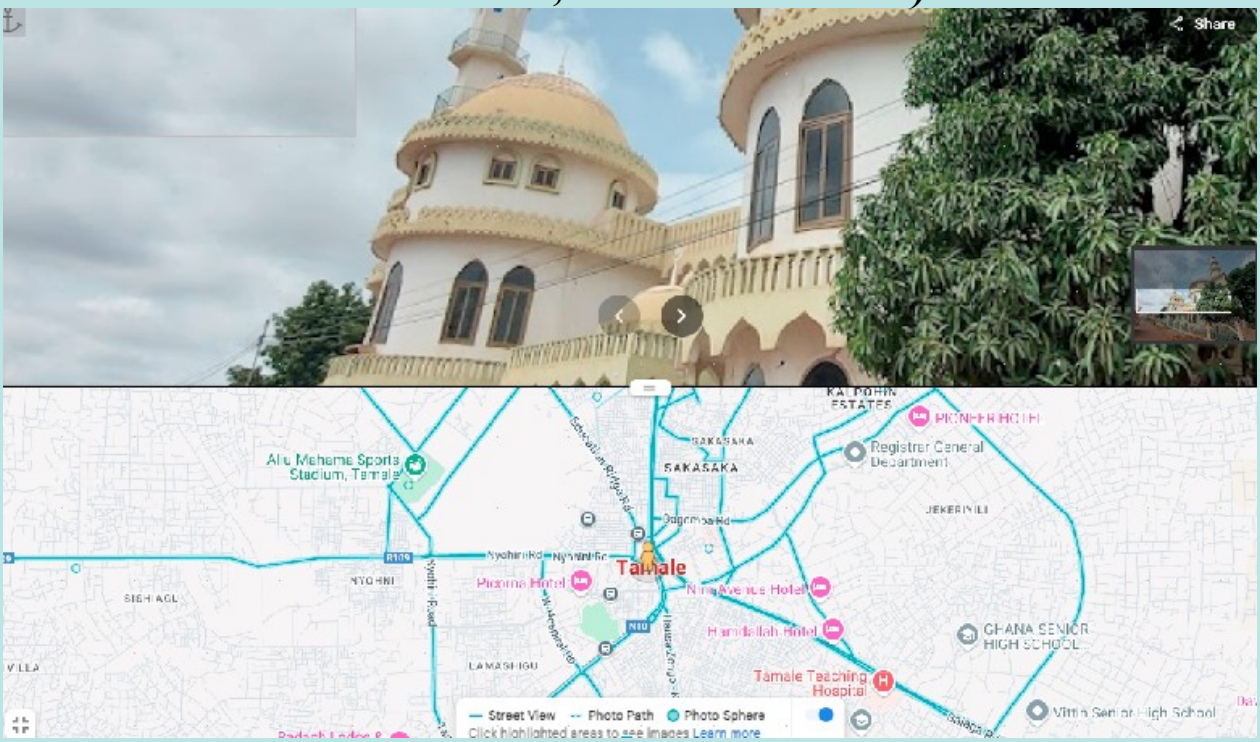
Training and implementation of Geo-enabled microplanning for immunization planning and demand generation (Polio, Covid-19, Measles/Rubella)



INTRODUCTION

Although the level of detail and completeness may differ from what is done now, planning activities have always existed in health services. Micro-planning at health units usually precedes all immunization activities and campaigns with due consideration of the intervention context. However, previous plans had considerable limitations like lack of precision of catchment areas, low community implication, movement of immunization teams only in some areas, sub-optimal staff distribution in some cases, with vaccinators overworking and acting beyond the boundaries of their catchment area. Mapping is central to the planning process, but previous maps of communities and catchment areas were hand drawn by health workers and other stakeholders, making them inaccurate. Hence, since 2018, the Geographic Information System (GIS) in Ghana has been training all levels of health staff from the regional level to the sub-district level on the use of Geo-spatial technology to draw maps using coordinates recorded with the technology.

