque, 2014.**

How can a Red Cross Society assess whether the right pieces are in place? The concept can seem very intangible, however in practice there are several criteria or issues that a Red Cross Society can review when planning a water supply program.

**National Government:**

* Is there a national policy in place for water supply? If so, does the policy differentiate between urban and rural water supply?
* Have performance targets been set for the rural water sector? Are they measurable and which government agency is responsible for monitoring the targets?
* Is there a Water Act that clearly defines the roles and responsibilities of different agencies involved in water supply services?
* Does the government support a range of service provider models (i.e public, private and community management)? Is one model emphasised above others?
* Does the government support the use of tariffs and levies to recover the costs of operations and maintenance?
* Are there regulations in place to guide service provision (i.e. tariff setting and water quality)?

The conditions in place at the national level should be assessable via a desktop review. However, local government priorities, budgets and institutional capacity can and do vary. In Rwanda, service delivery has been decentralised to the local government level and primary research will be necessary to understand the local political economy for rural water supply.

**Local Government:**

* Has the local government identified rural water supply as a planning priority and is that priority supported with a budget for new works and operations and maintenance?
* Does the local government have cost sharing agreements in place with service providers (both private operators and community management committees) and what are the terms for these arrangements?
* Does the local government employ trained technicians and are those technicians able to repair the type of system being considered by the Red Cross Society?
* Is the local government monitoring the performance of service providers? How frequently are monitoring activities conducted and what issues are assessed?
* Does the local government have a performance contract with central government? Could a Red Cross Society water project be included in the performance contract?

These lists are not exhaustive and simply indicate the range of issues that should be considered by program managers. The host Society and any national WASH partners should always be consulted in the early stages of a program or project in order to explore these issues and identify lessons learnt.

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# System Design Considerations

### Condition: A technically appropriate system has been built that can service population growth over 15 years.

International experience has demonstrated that a technically suitable water supply system is necessary to avoid breakdowns and ensure low costs for operations and maintenance. This section outlines the issues and principles that program managers should consider when designing a rural, small piped water system.

## Technical Feasibility

There are several key design determinants that program managers should review in the early phases of project planning. They are:

1. the size of the beneficiary population, current water supply needs and predicted population growth;
2. the distance between the water source or sources and the beneficiary population;
3. the extent to which beneficiaries are clustered together, or the extent to which they are dispersed;
4. the nature of the water source or sources (groundwater vs surface water); and
5. the topography of the land.

These factors will determine the desired water flow rate, the need for a pump, the length of the pipeline (including any branches) and the need for reservoirs, break pressure tanks and wash out tanks. Community consultation (discussed below) will also help to determine the number and location of water points.

When designing the system program managers should assess the cost and availability of spare parts for pumps, generators, valves and taps. A major cost driver will be the extent to which spare parts are sold in local markets. Parts that need to be brought in from capital cities or imported from outside the country incur higher costs and can cause delays for repair work. It is also important to confirm whether pumping technology has been standardised by government policy, as this ensures that the spare parts for those pumps are widely available. Program managers should consult with the National Red Cross Society, national WASH partners and private sector suppliers to ensure that suitable technology and reliable products are used for the system.

Research in Rwanda, where small, piped systems are prevalent, has found that the source of energy for conveying water through a pipeline is a significant cost driver for a water service. For example, the costs of running a diesel generator to power a pump are higher than for a pump that is connected to the electricity grid (refer Table X in Planning for Cost Recovery). Service providers managing systems that require a diesel generator have complained about the high cost of diesel and some have struggled to ensure an adequate supply of fuel for their pump, resulting in periodic water shortages.

Program managers should consider the impact of the energy source on operating costs for the service to ensure that costs are kept low, to better ensure that a basic level of service is maintained. It is recommended that program managers should assess the extent of rural electrification in the targeted district and negotiations should be undertaken with local governments to extend the reach of the electricity network to the proposed location of the water pump.

## The Principle of Participation

The 1992 Dublin Principles on Water and Sustainable Development underline the need for a participatory approach for water supply programs. The Dublin Principles specifically require “full public consultation and involvement of users in the planning and implementation of water projects.”

Putting these principles into practice, the community should be consulted on the following points during the design phase of a water supply project:

1. the source or sources of water for the water supply service;
2. the path of the water network;
3. the location of public water points;
4. the households that wish to pay for piped access to their home;
5. the preferred service provider model (i.e. community management, local government or private sector); and
6. the need to pay for the service and the basis of payment.

