



FLOWERED GeoDBapp: a mobile application for environmental crowd-generating data collection using Sentinel2 imagery

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This study is part of the EU H2020 research Project FLOWERED (de-FLuoridation technologies for improving quality of WatER and agRo-animal products along the East African Rift Valley in the context of aDaptation to climate change). FLOWERED project aims to develop technologies and methodologies to manage the risks associated with high Fluoride water supply in three study areas located in Ethiopia, Kenya and Tanzania. These sites have been chosen to analyze the local relationships between contaminated water and water supplies.

A specific action of the project is dedicated to the development of a water management system based on the knowledge of the distribution of water uses (domestic, agriculture, livestock uses) at the village scale. Land cover maps have been realized using ESA Sentinel images. On the basis of this information and for each land cover class, the transition to land use and water use maps has been studied and developed through the implementation of an app for mobile devices: FLOWERED GeoDBapp.

This study aims to discuss the possibility to improve the information gathered by satellite classified images through a dynamic updating of data collected by the citizen with their devices. The validation of the data generated by the citizen has been analyzed on the basis of the first data collected in the field in Tanzania.

Moreover, FLOWERED GeoDBapp has been created with the purpose to be ready for ground truth data collection and validation. These actions are crucial for land cover mapping and for this purpose, the possibility to see the classified image in the device (in online and offline mode) has been proposed.

The app has been developed with an open source SDK called Ionic Framework for iOS and Android systems, and it is available for download at <http://sharegeonetwork.floweredproject.org/geoportal/app>).

This app allows in a very simple way a field data observations and collection to every citizen equipped with a mobile device like a smartphone or tablet, in order to support the activity of crowd generating data.

The app is composed of 4 sections:

- 1 – Collection of general information
- 2 – Collection of land cover ground truth data
- 3 – Collection of land cover validation data
- 4 – Collection of water use data

Section number one is the logical core of the crowd-generating dataset because it represents the observation localization based on GPS device. Related to the geographical position a set of information can be filled in input forms provided by the app, including pictures taken by the camera. Interconnected to this mandatory section, it is possible to collect data about land cover and land use (supported by a map elaboration realized on the basis of Sentinel satellite images and available directly through the app) as well as data about the water use.

The collected data are stored in a local SQLite database and can be uploaded to the FLOWERED server when a network connection is available, after system authentication.

Currently, a first dataset of crowd-generating data is available for Tanzania study area.