SWIFT

Consortium for Sustainable Water, Sanitation & Hygiene in Fragile Contexts

SWIFT Consortium learning brief

Eastern DRC. Photo: Eleanor Farmer

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Introducing the SWIFT tool for environmental assessment and risk screening for rural water supply

Achieving long-term increases in rural water-supply coverage depends on many factors. A new tool developed for the SWIFT Consortium supports environmental assessment and risk screening activities for rural water supplies in low-income contexts. When conducting a detailed hydrogeological survey is not an option, the SWIFT tool provides simple guidance to help identify and mitigate environmental risks to long-term water availability and quality.

The SWIFT Consortium aims to deliver sustainable access to safe water and sanitation and encourage the adoption of basic hygiene practices in the Democratic Republic of Congo and Kenya. Led by Oxfam, the consortium includes Tearfund and ODI as Global Members, and Water and Sanitation for the Urban Poor (WSUP) as Global Associate, along with many implementing partners in the two focus countries. The SWIFT programme is carried out in collaboration with the governments of DRC and Kenya, and with a number of water service providers.

The SWIFT programme's objective is to provide Water, Sanitation and Hygiene (WASH) services (at least two of the three) to nearly 850,000 people by December 2015, and build capacity until March 2018 to ensure interventions are sustainable, helping to bridge the gap between humanitarian and development programmes.

The SWIFT Consortium is funded with UK aid from the British people under a 'Payment by Results' contract. Instead of a grant, payment is tied to outputs and outcomes: non-delivery will result in non-payment, and non-sustainability will result in reduced payment.

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Promoting rural water supply in terms of water resource availability

Achieving long-term increases in rural water supply coverage depends on many factors, including sound financing; community engagement in the design and implementation of schemes; and the training of village mechanics, local government and entrepreneurs in system upkeep and repair. For a scheme to be sustainable, planning also needs to consider the water resources that are available – whether there is enough water, of suitable quality, to meet demand across seasons and between good and bad years. Water supplies that depend on shallow groundwater are generally more vulnerable to changes in rainfall (and therefore groundwater recharge) and demand than those exploiting deeper and/or bigger groundwater storage. These can include hand-dug wells, shallow boreholes, and protected springs. Risks to water systems posed by flooding, land degradation and other environmental hazards also need to be considered and mitigated where possible, especially as climate change accelerates. For existing schemes, understanding patterns of seasonal recharge and demand, as well as the likely impact of environmental hazards, can help implementers develop more sustainable management approaches.

Why develop a tool?

In Sub-Saharan Africa and elsewhere, funds and expertise are not always available to conduct detailed hydrogeological surveys for new systems that are dependent on shallow groundwater. In their absence, simple guidance is needed to help identify and mitigate environmental risks to long-term water availability and quality.

Who is the tool for?

We originally developed many of the approaches included in the tool to support local government staff implementing water projects in rural Ethiopia,[1] and adapted and extended the tool for SWIFT field teams in DRC and Kenya. The tool is designed to be used by teams with engineering expertise and experience of working with community-based water supply, primarily in countries in Sub-Saharan Africa. We stress that a tool of this kind will be much less reliable than an assessment by a professional hydrogeologist, so it should only be used when that is not an option.

[1] The tool draws heavily on work carried out by Roger Calow, Eva Ludi, Seifu Kebede and Andrew McKenzie on similar issues in Ethiopia commissioned by DFID-Ethiopia and supported by the Government of Finland

What does the tool involve?

The tool helps answer three key questions for new and existing shallow groundwater sources:

- **Is there enough water of suitable quality to meet demand across seasons for the long term?**
- **What are the main environmental risks to ensuring a sustainable supply of safe water?**
- **How can these risks be mitigated?**

The tool sets out four steps to do this:

1. Understand how much water is available by tapping local knowledge.

2. Determine how much groundwater is needed to meet demand, and how big the catchment (recharge) area of a well will need to be to provide this water.

3. Protect the sites and sources by identifying environmental hazards that could result in site degradation and water supply contamination.

4. Maintain records of the assessment, design and implementation of groundwater projects, so as to inform similar, future projects.

How should the tool be used?

We recommend that field teams work through the four steps in detail, as set out in the full version of the tool, which is available at http://oxf.am/ZPgD. The flow chart we include below summarises the main steps and the inputs (data) needed. We recognise that to run the tool in full can be time and resource-intensive. Field teams may therefore need to select certain inputs/outputs from the tool – as has been done by SWIFT staff in Kenya and DRC. We would welcome feedback on which elements of the tool are most useful. The guidance can also be viewed as a contribution to work promoted by Oxfam and others around community-oriented monitoring and management of water resources.[2]

The activities proposed in this tool are most useful where water points are developed that access shallow groundwater, such as hand-dug wells, shallow boreholes equipped with hand pumps and springs. The tool does **not** cover all aspects of providing community WASH services and should therefore be used alongside existing guidance and tools, such as water safety plans, and more formal environmental impact assessments where they are mandated by national regulations, or where resources are available.

