

## **An innovative approach to managing geographical information system support for a large-scale indoor residual spraying campaign in Burundi**

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### **Introduction**

In 2018, in response to the malaria outbreak in Ryansoro district, Burundi, MSF successfully implemented two indoor-residual spraying (IRS) campaigns (38,367 identified habitations) with integrated geographical information system (GIS) workflows. In 2019, a larger scale IRS response was needed (62,370 habitations), but with the rainy season three months away, the team decided that existing workflows would not deliver the required quality at this scale in the given timeframe. In response, the team developed a new workflow integrating GIS-supported micro-planning. It was hypothesised that, by geo-referencing the location and type of sprayable structures, IRS operations could be planned, spray coverage estimates determined, spraying implemented, and effective follow-up conducted, within a one month timeframe.

### **Methods**

GIS and environmental health specialists provided support through interlinked GIS and information / communication technologies (ICT): a Missing Maps activation provided an estimated geo-referenced household database to support planning and IRS coverage monitoring; two interlinked mobile applications - Kobo Collect and OsmAnd - enabled offline data collection and daily analysis of activities; a local Kobo server hosted on a NUC server provided a secure, stable IT solution for centralising data; and two mobile aggregation kits provided independent, resilient connectivity to the server and smartphones for data synchronisation. The data collected were analysed daily to evaluate spray coverage, estimate accessibility and distance between structures, and identify types of sprayable structures and duration of the campaign. 64 spray team supervisors were recruited among the local community.

### **Ethics**

This innovation project did not involve human participants or their data; the MSF Ethics Framework for Innovation was used to help identify and mitigate potential harms.

### **Results**

A spray coverage of 97% (12% above WHO recommendations) was achieved within the implementation period, higher than coverage achieved in 2018 (~92-94%). The workflow provided fast, stable connectivity for data transfer, enabling enumeration and real-time monitoring. Implementation team feedback stated that daily access to accurate, real-time data facilitated informed decision-making and effective adaptation of spraying activities. Furthermore, collaboration with GIS / ICT specialists allowed the implementation team to focus on quality supervision and improving coverage equity.

### **Conclusion**

The new workflow enabled high quality IRS implementation at the necessary scale and within the given timeframe. This workflow has potential for replication in other settings if the required ICT / GIS skills are available. It is acknowledged that integrating GIS-supported micro-planning for smaller scale IRS campaigns might not be necessary, but where this threshold is remains to be seen.

**Conflicts of interest**

None declared.