Participation does not end at the design phase. Program managers should ensure that community leaders and local government representatives are regularly engaged throughout the project cycle to ensure responsiveness to community concerns.

Note that community consultation should also seek to determine the needs of people living with a disability during the project design phase. Program managers should identify any members of the community that have a physical impairment. An assessment should then be undertaken to determine the location of water points and the specific design requirements for water points to ensure equity of access for people living with disabilities.

People living with disabilities must be consulted throughout the project cycle, from design to construction and endline evaluation, to ensure that any barriers to access are identified and addressed.

## Supplying Demand

When planning for the volume of water that needs to be supplied to the beneficiary population, program managers must consider any change in demand over time. For example, Rwanda’s rural centres are experiencing rapid population growth. The national population has doubled since 1995 and is predicted to do so again by 2035. Government support for denser conglomerations of rural communities has also expanded the size of rural centres. Consequently, some water supply systems are no longer able to supply the demand for water, resulting in an increase in queuing times and increased used of alternative sources, such as springs and surface water.

Rwanda’s population growth demonstrates the need to plan for population growth when designing a water supply system. Program managers should review all available data and information on population growth rates, ideally down to the district level, as well as any trends for urban/rural migration and migration between rural communities. This information will then allow managers to project demand for water in the targeted communities.

When developing projections, program managers should consult with the local government on the period over which the system should be able to service population growth (national water departments should also be consulted). As a guideline it is proposed that a new water supply system should be able to meet water demand over a period of 15 years.

## Providing Safe Water

Testing of the water source should be conducted during the planning stages for a new system, before construction begins. This will identify any quality issues, such as high fluoride levels. Following the construction of the new system, monitoring activities should regularly test water at both the source and at water points to check whether water quality is being maintained and if any contaminants are entering the system along the pipeline.

Program managers should consider the need for a water safety plan. Water safety planning (WSP) is a concept promoted by the World Health Organisation (WHO) to prevent contamination of water, from the source to the point of consumption. It is essentially a risk identification and management process and can be used for water supply schemes of any size, from small community schemes to large utility-managed schemes. Guidance on WSP is [available from WHO](http://www.who.int/water_sanitation_health/dwq/WSP/en/).

# Selecting a Service Provider

### Condition: The service provider possesses sufficient capacity to maintain a basic level of service.

The performance of the service provider is central to sustainability. Weak management is a common cause of service deterioration. The model of service provision, and the capacity of the service provider, should be primary considerations for program managers.

## Models of Service Provision

The term ‘service provider’ refers to the organisation responsible for managing the water supply system. Their responsibilities include operations, maintenance and revenue collection.

In Rwanda there are three models of service provision for rural small piped water systems:

1. Direct public service provision.
2. Community management.
3. Private sector operators.

**Direct Public Service Provision**

Under this model the government takes responsibility for service provision in the form of water utilities. In the case of Rwanda, the Water and Sanitation Company (WASAC) is a state-owned enterprise responsible for service delivery. In practice only a small number of systems are actually managed by the Government, which tend to be rural water systems that cross district boundaries. The Rwandan Government has preferred to delegate the management of rural water supply services to communities and private operators.

**Community Management**

The model most commonly applied in rural Sub-Saharan Africa, the basic principles behind community management are:

1. the community must have a role in the water system’s design;
2. the community should own the water system; and
3. the community should have overall responsibility for the system’s operations and maintenance.

Under this model an external agency, such as a Red Cross Society, designs and builds the system infrastructure, which is then handed over to a community water committee that adopts responsibility for tariff collection, operations and maintenance. A community member is trained in repairs and the private sector is relied upon for the supply of spare parts.

In Rwanda’s case the arrangements can vary. In some cases the community manages the system independently of the government and in others the community committees receive support with budgeting and the sharing of maintenance and repair costs.

Experiences in Rwanda and more broadly in Sub-Saharan Africa have raised a number of limitations with this model, including:

* a lack of long-term incentives for community members to volunteer their time;
* difficulties convincing some members of the community to pay the water tariff or levy;
* politicisation of water and conflict between community members;
* a lack of technical capacity for maintenance; and
* a lack of ongoing support from local government or non-government organisations (NGOs).

Lessons learned include the need for improved planning for life cycle costs and the need for cost sharing arrangements with government.

