



# Technology choices in Water Supply and Sanitation

## Report on cross-country collaborative research, learning and networking

This summary is  
based on a RiPPLE

Research Report:  
**Technology choices  
in water Supply and  
Sanitation: Report  
on collaborative  
research, learning  
and networking  
between Ethiopia,  
Sudan and Kenya**

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**rippleethiopia.org**

**Research-  
inspired Policy and  
Practice Learning  
in Ethiopia and  
the Nile region  
(RiPPLE)** is a  
DFID-funded  
Research Programme  
Consortium led  
by the Overseas  
Development Institute  
(ODI) in partnership  
with IRC, Addis Ababa  
University, WaterAid  
Ethiopia and Harerge  
Catholic Secretariat

For practitioners, technological choice plays a huge role in designing water supply and sanitation (WSS) systems. Often considered in isolation, this study sought to look at factors that surround and influence technological choice. This is by no means an exhaustive list of factors, but rather an attempt to start looking more closely at what other factors should be considered when making technological choices, and how.

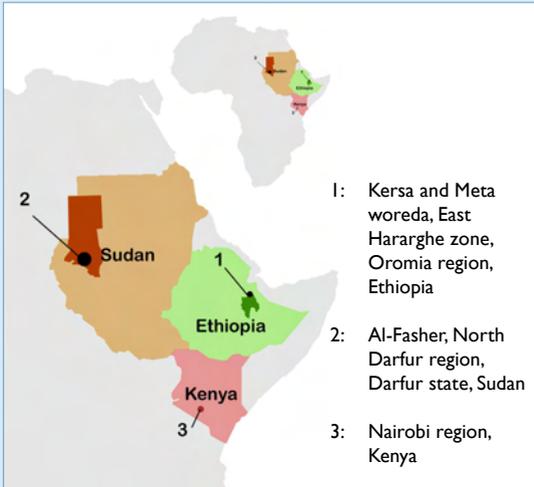
This report presents the key findings of a study undertaken by Research-inspired Policy and Practice Learning in Ethiopia and the Nile Region (RiPPLE) and Practical Action Consulting (PAC) in Ethiopia and Sudan in 2008. A sector review from Kenya was also carried out and included in the analysis. The main purpose of the work was fivefold:

- to identify, document and compare factors affecting choice of WSS technologies in Ethiopia, Sudan and Kenya through collaborative research;
- understand the links between the process of technology choice and its wider context related to participation, planning, governance and demand;
- to identify and establish potential for research and communication among practitioners;
- to develop capacity and establish channels of communication for strengthening the Nile region RiPPLE network; and
- propose further actions in collaborative research and communication.

The methodology and fieldwork were developed by the research team, made up of members from organisations across the countries, and tied strongly to a project cycle of planning, implementation, operation and maintenance, impact and sustainability, as well as investigating the wider policy context. As such, findings are both comparative and narrative-based. Based on 11 study sites, findings highlighted lessons learnt in planning, participation, land rights, sustainability, accessibility, financing, growth and productivity, risk and vulnerability and sanitation.



## Map of three countries and focus areas of studies



This piece of work was part of RiPPLE's concerted efforts to link with other countries within the Nile region, to share experiences and build links. Located in East Africa, and being among the 10 Nile riparian countries, these three countries enable interesting comparisons in water interventions. Within each country, sites were chosen based on locations of partner organisations. The map indicates geographical locations and regions of the selected sites.

## Country policy contexts

Approaches to project implementation, and consequently, technological choices tied in strongly with the policy environments in countries. The study highlighted these differences by describing the surrounding policy environments in order to situate findings within a policy framework.

For example, in Ethiopia, there is a standard procedure for project planning and implementation, based on Ethiopian government policy related to non-governmental organisation (NGO) work. As such, the approach to project implementation was standardised and, comparatively, witnessed strong government involvement.

