Data Release Statement
GRID3 DRC Settlements - Haut-Katanga, Kasaï, Kasaï-Oriental, Kinshasa, and Lomami Provinces, Version 01

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Abstract

This document outlines the methodology and data sources used for constructing the *GRID3 DRC Settlements - Haut-Katanga, Kasaï, Kasaï-Oriental, Kinshasa, and Lomami Provinces Version 01* dataset. The dataset consists of settlement points with name, location, health zone, and health area attributes in the aforementioned provinces in the Democratic Republic of the Congo (DRC). Limitations and use constraints are also provided.

Dataset citation

Center for International Earth Science Information Network (CIESIN), Columbia University and Ministère de la Santé Publique, Hygiène et Prévention, Democratic Republic of Congo, 2022. GRID3 DRC Settlements - Haut-Katanga, Kasaï, Kasaï-Oriental, Kinshasa, and Lomami Provinces Version 01. Palisades NY: Geo-Referenced Infrastructure and Demographic Data for Development (GRID3). https://doi.org/10.7916/pvdz-4x94. Accessed <DAY MONTH YEAR>.

Data Use Constraints

Users are free to use, copy, distribute, transmit, and adapt the work for commercial and non-commercial purposes, without restriction, as long as clear attribution of the source is provided.

Contacts and Data Queries

GRID3 appreciates feedback regarding this dataset, including suggestions, discovery of errors, difficulties in using the data, and format preferences.

Please contact: Geo-Referenced Infrastructure and Demographic Data for Development (GRID3), data.queries@grid3.org

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GEO-REFERENCED INFRASTRUCTURE AND DEMOGRAPHIC DATA FOR DEVELOPMENT

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I. Introduction

The *GRID3 DRC Settlements - Haut-Katanga, Kasaï, Kasaï-Oriental, Kinshasa, and Lomami Provinces, Version 01* dataset consists of settlement points with names and health catchment area attributes in the provinces of Haut-Katanga, Kasaï, Kasaï-Oriental, Kinshasa, and Lomami in the Democratic Republic of the Congo (DRC). This dataset is one of five (5) datasets (along with the Health Catchment Area Boundaries, Health Facilities, Schools, and Religious Centres datasets) included in this Version 01 release.

To conduct this work, the Center for International Earth Science Information Network (CIESIN) at Columbia University engaged with the mandated authorities in the DRC's Ministry of Health who support data collection and development for vaccination planning. Local healthcare workers were directly involved in the mapping of the health catchment area boundaries at participatory events coordinated with in-country provincial coordinators and mappers, and in the collection of data in the field from January to July 2021.

This work is part of the GRID3 Mapping for Health in the DRC project. Supported by Gavi through its INFUSE initiative, GRID3 Mapping for Health is a Ministry of Health initiative, delivered in partnership with Flowminder and CIESIN, and in collaboration with WorldPop at the University of Southampton, Kinshasa School of Public Health, UNFPA, UNOPS, and Novel-T. GRID3 Mapping for Health is a continuation of previous work conducted and/or supported in the DRC by the Geo-Referenced Infrastructure and Demographic Data for Development (GRID3) programme.

II. Methodological Approach

The methodological approach described below is accurate for the provinces of Haut-Katanga, Kasaï, Kasaï-Oriental, Kinshasa, and Lomami.

Summary

With the support of provincial and national health authorities, local healthcare workers ("head nurses", "health zone management staff" and "head doctors of the health zones") and GRID3 GIS specialists ("mappers" and "provincial coordinators") engaged in a participatory mapping process in Haut-Katanga, Kasaï, Kasaï-Oriental, Kinshasa, and Lomami from January through July 2021. This mapping process occurred at the level of the health zone (an operational unit made up of approximately 15-20 health areas).