**Private Sector Operators**

The use of private sector operators has grown as an alternative to the community management model, particularly in the case of small piped water systems. Also referred to as a form of a Public Private Partnership (PPP), the use of small-scale private operators is currently being promoted by the Rwandan Government.

The standard contractual arrangement in Rwanda is for the business to manage the day to day operations and maintenance activities, including tariff collection, with the district government in charge of system extensions and expensive repairs. On average, existing private operators are managing three water systems, which has the advantage of generating economies of scale and providing a buffer when the costs for a given system exceed the revenue raised.

International experience has demonstrated that the private sector is not a fail-safe alternative to community management or direct public service provision. For example, some operators have been found to have failed to conduct regular water tests and the functionality of water supply systems under some operators is comparable to poorly managed communal services. Corruption, inequitable pricing schemes and non-compliance with tariff regulations are also known issues, which demonstrates the need for sound regulation, scheduled audits and complaints mechanisms.

**Table X. Community and private sector management models compared (adapted from Harvey et al., 2006)**

|  |  |  |
| --- | --- | --- |
| Service Provider Model | Advantages | Disadvantages |
| Community Management | * Potential for fast initial response to problems, particularly for remote communities
* Community in control of own affairs
* Develop pride in own achievements
 | * Needs motivated people
* Voluntary inputs are difficult to sustain
* Needs appropriate local skills and tools
* Difficulty in accessing spare parts
* Requires ongoing government support
 |
| Private Sector | * Easier access to spare parts
* Concentration of skills and resources
* Profit creates an incentive to maintain the system
* Reduces burden on the community
* Potential for economies of scale
 | * Potentially higher cost of water
* Private sector capacity may need to be built
* Needs active government regulation and oversight
* May not be well suited for dispersed hand pump systems
 |

# Planning for Cost Recovery

### Condition: A plan for cost recovery is in place.

An ongoing source of finance for water supply services is necessary for sustainability. International experience has shown that many program budgets for water and sanitation have covered the capital costs of infrastructure but have overlooked the operations, maintenance, depreciation, and other costs associated with maintaining a service. Consequently, systems have deteriorated over time as service providers have struggled to cover costs.

In response to this problem the concept of life cycle costs has been developed. Life-cycle costs refer to the costs of ensuring the sustained delivery of adequate services to the beneficiaries. These costs go much broader than the initial investment costs and attempt to cover the ‘life-cycle’ of a system, from initial capital investment, to operation and minor maintenance, to capital maintenance and the replacement and extension of system infrastructure.

It is unrealistic, however, for Red Cross Societies to cover the full life-cycle costs of a system. Grant funding is typically limited to the immediate hardware and software costs associated with constructing a system. Alternative sources of funding are therefore needed to cover longer term costs associated with maintaining and improving a service. These sources of funding and the specific costs they must cover should be defined in a plan for cost recovery.

## Preparing a Plan for Cost Recovery

A cost recovery plan should be prepared by program managers as part of the design phase of a water supply project. This plan should clearly define the costs that will be covered by a Red Cross Society, the costs that are expected to be covered by a service provider and any costs that are expected to be covered by the local government. An example is provided in Table X below, using a cost categorization approach designed by the IRC International Water Centre.

**Table X – Life-cycle cost categories and sources of finance (adapted from Fonseca et al, 2011).**

|  |  |  |
| --- | --- | --- |
| Cost | Description | Source of Finance |
| Capital Expenditure – hardware | The capital invested in constructing or purchasing physical assets (i.e. pumps and pipes). | Red Cross Society through grant funding. |
| Capital Expenditure – software | The cost of consulting with stakeholders prior to or during construction of a system (i.e. location of water points, preferred choice of service provider). | Red Cross Society though grant funding. |
| Operating and Minor Maintenance Expenditure | Expenditure on labour, energy and spare parts. | Service provider through water tariff or community levy. |
| Capital Maintenance Expenditure | Expenditure on asset renewal, replacement and rehabilitation costs. | Service provider with support from the local government using a mix of public finance, bank loans and donor grants. |
| Expenditure on Direct Support | The costs associated with providing technical support to service providers. | Local government using public finance. |
| Expenditure on Indirect Support | The costs associated with monitoring activities. | Local and/or national government using public finance. |

Table X draws on current models of cost recovery for rural, small piped water schemes in Rwanda. Note that the example above shares the costs of the system between a Red Cross Society, the service provider and local government. Under this hypothetical arrangement, the Red Cross Society’s investment is limited to the initial capital expenditure on system construction. Following construction the system is handed over to the local government or service provider, who then takes on responsibility for the long term life-cycle costs for the system.

