RiPPLE

Mapping: Spatial thinking

Using Mapping to support WASH in RiPPLE activities

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Background

RiPPLE (Research-inspired Policy and Practice Learning in Ethiopia and the Nile Region) is a five year research programme funded by the UK Department for International Development (DFID). It aims to advance evidence-based learning on water supply, sanitation and hygiene (WASH), focusing specifically on issues of financing, delivery and sustainability and the links between sector improvements and pro-poor economic growth.

British Geological Society (BGS) is a Network Partner in the RiPPLE programme, working particularly to promote and support mapping activities that improve planning, implementation, monitoring and evaluation of WASH in Ethiopia. Most of the mapping-related activities within RiPPLE to date have been in Benishangul-Gumuz Region (BG), one of three regions in Ethiopia where RiPPLE is working.

This note is a toolkit for developing mapping activities to support WASH in other RiPPLE regions, based on experience from the RiPPLE mapping team in Benishangul-Gumuz.

Purpose

This note highlights the value of mapping in supporting WASH, based on the experience of the RiPPLE Benishangul-Gumuz (BG) mapping team. It suggests ways of developing mapping approaches in other RiPPLE regions to integrate with the different research themes.

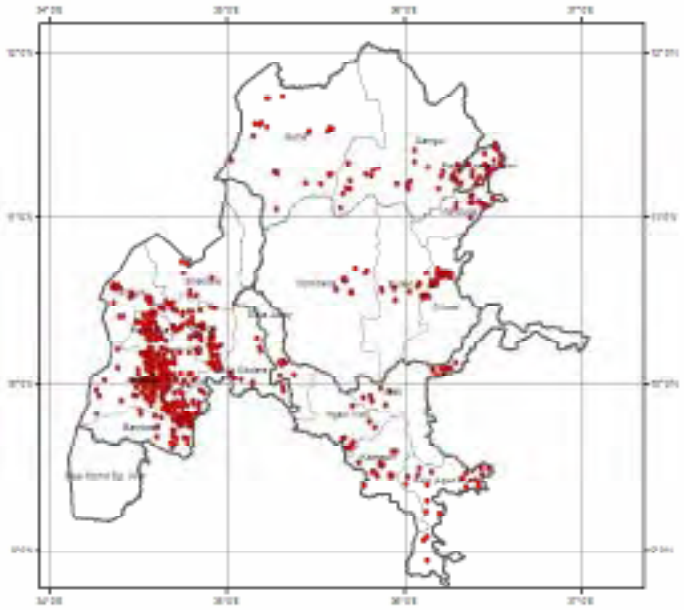
The main aim is to help people think more clearly about spatial data issues and to provide a tool kit of approaches to help address these issues and so improve WASH.

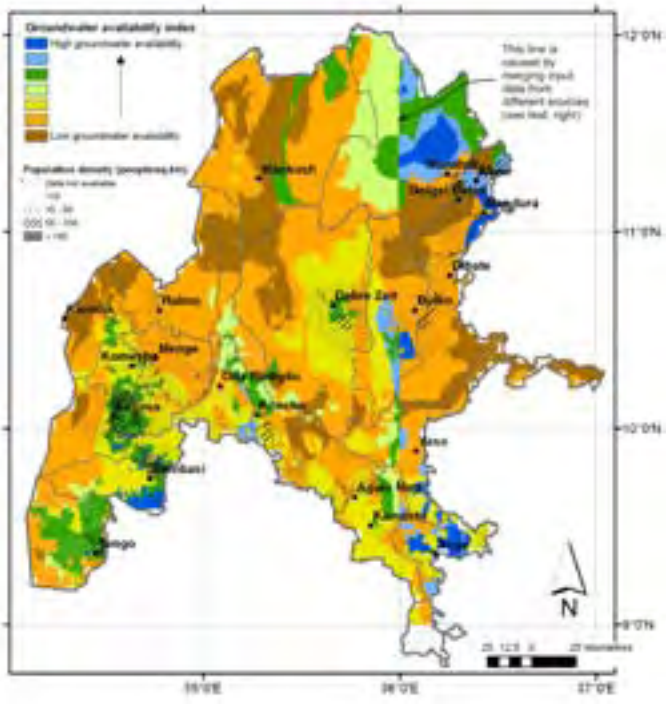
Why mapping?

