Mobilisation of local people and technology in mapping for the Sierra Leone Ebola epidemic response

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Background

During the West Africa Ebola outbreak, the Ebola Management Centre (EMC) operated by MSF in Magburaka, Tonkilili district, Sierra Leone, required reliable geographical information to enable the tracing of contacts of Ebola cases. GPS-enabled smartphones, specifically, inexpensive devices running the open-source Android platform, have penetrated rural African markets. This implies a potential new opportunity to conduct sophisticated mapping and census data gathering using local volunteers and what is now effectively local technology. We describe a project to map and collect census data for the Tonkilili district using local workers with smartphones.

Project

A data collection team was recruited in Magburaka comprising 24 local workers, 12 of whom had motorbikes, and 12 others Android smartphones. After being provided with free, open-source survey software (OpenDataKit) to install on their phones and some basic training, they visited and recorded the GPS coordinates of villages. They interviewed each village leader or representative and recorded village name (and common variants), name/phone number of village leader and local health-care worker (HCW), population, number of households, and location of closest health facility. The methodology involved some advanced setup, including a local web-based aggregation platform. Users mastered the survey software in a few hours, and most were trained by their own recently-trained colleagues rather than by the external supervisor. Devices using Android, rather than Symbian or other operating systems, were used due to a reasonably high market penetration of Android and the availability of high-quality Android-compatible open-source software.

Outcomes/lessons learned

The speed of data collection was unprecedented: the team mapped 950 villages (the whole Tonkilili district, one of 13 in Sierra Leone) in 2 weeks. The data quality was reasonable; of those villages where data already existed, either from the 2010 census or prior OpenStreetMap contributions, less than 5% disagreed with the pre-existing names, suggesting that the data collected were consistent. OpenStreetMap are using the validated data to update their maps. This comprehensive census exercise provided epidemiologists with the means of assigning Ebola cases to specific villages, determining at a sub-chiefdom level where the loci of transmission were occurring. The involvement of local community members using technology and devices they own and are familiar with allowed the implementation of a survey that would have required vastly greater resources using non-local devices.

Conclusions

A very modest investment can produce large-scale geographic and population data, using locally-appropriate technology in genuine partnership with local people.