

Question & Answer: FLOW in Liberia



WSP adapts the mobile technology of Water for People's dynamic baseline and monitoring tool, Field Level Operations Watch (FLOW), to enhance watermapping projects.

How did the World Bank/WSP come across the idea of using Android devices and Google mapping (i.e., the FLOW program) to monitor projects in Liberia?

FLOW was initially developed for, and piloted by, the NGO Water for People (WfP). The World Bank's Water and Sanitation Program is well connected in the sector, and when we heard about this technology we immediately realized that it could help us implement our planned waterpoint mapping project in Liberia.

We've adapted and further developed the software and used it on a national scale for the first time, and in the very challenging environment of Liberia, thus really testing its merits under difficult conditions.

FLOW appealed to us because of its relatively low cost, the easy-to-use interface that allowed us to train a large number of mapping-survey-staff in a short time, and its capability to transmit survey data from the field to central servers in almost real-time (at least theoretically—in practice the spotty network coverage in Liberia severely limited this third functionality).

How did implementation of these technologies work on the ground?

The aim of our project was to make a map and inventory of all safe waterpoints in Liberia. The FLOW software is suited for this task because it can transform any Android smartphone with a GPS chip and camera into an integrated, yet easy-to-use mapping device. This means FLOW-enabled phones can be used to:

(a) fill in a survey (in our case about waterpoints) on the touchscreen by clicking response boxes and typing responses. FLOW's survey is highly customizable in terms of designing question trees, or setting mandatory questions

that have to be answered before the survey can be submitted.

(b) take a picture of the object of your survey within the survey application

(c) capture the GPS location within the survey application by simply clicking a button

(d) submit the data straight to central servers IF there is network coverage (this proved a problem in Liberia, which has a very incomplete and expensive mobile phone coverage; however, it is possible to collect the data straight from the phones' SD cards as well).

Thus, WSP:

- acquired 75 Android smartphones
- loaded the FLOW software onto them and then hired and trained 75 teams of mappers
- provided them with motorbikes and sent them out all across Liberia to map all safe waterpoints in the country.

Our teams managed to complete this task in about 30 days of intense work.

Our primary problems were logistical and unrelated to the FLOW software (e.g., motorbike breakdowns in remote areas). The primary limitation of FLOW in Liberia arose out of the fact that the mobile phone network coverage is extremely limited outside of urban areas, which was a problem for us because we mainly operated in rural zones. Also, mobile internet connectivity is still fairly expensive here. We thus fell back on a system of collecting the data physically straight from the SD cards of the devices.

The software still gave us a number of advantages, not least that we could use fairly cheap phones instead of expensive professional GPS devices and still achieve professional results, and that the FLOW survey is very easy to use, thus allowing us to train a very large number of mappers in just 2-3 days per group.

What are the anticipated benefits?

The primary benefit of mapping all safe rural waterpoints in Liberia is that it will enable the Government of Liberia and its international partners to initiate large scale, effectively targeted building and repair programs of safe waterpoints (primarily handpumps). For this purpose, we are now working on a comprehensive investment plan based on the data.

The lack of access to safe drinking water is an enormous problem in rural Liberia, resulting in a heavy disease impact (primarily diarrheal diseases, but also parasites such as worms), especially among children. One straightforward way of addressing this is to provide the population with more safe waterpoints, such as handpumps—or to repair existing ones that have fallen into disrepair.

The challenge is that to construct and repair safe waterpoints in a targeted, effective manner and on the required large scale, a detailed map and inventory of the current waterpoint infrastructure is an indispensable precondition. This is because such a map can:

- produce a detailed overview of relative needs, i.e., identify particularly under-served, and thus priority, areas
- identify the types of pumps found in each area of the country, crucial to organize repair work, spare part supply chains, or to avoid building uncommon types of waterpoints, which would complicate the other two objectives
- analyze the types of pumps that break most often, and why

Our project has created this detailed map for the first time—after the end of the civil war in 2003, waterpoint building and repair activity was largely done in an uncoordinated way as part of the ad-hoc emergency response.

Do you see potential for open-source and mobile technologies in other sectors across the developing world, such as improving outcomes in health care?

Yes, this technology has a lot of potential. FLOW transforms any Android smartphone into an easy-to-use, integrated mapping/survey device, with the capacity to transmit survey

data from the field to central servers in real time (provided there is coverage!). Maps and surveys are needed for planning in virtually every context of social and economic development—households, hospitals, schools, businesses, water and sanitation access, etc. The technology thus has an extremely wide range of possible applications.

What was the World Bank's experience with respect to cost?

The cost is relatively inexpensive. The primary cost is that of purchasing Android smartphones onto which the technology can be loaded (at the moment, the cheapest suitable phone sells for around US\$100-150 per piece). Of course, telecommunication costs (the FLOW software can send survey data from the field to the servers using mobile internet) vary from country to country, and can be relatively expensive in some developing countries. However, this is rapidly changing, and in any case, one can always fall back on collecting the data directly from the phones' SD cards.

The software is open source and at least nominally free, though we ended up hiring a consultant from the developer to help adapt it to our particular needs. The cost of the servers that host the database and display the overview map is minimal.

What are some potential roles that similar open-source and/or mobile technologies could play?

In Liberia there is already a separate pilot project that plans to use the FLOW software to give local communities an easy way to monitor illegal fishing trawlers that frequent their local waters. The communities would fill in a short survey about each spotted illegal trawler, take a picture, capture the GPS location, and then send the information to a central database.

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