

32nd WEDC International Conference, Colombo, Sri Lanka, 2006

SUSTAINABLE DEVELOPMENT OF WATER RESOURCES, WATER SUPPLY AND ENVIRONMENTAL SANITATION

Decentralized water management and sustainable rural water supply

Paul van Beers

Decentralized Water Management (DWM) aims to optimise water supply services in a legal framework, through a maximal involvement of the local level. In rural water supply the DWM focus is on a step by step approach and on the long term impact of activities. A basic element is efficient operation with cost recovery supported by financially sustainable local organizations. This document describes some recent developments in the DWM approach towards rural water supply related to handpump projects and is based on the authors experience as a DWM consultant to the Provincial Water Department and NGOs in southern Angola in the past two years. One of the major constraints for sustainability remains the access to spare parts. Therefore specific attention is paid to the introduction of the Afripump, a new "spare parts free" handpump that can help solve these problems.

Introduction

Decentralization processes can occur as deconcentration of activities or as devolution, by giving more autonomy to local administrations, or as (preferably) both. Community planning, implementation and management of water supply services provides opportunities to reduce cost in a demand driven approach, while devolution of authority and responsibility for monitoring and evaluation to District level will create local support for quality control, access to resources and information and assistance in the participative decision making process.

Decentralized Water Management (DWM) provides the institutional framework for these activities; it requires a strong government commitment and motivated and qualified personnel.

For rural water supply, the provision of services is hampered by the dispersed habitat and limited financial resources in rural areas, whereas decentralized provision of hardware often increases unit costs. Strategies how to overcome these problems with the introduction of handpumps has been the subject of many studies in the last decade; People can resist to changes, while communities in rural areas often have deeply embedded habits how to fetch water from small ponds, springs or streams, or from traditional dug wells. They know how to maintain these traditional resources and not familiar to the more complex maintenance requirements of handpump; without external assistance, these communities have difficulties to maintain their handpump.

The sustainability of handpump maintenance is therefore a rather complex issue in a dynamic environment. Four major sustainability factors can be identified; factors that will be different from region to region and also will change with time:

1. Institutional arrangements (legal framework, policy and strategy issues, monitoring, information, etc.).
2. Social context (community issues, religion, local leaders, pro-poor arrangements, etc.).
3. Technical issues (adapted technology, spare parts, cost recovery, etc.).
4. Environmental factors (availability and quality of water resources, etc.).

The challenge of DWM is therefore to deal with all these factors and motivate and facilitate local actors (local government, NGOs, CBOs, the users and the private sector) to implement, maintain and monitor the desired service level with their own resources. This involves multi-actor planning with careful selection of the applied technology. Some recent developments of these sustainability factors are briefly discussed in the following paragraphs.

Institutional arrangements

In the water decade (1981 – 1990) most governments in developing countries were still in a transitional situation; trying to deal with the day-to-day problems in an unstable post-colonial context. Today, this situation has changed in many countries; this is also reflected by their commitment to the Millennium Development Goals for the water sector. Most Governments have now established new water legislations, initiate and manage funding, facilitate water projects and take up their role in supervision and monitoring of the results and the impact. This is clearly a result of capacity building activities at the national level.

In recent years, it has become clear that with introducing decentralization processes and DWM, we have entered a new phase in the capacity building process; the water sector is therefore now more focussing on capacity building on two new levels:

1. Provincial level, with water and sanitation (watsan) consultants for technical advise.
2. District level, in cooperation with NGOs that are oriented to provide capacity building and organisational development of local administrations.

Water projects can improve their impact and sustainability through facilitating multi-actor planning, using participative techniques to achieve an effective flow of information. In this approach, particular attention is paid to promoting of:

- A regulatory and enabling environment; which involves local solutions, innovation processes, debates and clarification of roles, advocacy in legislation and control of water resources.
- Sustainable service delivery in public-private-civil partnerships (PPPs); this includes realistic design-planning-implementation-maintenance procedures, cost recovery, cross subsidies, etc.

The DWM oriented project approach

At the end of the last decade, there was a tendency to move away from a project approach to a programme approach. However, although a program approach may look like an ongoing implementation strategy; this is no guarantee for sustainability of the rural handpumps.

In recent years, it has become clear that it is not the project approach in itself that has created unsustainable handpumps. It is now better understood that projects in the past were too centralistic and not following a DWM policy that involves more local structures in all phases and activities of the projects.

The DWM oriented project approach uses therefore a flexible log frame and defines activities and objectives not in terms to supply what is missing, but rather as how to take small steps towards creating a new sustainable situation, using multi-level monitoring as the main management tool.

The water project should therefore ideally be an activity related to a Governmental Management Information System (MIS). A MIS will have a rational (objective, measurable and replicable) set of process indicators as well as performance indicators and procedures for information flow. It also includes monitoring data from other sectors, like those of primary health care.