Note that the example above makes an important assumption: that a water tariff or levy will be charged to cover the costs of operations and minor maintenance. The use of levies and fees has become common practice in Rwanda and indeed they have become widely accepted by the international WASH community.

There a number of different approaches for raising revenue for cost recovery. The pros and cons of each are listed in Table X below.

**Table X. Forms of levies and fees (adapted from AfDB, 2010).**

|  |  |  |
| --- | --- | --- |
| Basis of Payment | Explanation | Pros and Cons |
| Pledges or donations  | Collected by each person/family when there is a need for operating and maintenance expenditures.  | *Pro:*Accounts for user ability to pay.*Con:*Does not reflect actual water use: a household with high consumption may pay the same as a household with low consumption. Contributions may not be sufficient to cover repairs when needed or ensure a reliable supply of fuel for generators. |
| Payment in kind  | By giving of labour, livestock or crops at harvest time.  | *Pro:*Provides an alternative basis of payment for cash poor households.*Con:*Difficulties with people's perceptions of value. Note an appropriate substitute for cash in all circumstances. |
| Community levies  | Can be charged per head, per household, flat rates or stepped rates according to wealth/land.  | *Pro:*Provides a transparent basis of payment for the community that can account for differences in household wealth and thus ability to pay. *Con:*Raises equity issues as with pledges and donations.Difficulty of communicating decisions on billing might lead to problems of collection. |
| Tariffs or levies charged by the service provider  | Per handpump, per standpost, per container of water supplied (flat rates, graded rates, mixed rates).  | *Pro:*People are charged per litre consumed, resulting in equity between consumers and/or households.Pricing can be structured to allow for differences in ability to pay.*Con:*Less flexibility over the form of payment and the timing of the payment. |

## Setting a Water Tariff or Levy

There are a number of factors that can influence the price of a water tariff or levy. For example, a study on the sustainability of rural, small piped water services in Rwanda found that the energy source for conveying water through a system was the main cost driver behind the price of a water tariff. Pumps that rely on a diesel water supply have higher operating costs due to the cost of fuel. Conversely, gravity fed systems have lower operating costs, resulting in a lower price for the water tariff.

At least in the case of Rwanda, the system characteristics are directly linked to the price of the water tariff. The price is however balanced against consumer demand. Research indicates that consumer demand for water supply in Rwanda is price elastic – an increase in the price of the water tariff causes consumers to substitute their water consumption with cheaper alternatives, such as springs and rivers.

**Table X. Market prices for water tariffs by energy source in Rwanda.**

|  |  |
| --- | --- |
| Source of Energy | Cost per 20 ltr. Jerry Can (RWF) |
| Gravity-fed system | 8 ‒ 10 |
| Electricity from national grid powering a pump | 15 ‒ 20 |
| Diesel generator powering a pump | 30 |

Consumer demand is an important consideration when setting water tariffs. There are many factors that can affect household decisions to pay for water or to use an alternative source, which can be grouped as follows:

* *Attributes of the service*: price, distance to the source, queuing times and reliability of supply.
* *Household characteristics*: income, education, size and composition (i.e. age and gender).

Other factors of possible significance are the knowledge and attitudes of the consumers, such as their perceptions of the quality of water between improved and unimproved sources, and the degree of ownership the community holds over the new system.

Program managers should undertake research on established rates for water tariffs as part of the design phase for a water supply project. In some countries the water tariff may be regulated, whereas in others the market may set the price. It is important to determine whether the tariff will be acceptable to the beneficiaries and whether the tariff will be sufficient to, at minimum, cover operations and minor maintenance expenditure. Consultation with government water departments and communities on the water tariff or levy is recommended.

## Support from Local Government

Although a water tariff or levy must be central to any cost-recovery plan, the water tariff alone may not be sufficient to cover the life-cycle costs of a system. A water tariff must be affordable and compromises on the price may be necessary to maintain willingness to pay. Private operators must also be able to make a small profit in order for a management contract to be attractive.

Financial subsidies can help to ensure that service providers are able to manage complex repairs and fund expensive costs over a system’s lifecycle. In Rwanda there is a developing trend whereby local governments enter into cost-sharing arrangements with service providers. These arrangements subsidise large maintenance and repair costs and allow service providers to keep water tariffs low while still saving revenue over time. There is evidence to suggest that such arrangements improve the sustainability of rural water supply services in Rwanda.