Mappers were deployed to health zones in teams of two for approximately nine (9) days at a time.[1] They started their work in the health zone by training the head nurses of each health area on data collection using the Geospatial Tracking System (GTS), an Open Data Kit (ODK)-based smartphone application. While the head nurses were collecting data in the health areas they regularly work in, the mappers worked with the health zone management team to validate and modify data from the field. After all data were collected, cleaned, and integrated into final geospatial layers, a first round of validation was conducted on preliminary data by the head doctor of the health zone before the mappers left the health zone.

From July 2021 through October 2021, the DRC mappers and provincial coordinators worked with CIESIN staff to consolidate the data (spelling, gaps and overlaps, topology, etc). The data were then used to produce basemaps at the health area-level and shared back with every health zone and province for a second round of validation. From November through January 2022, the DRC GIS team worked with CIESIN staff to integrate these corrections into a final geodatabase.

This work was done with the participation and supervision of the Direction du Système National d'Information Sanitaire (DSNIS). The Agence Nationale d'Ingénierie Clinique, de l'Information et de l'Informatique de Santé (ANICiiS) also played an important role in the area of data governance.

Details

Phase 1: Field data collection

In each health area, a head nurse is responsible for much of its management. These professionals work routinely in their respective areas and understand the health facilities, settlements, and points of interest (POIs) present. Mappers trained the head nurses to collect these data using the GTS application. These nurses also learnt how to use the application to manage activities, display data through web-based maps, download datasets for further analysis, andrecord time-stamped GPS coordinates (tracks) of health area teams in the field at regular intervals.

These head nurses were then deployed to their health areas for three to four days of data collection after the training. The GRID3 mappers worked with the health zone management team to familiarise themselves with GIS software and begin a participatory mapping process. This process included reviewing satellite images to help orient the GRID3 mappers and health zone management team.

[1] The duration of the fieldwork was adjusted based on the size and accessibility of the health zones. In some smaller, urban areas, the data collection could be slightly reduced, while the fieldwork in hard-to-reach health areas was extended up to 15 days to maximise accuracy.

When settlement data came back from the field, mappers worked with the health zone management staff to ensure that the settlements were properly identified, spelled, and in the correct location. They also verified that no settlements were missing. The mappers worked to refine the settlement layer (alongside layers related to health facilities, health area boundaries, and other points of interest) for the remainder of their nine-day stay in a given health zone. They then presented all of the layers to the head doctor of the health zone.

Phase 2: Cleaning and consolidation

Once data had been collected in all of the health zones in a province, mappers worked with provincial coordinators to consolidate a provincial settlement layer. These data were sent back to GIS specialists at CIESIN for review province by province between March 2021 and July 2021.

CIESIN then gathered statistics on all of the settlement information received. GIS specialists identified health areas and health zones where settlement information was missing or too many points were gathered. They also deleted duplicate points and ensured the attribute table was correct and consistent across all point data.

In August 2021, CIESIN returned the data to mappers now working from the GRID3 office in Kinshasa. These mappers worked to add missing information and correct any identified errors by communicating directly with health zone management staff over the phone and checking original field data. The mappers compared existing data to the GRID3 settlement extents, a polygon layer based on Ecopia Vector Maps Powered by Maxar Satellite Imagery © 2020 building footprint data. In this model, contours were generated around clusters of buildings, resulting in settlement extent polygons (CIESIN et al. 2020). When mappers noticed that there were large settlement extents without an associated point, they coordinated with the health zones to find a name for the settlement. They also removed duplicate settlement information and removed settlement points in areas where too many points were collected (usually in urban areas). Finally, the mappers compared the settlement points to the microplans to try to identify and locate any missing points.

The edited settlement layers were sent back to GIS specialists at CIESIN province by province. Again, CIESIN reviewed the layers and ensured that the names were clean and the attribute table was filled out and consistent. CIESIN created an alpha settlement layer and initial basemaps for all health zones and health areas in combination with their corresponding health facility, health area boundary, and POI layers.

These health area basemaps were sent to the Medecin Chef d'Antenne (MCA), EPI data managers, and head doctors of health zones in October 2021 for the

second round of validation. The head doctor of the health zone organised their team to check that all key settlements were present, the names of the settlements were spelled correctly, and the points were in the correct location. The mappers coordinated with the head doctors to ensure that all changes were integrated into the final settlement layer. Once all of the changes were integrated, mappers sent the provincial data back to CIESIN.