Monitoring

An essential aspect of the DWM is monitoring. Water project operates in a dynamic changing environment; therefore not only the project processes should be monitored, but also attention must be paid to monitor project assumptions and constraints, especially when the project comes in a new phase.

Water projects not only aim to increase the % of coverage, but also to have an impact on health and poverty reduction. Monitoring the impact is essential for maintaining the political commitment and to keep the water issues on the political agendas.

In the last decade, monitoring mainly obtained data

from service providers and projects results. However, such information does not include the huge amount of informal facilities such as private wells or community based initiatives, also definitions of service levels vary from country to country.

In recent years the importance of “impact monitoring” has been better understood and projects focus now more on random household surveys with unified criteria. This new monitoring approach provides a more accurate picture of the impact of project facilities and of what people actually use rather than on what they have.

Handpump management models

In the last century many governments in developing countries were understaffed with limited resources and therefore embraced the Village Level Operation and Maintenance (VLOM) handpump management model. This was a rational choice at that time. However, most communities were unable to maintain their donated pumps and spares were not available in spite of many efforts to create a private sector supply chain. Lack of spares also hampered the spontaneous development of rural mechanics that could repair the pumps. Therefore in most countries the coverage of rural water supply was rather going down than up, in spite of many new water projects.

In recent years it has become clear that governments are now able and willing to play a more active role in a DWM approach. Since the VLOM policy did not achieve the expected results, governments are also willing to accept new management models and new responsibilities that could provide better results to comply with the millennium targets.

The concept of interdependent services has now been widely accepted and this is reflected by the tendency to involve the private sector more in the O&M of rural handpumps. However, privatised handpump maintenance initiatives are not always successful.

Studies indicated that although the private sector is able to supply this service and that users are willing and able to pay, the main problem to overcome remains the access to basic spares.

The DWM model in South Angola

In South Angola over 300 rural handpumps (Volanta, Afridev and India Mark) are maintained in the last 15 years with a lease concept in which the users pay to a District Water Brigade (DWB) for regular maintenance and repairs. The DWB is trained by the Provincial Water Department and the users are organised in Water User Groups with a Caretaker, who is in charge of the daily supervision and is responsible for the collection of the contribution. The DWB owns the pump and can therefore remove the pump in case the community is not paying.

It soon became clear that the model is more sustainable with the reliable Volanta handpump. Therefore the Southern Provinces in Angola have standardised on the Volanta. The private sector has responded to this by establishing a full time

representative that has new pumps and spares in stock. With over 85 % of the handpumps in continuous operation, this DWM model is considered in Angola as the benchmark on how to organize and implement sustainable water projects. It has therefore also a scaling up potential for implementation in other countries that still struggle with the maintenance of their handpumps.

Information flow

In the last decade, access to watsan information was relatively complicated through schools, institutes, books, magazines and seminars.

In recent years the improved internet access has boosted the information flow through the “Google University”. The internet provides not only information and news, but also connects people through conferences and discussion fora. A good example is the portal www.watsan.org that provides a wide range of watsan information, a forum, news items, watsan job search, events, a free page for local watsan NGOs, a watsan chat page, etc. It is assumed that the use of this new media will further increase in the next years.

The social context

Initially, the implementing strategy of handpump projects focused mainly on the community. However, rural communities have their own complex dynamics based on traditional survival strategies. Their reluctance to contribute is not necessarily due to apathy, but often rooted in religious beliefs, taboos, local customs, and gender and leadership issues. The DWM project approach has the District administration in the centre, which has social mobilizers that have a better understanding of local dynamics and constraints. Through their intervention and project supervision, the community and the local leaders are more effectively involved in the implementation strategy, which will increase the sustainable impact.

Water user groups (WUGs)

It is widely accepted that a trained WUG promotes the sustainability of a handpump; water projects therefore often train up to 6 people. When WUGs are evaluated after some years, it becomes clear that only a few people remain active. However, this does not question the effectiveness of a WUG, or call for the need for additional training.

In recent years it has been understood that the function of the WUGs changes with time. In the beginning their main task is to create awareness and acceptance in community, to voluntarily comply with the new rules and habits that are required for a sustainable operation of the handpump.

Once people are familiar with the new service in the community and have understood and accepted their responsibility, the role of the WUG changes with a focus on monitoring of the operation of the handpump. The WUG can then be reduced to a few persons only.

Pro-poor arrangements

People who have difficulties to pay for water should not be excluded from access to safe water. The DWM approach for rural water supply is based on implementing the government commitment to pro-poor arrangements, such as cross subsidies.

However, it is institutionally complex and not sustainable to introduce direct cross subsidies for handpump maintenance. The DWM approach aims therefore first at the sustainability of the service at the lowest cost, through integrating handpump maintenance services in ongoing activities of sustainable organizations and in implementing low cost, but effective technical solutions. At the same time community initiatives are promoted to deal with this issue on the level of the water user group.

