Non-traditional Water Monitoring through Local Involvement, Key Learnings from the iMoMo Global Initiative

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Abstract

In developing and transitional countries and despite significant global investments in hydrometeorology, data on water remain scarce/fragmented. One key reason is that traditional monitoring technology (e.g. a fixed river gauging station) does not scale, esp. in remote and/or poor regions of the world. High investment costs, vandalism and difficult operation and maintenance are factors that especially limit its scalability in the context of Sub-Saharan Africa. The collection of non-traditional data through local involvement using low-cost, high-tech devices (also referred to as crowd-sensing or citizen-based data collection) has emerged as an interesting pathway for obtaining data at lower costs.

Over the past 6 years, the iMoMo project and its multi-national team has worked in Africa and Central Asia to develop and deploy crowd-sensing technologies and implement data collection campaigns mainly dealing with the acquisition of discharge data (www.imomohub.com). One of the developed technologies was the mobile (Android-based) application discharge.ch which allows to measure discharge in small to medium-sized rivers and channels using the smartphones' camera and its computational power. Measurements are automatically synchronized with a database on the web, where they can be managed, analyzed and shared/exported by institutions and academia. Involving local citizens in the monitoring process not only improves their understanding of water related issues, but also creates local ownership of the technologies and provides a direct tool to support daily decision-making and management on the very local levels (e.g. throughout large scale irrigation schemes).

Data collection through local involvement requires careful planning, including the definition of collection protocols, establishment of contractual relationships between e.g. the basin water office and local crow-senders, agreements on compensations and small salaries for involved citizens and finally constant quality control and assurance. Our approach therefore deviates from many other citizen science projects which are exclusively based on voluntary participation of citizens, providing data at random times and locations (e.g.wow.metoffice.gov.uk). During our involvement in Eastern Africa, a key learning was that generating timeseries with constant temporal resolution and at predefined locations leads to much more valuable information and is therefore worth the expenditure. This is especially true when the measured parameter is influenced by human interactions (e.g. the inflow to a large-scale irrigation scheme) and can therefore not be spatially correlated with other data from nearby traditional sensors or satellites.