[2] See: http://policy-practice.oxfam.org.uk/publications/managing-water-locally-an-essential-dimension-of-community-water-development-165794

Flow diagram of key inputs and expected outputs of the SWIFT/ODI/Tearfund tool on environmental assessment and risk screening for rural water supplies

This tool is meant to address the following questions regarding shallow groundwater sources (i.e. protected springs, hand-dug wells and shallow boreholes):

1. Is there enough water of suitable quality to meet demand across seasons for the long term?
2. What are the main environmental risks to ensuring a sustainable supply of safe water?
3. How can these risks be mitigated?

You can use this tool by itself or use components of other tools already familiar to you to obtain similar outputs

STEP 1: Understand how much water is available by tapping local knowledge

INPUT	Basic geological map (detailed if available, or simple sketch map) with project water sources superimposed	See section 1.1
INPUT	Expert hydrogeological advice if available (particularly where no mapped data or records exist)	See section 1.1
INPUT	Observation of exposed rock (to compare with summary of typical African geologies and their groundwater potential)	See section 1.1
INPUT	Well records from the surrounding area (including data on geology, seasonal yield, reliability and water quality)	See section 1.1/1.2
INPUT	Local knowledge of behaviour and history of sources in the area	See section 1.2
INPUT	Simple yield measurement of existing sources (using bucket and stopwatch, or weir plate)	See section 1.3

OUTPUT

a) Groundwater potential and average yield estimates based on geology (See Annex, Table A1)
b) Actual yield measurements of sources in the area
c) Short narrative/tabular information on seasonal and long-term reliability of the source, including water quality

STEP 2: Determine how much groundwater is needed to meet demand, and how big the catchment (recharge) area of a well will need to be to provide this water

INPUT	Annotated sketch map and/or photos to identify the resilience / vulnerability of the source site in terms of drainage	See section 2.1
INPUT	Measurement of distance of water sources from pollution hazards (contamination control measures needed if hazards are closer than recommended minimum distance)	See section 2.1
INPUT	Estimate of demand for water, currently and in future (assuming a certain population growth rate e.g. 2.5%)	See section 2.2
INPUT	For wells: Estimate of required catchment size by comparing demand with estimated recharge (latter requires agreeing proportion of annual rainfall that is retained at shallow aquifer levels and is accessible. A figure of 1% to 3% is recommended to develop secure water sources in most areas of Africa with over 750mm of rainfall per year)	See section 2.3
INPUT	Estimate of actual catchment sizes for flat or hilly terrain	See section 2.3
INPUT	For springs: It is also possible to compare spring yield (measured during the dry season) with current/future water demand	See section 2.3

OUTPUT

d) Traffic-light assessment of adequacy of catchment size for rainfall and water-demand scenario

STEP 3 Protect the sites and sources by identifying environmental hazards of, and mitigating measures for, site degradation and water supply contamination

INPUT Catchment walk/observation to capture sketch map of direct environmental hazards within 150m radius of the water source (direct environmental hazards include features like gully erosion, rill erosion, land slips, cattle tracks etc.)
See section 3.1

INPUT Assessment of severity of hazards: e.g. of gullies, flooding risk, and landslides and landslips, and whether they require immediate remedial action or relocation of the water facility
See section 3.1

INPUT Simple table to identify and outline causes of degradation features in the wider catchment (indirect environmental hazards) based on community discussion
See section 3.2

INPUT Assessment of severity/extent of indirect environmental hazards (simple table constructed with community)
See section 3.2

INPUT Discussion with partners/authorities/experienced local people on management processes for medium to high-risk degradation processes (incorporate community representatives and consider also community-based ideas and solutions)
See section 3.3

INPUT Construction of table identifying corrective measures
See section 3.3

OUTPUT

e) Remedial measures for direct hazards e.g. to protect against flooding
f) Catchment and water-point protection plan with corrective measures and assigned responsibilities, drawn up/agreed with community

STEP 4 Maintain records of the assessment, design and implementation of groundwater projects, so as to inform similar, future projects

INPUT

- Geological field notes/data from geophysical surveys
- Digging/drilling logs including all data relating to the drilling, construction and geological/geophysical logging, for dry and successful wells
- Pumping test data
- Seasonal water-level observations
- Records on water quality and observations of seasonal quality variations
- Information on physical and legal access (e.g., land ownership)
- Number of people using the scheme and estimate of amount of water collected per person/household across different seasons
- Any incident when water supply system was not functional, reasons and actions undertaken
- Records of corrective/remedial measures taken to address direct and indirect environmental hazards
- Water level across different seasons
- Any chemical, biological and physical parameters from water testing

See section 4

OUTPUT

g) Data records, to be kept at local level and made available to local government WASH/hydrology department, members of national WASH cluster, and key networks that seek to build national databases

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