Technical issues

There are basically two general handpump design options; (1) regular maintenance designs; which requires a dense spare parts supply network for those critical parts that can stop the pump from functioning (for example, the rubber piston seal on the Afridev piston) and (2) Minimal maintenance designs; that only use parts that wear out very slowly. These parts have either (a) a better quality, or (b) enable regular maintenance (lubricating).

The Volanta is based on (2a) and (2b). Although the experience in South Angola with the Volanta in the DWM (lease) model is positive, it became clear that two problems remain to be solved:

1. The Provincial Water Department (DPA) still has to intervene in case of complex mechanical problems that are beyond the capacity of the District Water Brigade. This can take many weeks and also involves high transport costs.
2. The Volanta is relatively expensive.

As a response to the demand for a reliable low cost handpump, the Volanta manufacturer modified the Volanta and changed the flywheel for a handle and improved the cylinder with a Beers piston.

The result is the new Afripump, cheaper and more simple, with in fact no need for spare parts, so it can easily be maintained by the District Water Brigade without any further assistance.

The “spare parts free” Afripump

The Afripump has no parts that can wear out in such a way, that it will stop the pump from functioning. Maintenance is limited to occasional greasing of the standard heavy duty bearings. However, even without greasing it is estimated that the bearings will function for more than 10 years before they may need replacement. The Afripump has a maintenance free, stainless steel Ø 53/57 mm cylinder, a simple free floating footvalve and a Tevlon, 33 cm long Beers piston. The piston has no rubber seal, but works on a hydraulic lock that is created by a small amount of water that is present in small



Photograph 1. The new, spare parts free AFRiPUMP in Angola

horizontal grooves in the piston. Without the wear and tear of a traditional rubber (friction) seal, the pumping is light which is important for children, as they often have to fetch water (see Afripump picture).

Other characteristics of the Afripump are; (1) output of 1200 litre/hour at 30 m; (2) Easy installation (up to 100 m deep with a bottom support) by one trained person without special materials; only spanners N° 17 and 24 and a screw driver are required; (3) surface parts of the pump can be produced locally; (4) the cap is secured with a padlock; no unauthorized person can open the pump; (5) the spout is separate and can be adapted to local needs.

Due to its reliability and expected long lifespan, the operational cost of an Afripump (including depreciation) is less than 100 US\$ per year. This comes to less than 5 US\$ per family per year.

Pumping from the borehole casing

The rising main of the Afripump (70/80 mm) can also be used as a borehole casing, in case of a new borehole. Because no borehole casing is needed anymore, this greatly reduces the total cost and logistics of a new waterpoint and makes the Afripump in fact a low cost handpump. To enable this, the rising main is simply extended with a 0,7 mm screen that is placed in the borehole in stead of the casing screen. This option is possible because the complete cylinder can be lifted out with the rods, leaving the PVC pipes always inside the borehole. With this option, the Afripump is not only very cost effective, but also more reliable, because the PVC pipes cannot break or fall down in the borehole.

Environmental factors

Environmental factors are those beyond direct project control, they comprise amongst others the quality and availability and depth of the groundwater. In recent years new technical developments have made it possible that handpumps can also be used for deep groundwater levels, up to 100m , with a bottom support for the rising mains.

Recently also good progress has been made in eliminating high concentrations of arsenic, fluoride and microbes. Promoting low cost household water treatment systems are becoming standard activities in most projects.

The most popular and simple way of low cost treatment is: (1) Chemical disinfection with a tablespoon of 5 % bleach solution to a 20 litre container and (2) using ceramic filters in two plastic buckets; the filter in the top container drips into the lower container that has a small tap (the Kisii water filter).

Lessons learned

Decentralized Water Management is beginning to make progress towards enabling sustainable rural water supply due to its focus on regional devolution and adapting to changes in the institutional setting, social issues and better technical options (Afripump) that are becoming available.

When these new developments are included in a comprehensive Government policy with regulatory mechanisms supported by a Manage Information System, DWM can significantly contribute towards achieving the rural MDGs in 2015 and beyond.

References

- Hazelton, D.G., (2000) *The development of effectiveCommunity water supply systems, using deep and shallow well handpumps*. WRC Report No TT 132/00, Pretoria, South Africa.
- Harvey, P. and Reed, R.A, (2004) *Rural water supply in Africa, Building blocks for Handpump sustainability*. WEDC, Loughborough University, UK.
- Smout, I. and Parry-Jones, S., (1999) *Lessons learned from NGO experiences in the Water and Sanitation sector*. WELL-WEDC, Loughborough University, UK.

Contact addresses

Paul van Beers
 WatSan Consultant, Rural Water Systems (RWS)
 Fax / Phone: +31-20-6837540
 pvanbeers@gmail.com
 www.watsan.org