Geospatial technology plays a significant role in enhancing health outcomes including micro-planning for immunization activities in Ghana. Geo-spatial tools create precise maps of communities, health facilities, and populations. This helps in identifying areas with low immunization coverage. Visualization of geographical data also aids in the efficient allocation of resources such as vaccines, healthcare workers, and cold chain equipment. Geo-spatial data helps

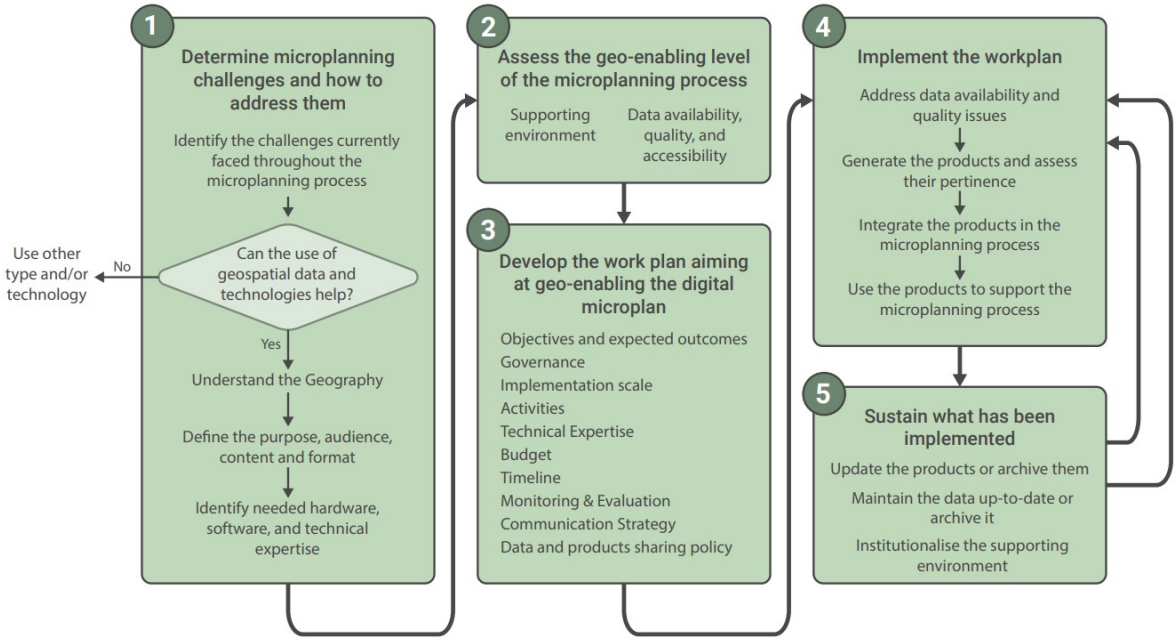
to identify hard-to-reach and underserved areas, ensuring that immunization campaigns target these locations effectively. The use of Geo-spatial technology also helps with the involvement of communities in the microplanning process and enables regional teams to identify movement of vaccination teams.

Mobile technology such as KoboCollect and ODK integrated with geo-spatial tools allows for real-time data collection and monitoring. This helps in tracking immunization progress and identifying all issues promptly. It also helps in organizing targeted awareness campaigns by identifying areas with low awareness about immunization benefits. In 2024, JSI contributed to the training of health workers in Ghana in geo-enabled micro-planning.

IMPLEMENTATION OF THE PRACTICE

In practical terms geo-enabled microplanning is a process of five steps including 1) the identification of challenges in microplanning and determining the relevance of geospatial data and/or technologies to address them 2) The assessment of the current geo-enablement level of the Health Information System and of the programme 3) Development of the workplan 4) the implementation of the workplan 5) Sustaining what has been implemented (Figure 1).

Figure 1- Process to geo-enable a microplan



Source: WHO/UNICEF (). Geo-Enabled Microplanning Handbook A product of the WHO-UNICEF COVAX GIS Working Group

In Ghana, the implementation of the geo-enabled microplanning was made possible by two convergent and favorable processes. The first is the Ghana's digital transformation policy which aims to unlock the huge potential of digital economy; the second is the interest of EPI in the use of maps for planning.

The implementation process involved the identification of relevant stakeholders including the Ministry of Health, Ghana Health Service (GHS), local government authorities, international organizations (e.g., WHO, UNICEF, USAID), and community leaders. Meetings and workshops to discuss the objectives, benefits, and implementation plan of using geo-spatial technology for immunization were conducted at various levels of implementation. These stakeholders' meetings and trainings were done simultaneously. Support systems were established to assist with technical issues and troubleshooting.

