

## When Government 2.0 Doesn't Exist: Mapping Services In The Developing World

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### Abstract

The idea of government 2.0 is one that has become prevalent in recent years. Accelerated by recent economic conditions more services are being delivered online. However within developing nations this has not occurred on the same scale due to the reasons of technology and budget. We present a case study of projects in Kenya and Tanzania, where services, along themes of sanitation, waste management and water are being mapped using open source GIS technologies through citizen engagement. This then feeds back to NGOs and government sources, raising awareness of the problems faced daily, by people living in the slums of Kenya and Tanzania.

### Introduction

Because of the socio-economic problems faced by governments in the developing world it is unrealistic for service provision to be on the same level as those in the developed world. In our context we take services to be along the lines of water, education, transport infrastructure and health and sanitation. Ordinarily in the developed world such public services would be, in part or wholly, subsidised by the state. This is not the case within the developing world, though these services exist, they are run as wholly private enterprises with basic, if any, government regulation and intervention.

The problem of services within developing nations is further compounded by the lack of reliable and up-to-date data. Open data is a potential solution, mooted and implemented within the developed world with *data.gov* and *data.gov.uk* being examples from the USA and UK respectively. By opening up data repositories this makes the processes of government transparent (and by extension service provision by the government). From this citizens can have a greater understanding of the processes of the government and suggest improvements or make something that helps the government provide a better service.

Within the developing world this process is happening, but not on the same level as the developing nations. Kenya has become the first nation in Africa whose government is opening their data to the world. Through *opendata.go.ke* the Kenyan government is making datasets available on education, energy, health, population, poverty, water and sanitation along with public expenditure. Events like AppsForAfrica spark the creativity and usage of this data, by the technologically literate communities in the developing world, using the data.

Though the problem of data and access to data is resolving itself, the issues of granularity of data remain. Data collection within the developing world has many barriers, from the quality and knowledge of the surveyors to the equipment. Within the slums of the developing world, like Tandale in Dar Es Salaam and Kibera in Nairobi, Kenya the influx of people into slums causes a rapidly growing and changing urban environment and demographic. This causes any survey conducted to be rapidly out of date.

Because we wish to improve the provision of services in these areas the need to understand the current situation is important. Our solution to this has been to create a framework using community members as surveyors, with open source technologies and platforms like OpenStreetMap and Ushahidi interfacing between the community and the data they collect.

## Community Involvement

Including the community in the mapping process allows for three things to be considered. Firstly it allows the community themselves to take ownership of the project; the intention is that any mapping project becomes sustainable, the community are a key driver in this regard.

Secondly it allows the community to understand the limitations of the government. Because of past issues like corruption and broken promises, citizens, in general, are wary of government initiatives. Governments in developing countries suffer from fuel shortages, budgetary deficits and lack of infrastructure. With the support of the government, driven by community members, the processes of the government become transparent. This enables the citizens to understand the limitations of the government, in a fair and measured way while understanding its abilities.

Thirdly, it can be assumed that community members are familiar with the problems faced by their own community and are familiar with the geography of their environment. Therefore once competent with the collection and processing of spatial data they will, in effect, know what they're looking for.

Crowd sourcing using community members allows for more than geospatial data to be collected. While collecting information about the location and capabilities of services within their locale they also can report on issues. Within the Tandale project the issues reported ranged from community meetings, dumping of rubbish and drug taking. These would be missed in one sweep by an outside survey, however for the community members on the inside they can provide this information when given the appropriate training and equipment.

The costs of supporting a project once started are quite small. Within Tandale, 18 community members were selected alongside 25 urban planning students from Ardhi University. The students were completing compulsory vocational training and received a small stipend along with community members. When the first phase of the project was complete the project has the ability to continue with a small investment for community stipends. This keeps the data collected up to date and creates employment for those community members who continue to interact with the project. This in turn allows for the project to be sustainable. This model (without) students was piloted in Kibera and refined in Mathare, Kenya.