Mapping is another way of saying spatial thinking. Mapping within RiPPLE is not about simply making maps, and not about providing technical training. It is about raising capacity in using information for planning, implementing, monitoring and evaluating WASH – helping people think more clearly about issues and problems. Mapping is therefore a tool that can support the research activities of all the different RiPPLE themes. The great advantage of using mapping techniques is that they can combine many different types of information, and therefore communicate patterns and relationships that would be hard to identify in any other way.

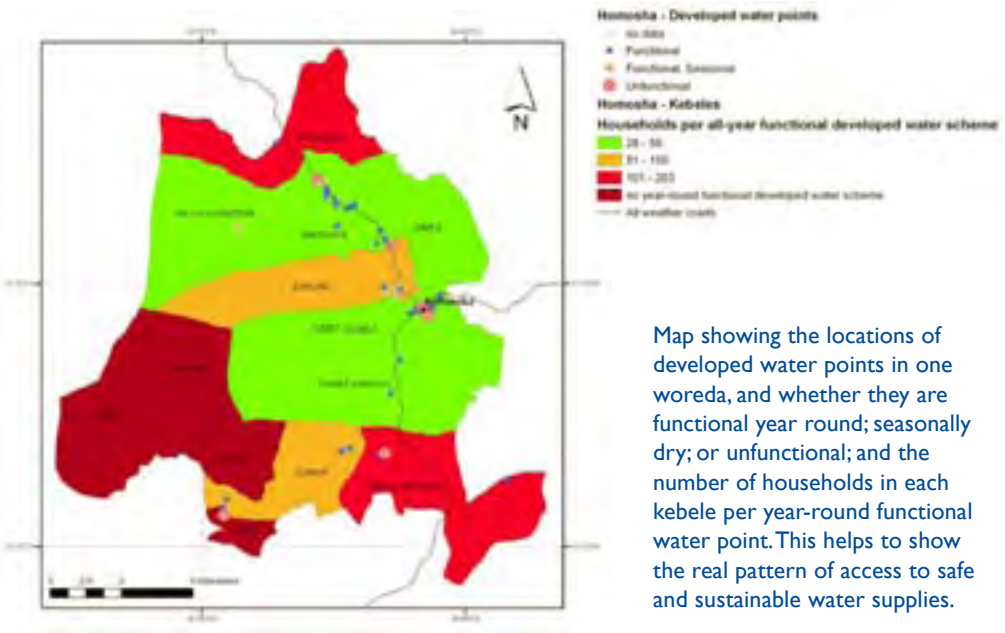
The mapping team in BG is trying to:

- understand what kinds of information is collected, stored, analysed and used by different WASH actors;
- understand the challenges affecting all of these activities – challenges like lack of capacity, hardware, communication, incentives, and structures
- improve the capacity of actors in BG to make effective use of mapping techniques: from map and spatial database developers to effective use of paper maps by woreda water desks.





Maps showing the known locations of developed water points (above) and groundwater availability across Benishangul-Gumuz (right). Most of the water points are in areas of relatively high groundwater availability – i.e., areas where it is easy to develop water points.



Map showing the locations of developed water points in one woreda, and whether they are functional year round; seasonally dry; or unfunctional; and the number of households in each kebele per year-round functional water point. This helps to show the real pattern of access to safe and sustainable water supplies.

This kind of understanding has direct relevance to the other RiPPLE research themes: to Finance, Growth and Governance and Planning. For example, the Governance and Planning theme could use maps to reveal and help explain patterns in access, sustainability and management of WASH across woredas and regions – such as the relationship between water scheme coverage and the actual level of year-round water service provision to households. The Finance theme could use maps to show how the degree of budget under-utilisation varies from one woreda to another, and how this relates to the level of WASH coverage and/or new implementation activities in each woreda, or to explore different facets of cost-effectiveness. The Growth team could use a groundwater availability map combined with a population distribution map – such as one produced for BG – to show the relative risk of communities being impacted by seasonal dry or longer drought periods, and therefore to support planning for improved food security.

If these approaches would be useful to you, the following notes, based on the experience of the mapping team in BG, are designed to help in the setting up of a dedicated mapping team in the region.

Starting points for mapping

The aim is not for the mapping team to produce maps: that would only be a short term solution to any specific problem. Rather, the mapping team in BG is working to promote the development of a group of mappers – or people using mapping approaches – within the Learning and Practice Alliance (LPA), who will be supported by RiPPLE. This group would promote mapping approaches within sector bureaus and NGOs.