Data was collected on population demographics, including age, sex, and location of residents. All health facilities, including clinics, hospitals, and outreach posts were mapped, along with their capacities and resources. Geographical data such as road networks, topography, and climate information were obtained. Community members were involved in mapping exercises to ensure accuracy and inclusiveness. Geo-reference was done on important landmarks, residences, and other relevant locations. The technology was then deployed using QGIS, a geographic information system that is free and open source. The technology was deployed on GPS enabled devices.

Currently, GIS supports three districts in the Greater Accra region with the use of geo-enabled microplanning for EPI activities. The districts are Kpone Katamanso district, Ga South district and Ashaiman district. The practice is fully funded by donors such as GAVI and USAID. Some training manuals and GPS-enabled devices were given to regions and districts for implementation. The EPI also has a standardized training manual for country-wide rollout.

RESULTS

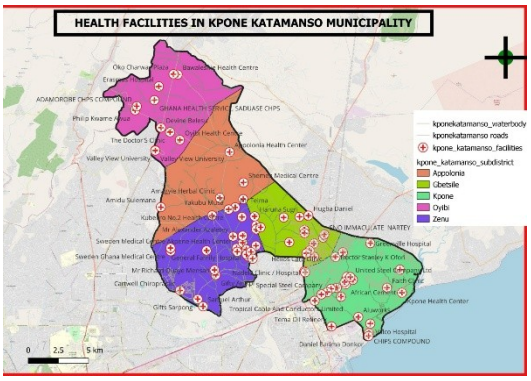
The implementation of geo-spatial technology for microplanning immunization activities in Ghana has led to several notable achievements.

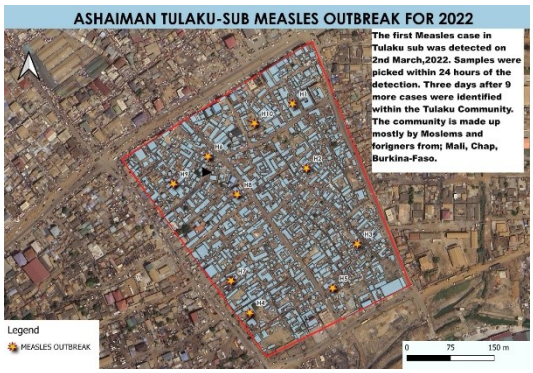
- The initiative trained 39 people, including 20 women and 19 men. Participants had different profiles including public health nurses, community health nurses, disease control officers, health information officers, health promotion officers, physical planning officers, medical assistants, nutrition officers, public health officers and health service directors.
- Hard-to-reach and underserved areas have been accurately identified and targeted, ensuring access to these communities. Resources such as vaccines, healthcare workers, and transportation (motorbikes) have been allocated more effectively, ensuring that all regions, districts and sub-districts, especially those previously neglected, received adequate attention.
- The use of geo-spatial data has enabled better planning and monitoring, helping to minimize vaccine wastage and improve the management of cold chain equipment.
- The implementation also provides real-time data collection and mapping, ensuring accurate and up-to-date information on immunization activities, aiding in better decision-making.
- It also ensures continuous monitoring and evaluation for timely interventions and adjustments, ensuring the immunization campaigns remain on track. The practice again provides detailed data which analysis helped identify gaps and areas needing improvement, facilitating a more targeted approach in future campaigns.
- Participatory mapping and feedback mechanisms have increased community engagement and trust in the immunization process as well as making recommendations on communities that exist and those who do not exist. Targeted awareness campaigns based on geo-spatial data have helped educate communities about the importance of immunization, leading to higher participation rates.

GHS's use of geo-spatial tools to create detailed microplans for immunization has resulted in a more systematic approach ensuring all target populations are reached.
- Partnerships with organizations like Gavi, WHO, and USAID provided technical and financial support, enhancing the effectiveness of the geospatial interventions. Overall, integrating geospatial technology in immunization microplanning in Ghana has demonstrated substantial improvements in coverage, efficiency, and health outcomes, serving as a model for similar initiatives in other regions and countries.