Finally, CIESIN did one last review of the settlement layer by ensuring that names and attribute tables were written correctly.

III. Dataset Description(s)

The *GRID3 DRC Settlements - Haut-Katanga, Kasaï, Kasaï-Oriental, Kinshasa, and Lomami Provinces Version 01* dataset consists of one layer: settlement point data and a table with the field descriptions for the layer. The data are available for download in Esri file geodatabase format packaged in zip files.

File name: GRID3_DRC_settlements_names_V01.gdb

The following layers are included in the gdb:

*codebook*__settlements_names
*GRID3_DRC*_settlements_names_*5_prov_V01*

Extent: Democratic Republic of the Congo: Haut-Katanga, Kasaï, Kasaï-Oriental, Kinshasa, and Lomami provinces.

DRC provincal extents:

Haut Katanga Extent
West 25.413033 East 29.810980
North -7.611716 South -13.455997

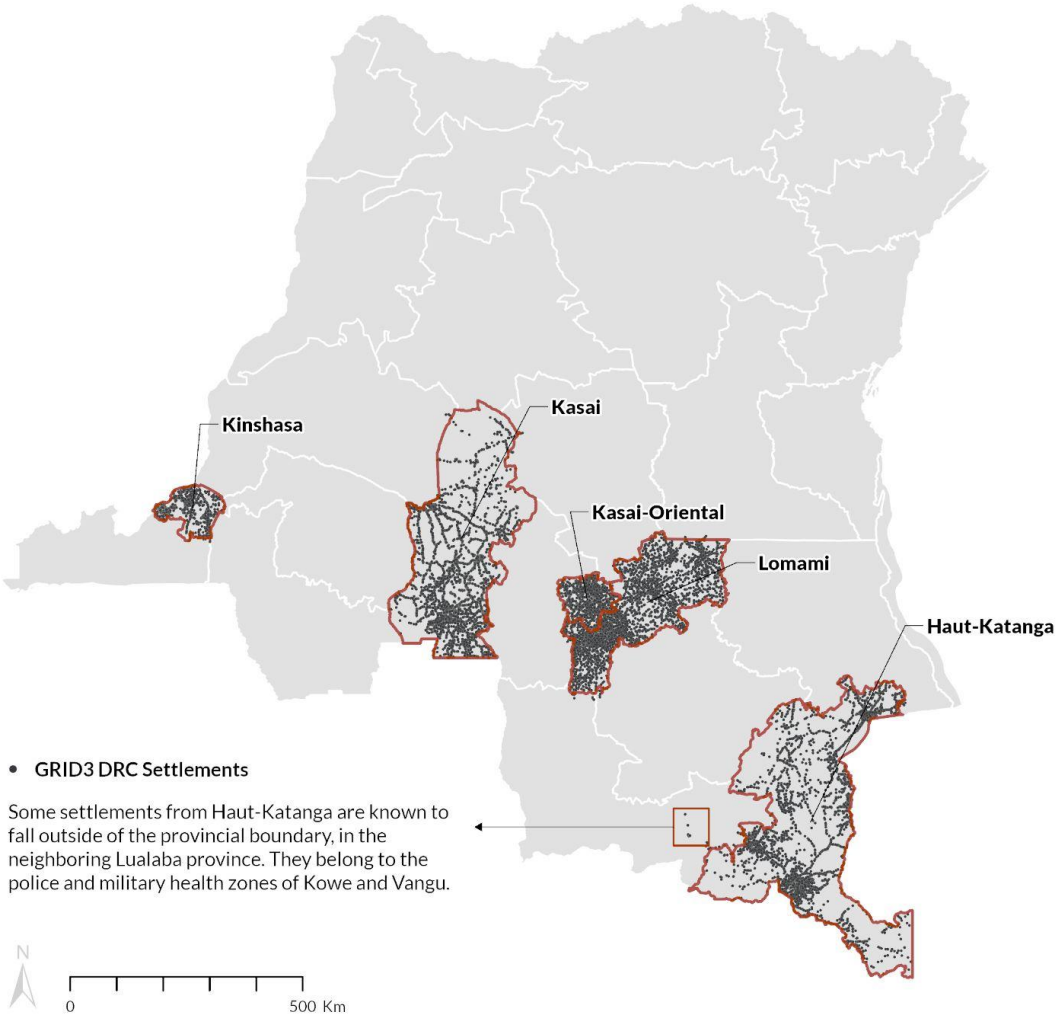
Kasai Extent
West 19.676606 East 22.317255
North -2.309603 South -7.286028