## Opening Data

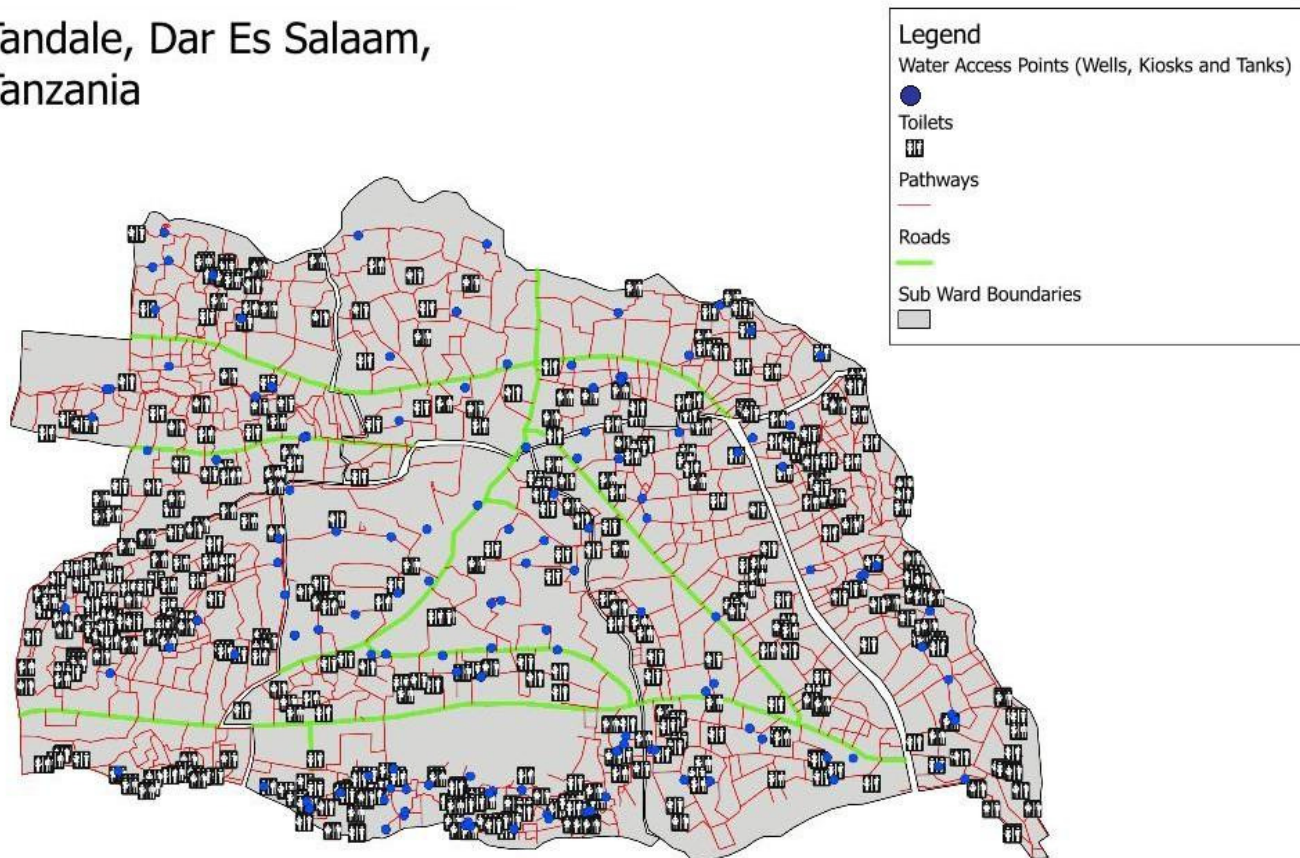
OpenStreetMap (OSM) is used as the repository for the geospatial data collected by community members. OSM is essentially a 'wiki' for maps with the aim of producing a free and open map of the world. During the Haiti Earthquake of 2010 a humanitarian effort, involving OSM contributors from around the world aided in surveying on the ground and tracing satellite imagery to produce a map of Haiti, especially Port-Au-Prince [1].

OSM has a flexible and thorough<sup>1</sup> tagging ontology. Using this ontology it is possible to classify different types of landuse (residential, industrial and wasteland etc.), and points of interest (POIs) (pharmacies, schools, water points etc.). This is well documented online in a wiki. Other forms of support exist, through mailing lists and forums.

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<sup>1</sup> Because of OSMs open nature it is also possible to suggest tags which currently do not appear within the tagging system.

## Tandale, Dar Es Salaam, Tanzania



**Figure 1: Tandale**

Figure 1. Shows the community efforts of the Tandale mapping project. Identified here are water access points, toilets and drainage points. From this data we (or anyone) can conduct further analysis. For example many of the water points are open wells, situated near dumping grounds and sewage drainage.

Also open defecation areas, dumping grounds and general landuse. The data now exists for anyone to understand where those issues are, not just that they exist. Identifying these areas allows for outside organisations like World Bank and NGOs, aided by the government to conduct improvement works.

Combining the map with Ushahidi allows the reporting of problems at the community level. Using SMS messages and a web form, community residents can submit problems along previously discussed themes.

### **Future Work**

Our future work will be along two lines. Firstly we will be investigating how feedback can be achieved with community members and those groups (be they governments or NGOs) through platforms.

Secondly an expansion of the mapping program, to include drainage routes and enhanced information about POIs. Part of this process will be keeping the collected data up to date.

## Conclusion

In this paper we have presented a case study and the framework of the community mapping projects within Kenya, focusing on recent efforts in Tanzania.

Because of the ubiquitous nature of mobile phones in the developing world[2], we feel that the barriers of participation rest not with the community, but with the apparatus of the state. Governments in developing countries have a difficult task, generally they have large budget deficits combined with large health and poverty concerns, of which slum dwelling is a small part. By instigating mapping projects at the ground level, using relatively cheap devices and an open platform we feel that a potential exists for this methodology to be 'franchised' to other areas. In doing so we can bring the ideas of 'government 2.0' to the developing world.

We have also shown how the data collected can help with understanding the baseline of service provision in deprived environments, where government data is either unavailable or unreliable. We have also illuminated the benefits of using open source technologies in facilitating the sharing of this information.

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Map Data and Map Images (c) OpenStreetMap contributors, CC-BY-SA.

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