In contrast, the Darfur region of Sudan has been in a state of humanitarian emergency since 2003, due to an ongoing conflict. Whilst, there was no clearly stated government policy and operational framework guide work with NGOs in the water and sanitation sector, large implementing agencies, such as UNICEF, worked on water and sanitation issues, under a relief, rather than development umbrella.

In Kenya, the government has embarked on reforms in the water sector under the framework of the Water Act 2002, to address problems associated with access to and provision of water and sanitation services. The Ministry of Water and Irrigation was seen to spearhead implementation processes with a coordination and capacity building focus, with contracted water service providers (WSPs) (community groups, NGOs or private companies) providing water and sewerage services.

## Key findings

Across the board, sustainability needs to be strengthened in planning processes by considering a range of factors, including accessibility, availability, technical and human resources, management, productivity, vulnerability etc.

Sites reflected some country-specific issues and some context-specific issues affected technology choice. For example, land rights issues are prominent in Ethiopia, where land is scarce, whereas maintenance and management were greater challenges in Darfur, Sudan, where the conflict has had lasting damage on systems. Good examples of clear legal agreements on and community management of access to land and water as conflict resolution mechanisms.

## Site summaries

### Ethiopia:

1. *Kenchera*: Simple lift and drip irrigation technology was being developed with farmers. Other farmers had already started replicating systems and land tenure agreements were in place.
2. *Gorobeyo*: Spring-fed gravity system allowed for multiple-use, and saw a significant increase in income for those benefitting from irrigation schemes.
3. *Welteha Bilisuma*: A motorised supply service proved more accountable when communities changed the management structure. They also began to demand for cheaper-run systems.
4. *Millennium Village*: Replacing a damaged gravity-fed system within an integrated programme intervention showed a multitude of benefits.
5. *Ifa-Jalela & Kufanzik*: Two distinct areas sharing one motorised (therefore, expensive) source caused tensions, with a corrupted management and thus failed to provide services.



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### Sudan:

- a) *Azagarfa*: A defunct water harvesting dam was designed to be appropriate, however, ongoing conflicts and silting have made maintenance difficult.
- b) *Fasher Hafirs*: Communities took charge of twin ponds, when they realised that government could not maintain these systems due to the conflict.
- c) *Golo Dam & Shugra boreholes*: Supplying part of the urban needs of Al-Fasher, these water sources are difficult to maintain and need resource-intensive rehabilitation.
- d) *Al-Fasher*: A privately owned borehole demonstrated benefits of private sector water supply.



a



b



c



d

### Kenya:

- *Kabuku water project*: Community-managed water supply scheme showed how metering and consensus can ensure sustainability.
- *Kibera slums*: Urban sanitation for informal settlements should be looking at decentralised systems for urban areas.

There was a clear need to incorporate natural resource management into the programme implementation to help maintain water levels and increasing the amount of water available. Community-based management was a popular solution but, with more complex systems, such as motorised boreholes, it is more difficult for rural communities to perform maintenance, particularly in the case of breakdowns. More complex systems, often seen as the only viable solution, tended to require more long-term and more resources in terms of external technical and managerial support. Overall, there was strong evidence for the need for context-specific management solutions.

For financing, all sites visited were implemented by external agents rather than local communities, but often local communities made a contribution. Fee recovery schemes vary in their success, but most of the sites visited failed to demonstrate an understanding of how to progress past simple maintenance into improvements and innovations.

In conclusion, technology choices were often made by engineers, based on a limited number of considerations, including technical, environmental, policy and financial variables. The key factors identified in this paper tended to affect the sustainability of the system, rather than the initial technology choice. Sustainability, which is affected by all the identified factors, needs to be better considered throughout the project cycle.

Finally, management of technologies and the natural resources around them is often the largest determining factor in the longevity and benefits of a service. Carrying out collaborative research and sharing and exchanging ideas and perspectives represent a unique opportunity for learning, as well as, evaluating existing projects.



### Study core team

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