In summary, program managers should prepare cost-recovery plans that clearly identify the different costs that must be covered and the source of revenue for each cost category. The use of a tariff or levy should be central to any cost recovery plan and consideration should be given to cost sharing arrangements with local government for system upgrades, extensions and major repairs.

# Guidance on Division of Responsibilities

This guidance note provides a broad range of advice on effective planning for sustainable rural water supply services. In order to assist program managers to prepare for project implementation, the following diagram has been prepared to illustrate what activities need to be undertaken and the timing for each activity.

The diagram also seeks to demonstrate an ideal division of labour between a Red Cross Society, as the implementing agency, and the local government, which in this example will inherit ownership of the small, piped water system once it has been constructed.

This distinction is significant. It is common practice for system ownership and service management to be passed on to another organisation once a system has been constructed by a Red Cross Society. Ownership and management can be handled by one organisation, such as a community management committee, however ownership and management responsibilities can also be split between, for example, local government, as the owner of a public asset, and a community committee, as the agency responsible for managing the service on behalf of the government.

The consequence is that sustainability can be influenced by multiple agencies and is not solely controlled or influenced by the actions of a Red Cross Society. Program managers should therefore be thinking ahead about how certain decisions, such as service monitoring and the choice of the service provider model, can be influenced.

The diagram has been split into three phases, being Pre-Construction, Construction and Post-Construction.

## Pre-Construction

During the pre-construction phase, or the design phase, program managers will primarily be concerned with technical design considerations for the service. However, program managers should also be assessing the enabling environment, preparing plans for cost recovery as well as reviewing disaster risk reduction (DRR) strategies and related safeguards.

A close working relationship with local government should be established during this phase to help ensure that issues such as the period over which the service should be able to service demand, the potential for cost-sharing arrangements, the price of the water tariff and the possible choices for the service provider model are discussed. These preparations will allow the Red Cross Society to prepare a Memorandum of Understanding that clearly articulates responsibilities regarding system design, construction and service management.

## Construction

The construction phase is primarily concerned with budget management and supervision of construction quality. Program managers should maintain community consultations during this time to avoid disputes over the locations of water points and pipelines and to ensure that any barriers to access for people living with disabilities are addressed.

Following construction, and before handover, program managers should prepare a water safety plan in cooperation with the local government. This plan could incorporate elements of DRR, where relevant.

## Post-Construction

At this stage ownership and management of the water supply service is handed over to the local government. Many of the tasks for this phase are critical to sustainability and Red Cross Societies should ensure that advice and information is available to assist local government with its decision making. Ideally, the Red Cross Society has established an effective working relationship with the local government and is consulted on many, if not all, of these issues. As aforementioned, the use of an MOU and efforts to build a constructive working relationship with local government during the pre-construction phase will bear fruit here.

The following diagram is just a guide for program managers, however it does demonstrate that there is a significant workload during the pre-construction phase. Program managers should bear this in mind and ensure that timeframes and budgets are realistic.

|  |  |
| --- | --- |
|  | **LEAD** |
| **PHASES AND TASKS** | **Red Cross** | **Local Government** |
| *Pre-Construction* |  |  |
| - Establish demand through consultation with community and local government |
| - Confirm that rural water supply is a planning priority for local government, which is matched with a budget allocation, and assess capacity to provide technical support |
| - Survey community to identify any people living with a disability and other vulnerable groups, and prepare advice on access and infrastructure needs |
| - Survey terrain for water system in cooperation with local government |
| - Determine method for conveying water through the system |
| - Confirm the design life of the system |
| - Design a model that can predict the O&M costs, desired revenue and likely water tariff for the system |
| - Conduct a Disaster Risk Reduction assessment in cooperation with local government |
| - Assess the availability of spare parts in local markets to support O&M |
| - Seek agreement on method for conveying water, path of the pipeline, location of public water points and model of service provision |
| *Construction* |
|  - Hiring of contractors, if any, in cooperation with local government |
|  - Supervision of construction quality and appropriate use of funds |
| - Develop a Water Safety Plan in cooperation with local government |
| **HANDOVER** |  |
| *Post-Construction* |  |  |
| - Selection of the service provider |
| - Setting of the water tariff |
| - Clarification on which life cycle costs will be covered by the service provider |
| - Clarification on any cost sharing and technical support arrangements with the local government |
| - Clarification on responsibilities for ongoing monitoring of service levels |