The working hypothesis of the mapping team in BG is:

> *Regular collection, organisation and use of information on water availability, access and demand/use at all levels makes for more effective, sustainable, transparent and accountable WASH. Mapping is an excellent way of organising and using this information during planning, advocacy, implementation and monitoring and evaluation.*

A very useful starting point for looking at mapping and data issues is to consider the different needs of various mapping users. These can be divided into a light or shallow user (e.g. a planner who needs interpreted information), an intensive or deep user (e.g. a hydrogeologist who needs detailed information on geology and groundwater resources) and a developer (e.g. an expert in geographic information systems (GIS) who uses and interprets GIS-based hydrogeological information to produce interpreted maps for hydrogeologists and/or planners).

Another useful starting point is to think in terms of who generates data; who holds data; and who uses data. They may be the same people, or organisations; or more often they will be different. How they interact will also depend on their different needs.

Promoting spatial thinking approaches

1. Identifying current practises

The first step is to learn about current practises related to data and mapping in the areas of planning, implementation, monitoring and evaluation of water supply and sanitation (WSS), and in doing so identify issues that mapping could help tackle and challenges that currently limit data and mapping activities.

At this stage we are trying to pose the following questions, and promote discussion about data availability, use and sharing.

- Who collects, stores and uses relevant information for WASH?
- How are data and information shared? Is it all easily accessible?
- What use is being made of the available information?
- Can we divide stakeholders into map developers, deep users and shallow users?

There are several ways of going about this:

1. The first question can be answered by using a questionnaire or matrix that can be completed by visiting several relevant institutes (e.g. the Bureau of Water, Energy Resources and Mineral Development – BoWERMD – and the GIS unit in the Bureau of Finance and Economic Development – BoFED) and identifying and involving key informants.
2. A workshop can be very helpful at this stage, where collectively a matrix of information availability can use can be drawn together. Questions 2 to 4 can provide lively and useful debate.

The BG mapping team are producing a set of flyers to illustrate mapping approaches aimed at these three types of users: developers (e.g. a hydrogeologist and GIS expert producing a groundwater potential map); deep users (e.g. hydrogeologists using groundwater potential and geological maps to help them site and implement new water schemes); and shallow users (e.g. a planner at Regional level using maps of groundwater potential, population distribution and current water scheme coverage to prioritise woredas for WSS implementation).

2. Identifying areas where spatial information would be useful

Spatial information is useful in many, if not most, areas of WASH. Specific areas where mapping approaches would be useful are likely to vary in different regions and sectors. This is a key stage in the process of improving spatial thinking and planning of WASH: identifying with the relevant stakeholders where mapping approaches could be helpful for planning, implementation and advocacy it can provide an important driving force for tedious work of properly collecting and storing information.

Some examples from BG, where we concentrated on water supply rather than sanitation, are:

- Revealing patterns in access to developed water points across woredas and regions.
- Revealing patterns in the year-round sustainability of water points.
- Showing where water supplies are easy to develop, and by contrast where more resources are needed to support successful development.
- Showing where water demand (i.e. population size) is highest, and how this relates to transport networks.

A workshop, possibly combined with the initial workshop described above is an excellent way of achieving a consensus and vision for how mapping can help in a region or woreda.

3. Identifying GIS skills and use

Mapping is not just about GIS, but GIS expertise makes many mapping activities easier and more effective. However, GIS use needs to be targeted according to the needs of users – i.e., shallow user, deep user and developer. Not everyone needs to be trained to expert GIS developer level – for example, a regional planner might only need to have an overview of the kinds of analysis that GIS can be used for, so that he can effectively direct staff with a higher level of training to analyse data. It is useful to try and answer the following questions:

- What GIS software is available in the area?
- What GIS projects have already been set up, or completed?
- What training courses have been undertaken?
- Who has used GIS – are they a developer or a user?
- Who is comfortable about using paper maps?

There are various ways to collect the information to answer these questions. One is to hold a dedicated discussion meeting with people who have had GIS training and/or experience, from all relevant offices. If there are less than ten to 15 participants, such a meeting could be held in half a day. Another very useful method is to work directly with GIS users in different offices to learn about their needs and skill levels, while at the same time providing practical advice and assistance to GIS users.

Training is an obvious area of improvement. This might mean developing the GIS skills of specific staff within the BoFED GIS unit to an expert level, or developing the GIS skills of WSS experts in water and/or health bureaus to a more basic level where they can carry out practical analysis of their own data; or they might be in better integration between offices; or in more support for GIS (and often for wider mapping approaches) from managers.