Samples of maps generated with the GIS

The pictures below are maps generated by training participants. The picture on the left is a sample map of health facility mapping in the Kpone-Katamanso municipal by a participant and the picture on the right is a sampled map of point and polygon creation on Google Earth Pro in the Ashaiman Tulaku sub for a measles outbreak by a participant during the training.





Source: Geo-enabled digital micro plan for COVID-19 vaccination training report, April 2024

BEST PRACTICES

Integration of geo-enabled microplanning is the best practice that can be adopted in many health systems and immunization programmes. It comes with several specific best practices. These specific issues are related to the results

☐ ***Training of actors of different backgrounds and positions***: An important approach to training adopted by healthcare managers is the inclusion of players from different levels and backgrounds. Planning is a collective process and a team effort. Changes and innovations must involve all stakeholders. This approach makes it easier to implement the change.

☐ ***Adequate determination of catchment area***: As already noted, the use of manual maps by health teams had many limitations. The use of geo-enabled microplanning was adequate in the identification of hard-to-reach and underserved areas and in easing access to those communities. The relevant resources are then planned for and made available. This approach promotes data-based procedures that are more robust in terms of accuracy and completeness.

☐ ***Identification of additional partners***: One limitation of manual maps is the only inclusion of structures within the boundaries of the health zone. The use of geo-enabled micro-planning including google map helped health teams in finding the neighboring institutions that can be considered as appropriate collaborators including private health facilities for the implementation of their plans.

☐ ***Good community involvement and cocreation***: the geo-enabled microplanning, as implemented in Ghana, has contributed to community engagement. In addition to the presence of physical infrastructure, the actual presence of communities in the identified areas was confirmed or denied by community representatives. This helped to make the micro plans more useful in terms of resource allocation.

☐ ***The development of a standardized manual by the EPI***: To facilitate the organization of training sessions and the implementation of microplanning, the EPI has designed a manual for this purpose. This approach facilitates the replication and adaptation of the practice in different contexts and is a good practice for sharing experience.

LESSONS LEARNT

A participatory process: The co-creation approach used in the geo-enabled microplanning process helped improve the usefulness of the plans. Involving all stakeholders and accepting their input from the beginning to the end was a big win for the practice. Also adopting approaches that make sure the people accept the practices was helpful. A robust technical infrastructure and support systems needs to be put in place to handle geo-spatial technology effectively and provide extensive training programs for all stakeholders to ensure proficiency in using geo-spatial tools and interpreting data.

Intersectoral Collaboration: Successful implementation of digital micro plans requires collaboration across multiple sectors, including healthcare, technology, and local governments. These initiatives can foster partnerships between government agencies, private sector stakeholders, and community organizations, leading to more comprehensive and coordinated responses to public health challenges.

CONCLUSION

The integration of geo-spatial technology into immunization microplanning in Ghana has proven to be a transformative intervention, yielding significant benefits for the population. By leveraging precise mapping, real-time data collection, and efficient resource allocation, this approach has enhanced the effectiveness and reach of immunization campaigns, leading to substantial improvements in public health outcomes. The ability to identify and target hard-to-reach and underserved areas has resulted in higher immunization rates. Communities that were previously neglected due to logistical challenges are now receiving the necessary vaccines, reducing the risk of vaccine-preventable diseases. With more children immunized, the incidence of diseases such as measles, polio, and hepatitis B has decreased, leading to healthier communities and lower healthcare costs.

Geo-spatial technology has allowed for the optimal use of resources. Vaccines, healthcare workers, and transportation are allocated based on accurate data, ensuring that every resource is used efficiently. The implementation of geo-spatial technology represents an innovative approach to addressing the challenges of immunization. Its success in Ghana serves as a model for other countries looking to improve their immunization efforts. The methods and tools used in Ghana can be scaled and adapted to different contexts. The principles of accurate mapping, real-time data collection, and efficient resource allocation are universally applicable, making this approach replicable in various settings.

Countries or settings looking to replicate this practice need to accept the importance of geo-planning and digitalization policy. The playbook (summary of steps of implementation) by GIS Ghana can be adopted to ensure a successful implementation.

Further reading

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