

Summary of Maps/GIS Workshop Day 2 and Q&A

<https://www.youtube.com/watch?v=bplMBMGRsOs>

Speakers

DHIS2: Björn Sandvik, Austin McGee, Alice Aké Loba, Martin Evensen

GRID3: Ollie Pannell, Asmau Bugaje

WorldPop: Professor Andy Tatem, Dr Attila Lazar

Summary

00:00:00 - Björn Sandvik (DHIS2): Introduction and Day 2 Plan The session begins with an introduction to the day's agenda, which involves moving from DHIS2 into a program called QGIS. The presenters are introduced. The plan for the session includes four or five exercises, each lasting about 15 minutes, which might be more challenging than the previous day, especially for new QGIS users.

00:03:00 - GIS Concepts: Raster vs. Vector Data A brief overview of GIS concepts is provided, focusing on the distinction between raster and vector data, which are key terms in QGIS.

- Vector data, used in DHIS2 maps, consists of points (e.g., health facilities), lines (e.g., relationships between tracked entities), and polygons (e.g., organization unit districts).
- Raster data is represented as a grid of cells or pixels, like the WorldPop population data which uses 100x100 meter cells. While DHIS2 doesn't currently store raster data, it can be included from external providers like Google Earth Engine.

00:06:00 - Map Projections and Coordinate Systems The topic of map projections and coordinate reference systems is discussed. DHIS2 simplifies this by only supporting the Mercator projection, which is used by major providers like Google and Bing, and works well for countries near the equator. However, when analysing data in QGIS, using a region-specific projection is crucial. The Universal Transverse Mercator (UTM) system is mentioned as a commonly used system.

00:09:00 - Overview of Today's Analysis The main goal for the session is outlined: to download and import data from WorldPop and DHIS2 into QGIS to analyze population data. The three planned analyses are:

- Counting the population within district polygons.
- Finding the population within a buffer zone (e.g., 10 km) around a health facility.
- Creating an isochrone to determine how many people can reach a health facility within a specific travel time (e.g., 30 minutes driving).

00:13:30 - Introduction to WorldPop Data Sets Professor Andy Tatem from WorldPop begins his presentation. He explains that WorldPop is an applied research group focused on mapping small area demographics in low and middle-income countries and making the data openly available. The presentation addresses the challenges of using outdated or incomplete census

data and explains how WorldPop produces gridded population estimates. The goal is to divide the world into 100x100 meter grid cells and estimate the population in each, which allows for flexible data analysis.

00:14:00 - WorldPop Data Ingredients and Methods Professor Tatum details the "ingredients" for creating population maps:

- Population Data: From complete enumerations (censuses) or partial surveys.
- Settlement Mapping: Using satellite imagery to identify buildings where people likely live.
- Geospatial Covariates: Additional data layers like roads, schools, conflict zones, and building densities that help explain variations in population density.

WorldPop uses two main modelling approaches: "top-down" for when complete census counts are available, and "bottom-up" for situations with data gaps. The datasets used in this workshop are the "top-down" type.

00:30:00 - Demo: Downloading WorldPop and DHIS2 Data Ole begins a demonstration on how to download the necessary data.

- WorldPop Data: He shows how to navigate the worldpop.org website to download the "constrained individual countries 2020 UN-adjusted" dataset at 100-meter resolution for a specific country (Sierra Leone in the demo).
- DHIS2 Data: The demonstration moves to the DHIS2 Maps application to download organization unit boundaries (polygons) and health facility locations (points) as GeoJSON files.

00:37:30 - Ollie Pannell (GRID3), Exercise 1: Downloading Data Participants are given 20 minutes to complete the first exercise, which involves downloading the population data from WorldPop and the boundary/facility data from their DHIS2 instance.

00:46:40 - Ollie Pannell (GRID3), Exercise 2: Importing Data into QGIS The workshop reconvenes for Exercise 2, which covers setting up a QGIS project. This includes saving the project, setting the correct coordinate reference system (CRS) for the local area, and importing the downloaded raster (WorldPop) and vector (DHIS2) data layers. The demonstration also covers styling the layers to make them more visually friendly.

01:05:00 - Ollie Pannell (GRID3), Exercise 3: Analysing Population within Boundaries This exercise focuses on calculating population statistics. The demonstration shows how to use the "Identify" tool to see the population value in a single raster pixel and the "Raster Layer Statistics" tool to calculate the total population for the entire country raster. The main task is using the "Zonal Statistics" tool to calculate the population living within each downloaded district boundary.

01:19:50 - Ollie Pannell (GRID3), Exercise 4: Population Around Health Facilities (Buffers) Exercise 4 demonstrates how to calculate the population within a specific distance of health facilities. This involves creating a five-kilometre buffer around each facility point. Before creating the buffer, the data layers must be re-projected to a coordinate system that uses meters as its unit of measurement. After creating the buffers, the "Zonal Statistics" tool is used again to calculate the population inside each buffer zone.

01:47:40 - Ollie Pannell (GRID3), Exercise 5: Population within Travel Distance (Isochrones) The final, optional exercise introduces a more advanced analysis: calculating the population within a specific driving or walking time from a health facility. This is done using a QGIS plugin called "ORS Tools" (OpenRouteService). The demonstration covers installing the plugin, setting it up with an API key, and using it to generate isochrones—polygons representing areas reachable within a set time (e.g., 30 and 60 minutes). Finally, the "Zonal Statistics" tool is used one last time to calculate the population within these isochrone areas.

02:07:50 - Björn Sandvik (DHIS2): Q&A and Wrap-up The session concludes with a Q&A session. A key question addressed is how to import the newly created data from QGIS back into DHIS2, with the presenter noting that it is complex but there are some possibilities, including future support in the Import-Export app. Information on further GIS training opportunities from Grid3 is also shared.

02:15:30 - End