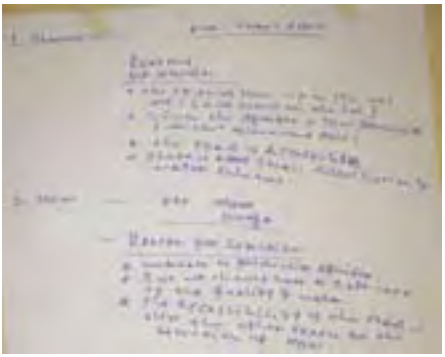
Raising awareness and increasing the application of mapping approaches

1. Raising awareness initially

As discussed above, there are various ways of raising awareness and increasing the use of mapping approaches. One way, which we used in BG, is to hold a training workshop to demonstrate how mapping approaches can be used in WSS . The BG workshop had a practical focus and was designed around existing real datasets used by the BoWERMD, BoFED and WaterAid. We recommend aiming such a workshop specifically at planners, implementers and monitors of water supply in a single sector office (e.g. BoWERMD or Bureau of Health), the BoFED GIS unit, and where relevant, NGOs and private sector organisations. By keeping the focus of the workshop on one area – e.g. water supply, or sanitation – you can focus specifically on practical aspects of planning, implementation and monitoring.

At the end of the workshop there should be a clear idea of the main issues and opportunities for mapping, and ideally have identified two or three practical actions or areas of research to take forward.

A break-out group at a mapping workshop in BG, using maps based on existing datasets to carry out a water point planning exercise (above), and some of the results from the exercise (below)



2. Setting up a mapping team within the Region

The value of a mapping team within an individual region is that it can be dedicated to the specific research issues in that region, and it can work closely over extended periods with regional sector bureaus, BoFED, NGOs and private sector organisations (within which most if not all of the team members will probably work) and with woreda LPAs, in order to promote integration in spatial thinking – spatial data collection, storage and analysis activities. Such a team can also produce maps on request for other RiPPLE teams, either within the regional LPA or nationally, to aid their research.

The obvious way to set up such a team is through the LPA. In BG, we started this process at the first regional LPA meeting in October 2007. We first presented the progress made to that point by the RiPPLE mapping team, including the issues and actions that had arisen from previous workshops in BG. Then we held a detailed discussion on three specific topics related to spatial data and mapping, out of which a large number of recommendations for action arose. At the end of this discussion seven people volunteered to form a spatial data and mapping (D&M) team under the BG LPA. These are people who are active in one or more of the following areas: data collection, data analysis, planning and implementing, not only for domestic water supplies but also in the fields of agriculture and food security. Some of them have existing mapping skills – including basic GIS training – but none are mapping or GIS experts; while such experts would be welcome, they are not essential.
At the time the BG D&M team was set up, it had a clear set of issues to consider, and quickly produced a clear list of proposed aims and activities. This is likely to be vital to optimise the team's work and success.

For example, the three topics around which the BG D&M team was initially set up are:

- Improving spatial data sharing and integration for planning WASH (with particular reference to a new WASH database being developed by WaterAid Ethiopia, which the D&M team propose to trial at regional government level in BG).
- Using spatial thinking to support regional level planning, e.g. on growth.
- How can the data & mapping team support the finance theme in BG?

The main initial activities proposed by the D&M team were:

- To develop working guidelines for using a common database system in the region. e.g. based on WAE's data base.
- To further develop this database.
- To promote training to support data sharing and integration in BG.
- To pilot the new database in Menge woreda

3. RiPPLE support for the new mapping team

RiPPLE support for the new LPA Data and Mapping (D&M) team should be through the regional facilitator and the RiPPLE mapping team, whose details are in the table below:

Name	Organisation	Role / (expertise)	Email
Alan MacDonald	British Geological Survey	Co-Lead (hydrogeologist, GIS)	amm@bgs.ac.uk
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Frank van Steenbergen	MetaMeta	Member (Fluoride; (engineer; communications)	fvansteenbergen@metameta.nl
Kathi Welle	Overseas Development Institute	Co-Lead (Governance; socioeconomic aspects)	k.welle@odi.org.uk
Mulugeta Feseha	Addis Ababa University	Member (Geologist; GIS)	mulugetafy@yahoo.com
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RiPPLE is a DFID-funded Research Programme Consortium hosted by WaterAid Ethiopia

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RIPPLE Toolkits provide guidelines on 'how-to' implement recommendations from supporting case study examples.

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