

# Using geospatial data techniques to fight disease and improve population estimates

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Geographers developed GIS and survey methods to collect population data in places where census data can be outdated or incomplete, supporting large development and public health projects.

## Challenge

Understanding the spatial distribution and characteristics of a population is important in targeting and planning policy interventions and humanitarian responses, as well as understanding potential impacts and repercussions at national and sub-national scales.

For example, inaccurate census data in Nigeria hampered efforts to effectively target polio vaccination campaigns; similarly, in the Democratic Republic of the Congo (DRC) vaccination distribution is planned at a hyper-local level, but decisions have been based on outdated data or local surveys, which must then be then collated centrally.

## Solution

GRID3 (Geo-Referenced Infrastructure and Demographic Data for Development) works with

countries to generate, validate and use geospatial data on population, settlements, infrastructure, and boundaries.

The programme provides countries with a unique package of tools with which to generate open-source data, as well as support for data applications to ensure effective impact, and training to strengthen the national geospatial foundation for future evidence-based development and humanitarian decision making.

The programme also provides support to countries in census modernisation, primarily through digital mapping, satellite imagery, and increased use of geospatial information systems (GIS) to improve accuracy, timeliness, quality, and use of census data.

This can include geospatial analyses of census data to identify populations in need; for countries conducting a census where enumerators cannot be deployed to certain areas due to inaccessibility, disasters, or insecurity, GRID3 can support modelling processes to estimate populations that otherwise would go uncounted.

Population estimates are created by combining data derived from a 'microcensus' (a set of complete population counts collected within small areas that are sampled from across a country) with machine-learning analyses of satellite imagery and available maps of boundaries, settlements and key points of interest (such as road networks and water infrastructure).

GRID3 builds on previous work done by other programmes around modelled population estimates for census under-coverage in Afghanistan and polio eradication efforts in Nigeria.

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## Benefits

### Better decision-making and governance

The GRID3 programme is supporting the delivery of the Sustainable Development Goals – in particular, improving public health outcomes by helping plan vaccination programmes.

In the DRC, GRID3 trained health workers in geolocation skills so that they could produce data on the geography of health facilities and settlements which were then combined with sample surveys and machine learning trained on demographic data.

GRID3 supported the ‘micro-planning’ process that Nigeria’s [National Primary Health Care Development Agency](#) used to accurately and collaboratively map settlements for vaccination programmes, contributing to the [effective elimination](#) of wild polio in Nigeria in 2019.

### Combining systems or data

Access to geodata is a key programme aim of GRID3 in Nigeria, where a geodatabase containing data on boundaries, settlements, and over 500,000 points of interest collected in the project were made [publicly available](#).

In Zambia, GRID3 provided high-resolution data for enumeration area demarcation that supported the government’s pre-census cartography exercise. GRID3 is currently working closely with Zambia’s National Spatial Data infrastructure to build data awareness and strengthen capacity around [geospatial data use](#).

GRID3 data are available at [grid3.org](#), and some population data are visualised on the WorldPop interactive WoprVision web map (which also enables population estimation for user-defined areas and [API access](#)). Specific programme strands also share data, such as via the [GRID3 Nigeria data portal](#).

### Building capability and boosting productivity

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### Further reading

- Visit the GRID3 website [here](#)
- Follow the GRID3 team on Twitter [@grid3global](#)
- Access data on the [GRID3 Nigeria](#) data portal
- [How FCDO used satellites to estimate populations](#)
- [FCDO GRID3 programme tracker](#)
- The [woprVision data viewer](#) by GRID3 partner WorldPop, which overlays population data on maps and facilitates population estimates