Kasai-Oriental Extent
West 22.944402 East 24.061856
North -5.667474 South -6.773613

Kinshasa Extent
West 15.161557 East 16.538300
North -3.927611 South -5.050161

Lomami Extent
West 23.009694 East 26.280757
North -4.865162 South -8.091451

Coordinate system: GCS WGS 1984



The map above shows settlement points collected in Kinshasa, Kasai, Kasai-Oriental, Lomami, and Haut Katanga provinces. Some settlements from Haut-Katanga are known to fall outside of the provincial boundary, in the neighbouring Lualaba province. They belong to the police and military health zones of Kowe and Vangu.

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Codebook

Field Name	Field Description
OBJECTID	Automatic field number
Shape	Shape geometry of the layer
pays	Name of the country
province	Name of the province
antenne	Name of the antenna
zonesante	Name of the health zone
airesante	Name of the health area
village	Name of the locality (town, quarter, village, or hamlet)
villagetyp	Type of administrative entity (locality, avenue, block, etc.)
villagealt	Other name of the locality
access	Road accessibility mode
enclav	Site isolation at certain times of the year
enclavdate	If isolated, during which quarter of the year?
vaccavan	Fixed or outreach vaccination sessions organised at this site (during the last 6 months)
cellule	Name of the community (to which the vaccination site belongs)
nbreco	Number of health community members present on this site
source	Data provenance
date	Date of last edit
notes	Comments
lat	Latitude in decimal degrees
lon	Longitude in decimal degrees
altitude	Altitude in metres
precision	Accuracy (GPS

IV. Known Data Limitations

The spatial accuracy of the settlement data is dependent on both the accuracy of the point data collected in the field as well as on the correctness of the edits made to the collected data throughout the validation process. In general, it was assumed that the field-collected data were more accurate than the previously compiled settlement point data. Temporal mismatches exist among the point datasets, the settlement polygons, and the satellite imagery used to perform quality checks. This may lead to settlements not being identified or the inclusion of abandoned settlements.

The scope of the GRID3 Mapping For Health project included fieldwork and validation for Haut-Katanga, Kasaï, Kasaï-Oriental, Kinshasa, and Lomami provinces and 115 health zones.

Known issues

- Spelling mistakes (spelling may vary colloquially and between organisations).

V. Disclaimer

CIESIN, Columbia University, and the GRID3 programme follow procedures designed to ensure that data disseminated by the project are of reasonable quality. If, despite these procedures, users encounter apparent errors or misstatements in the data, they should contact GRID3 at data.queries@grid3.org.

CIESIN, Columbia University, and their sponsors do not guarantee the accuracy, reliability, or completeness of any data provided. We provide this data without warranty of any kind whatsoever, either expressed or implied, and shall not be liable for incidental, consequential, or special damages arising out of the use of any data provided.

VI. Acknowledgments

GRID3 thanks the following institutions that provided input data and/or assistance with data production:

Acasus, Switzerland
Agence Nationale d'Ingénierie Clinique, de l'Information et de l'Informatique de Santé (ANICiiS), DRC
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Bureau Central du Recensement (BCR), DRC
Caritas, USA
Centers for Disease Control and Prevention (CDC), USA
Direction d'Etudes et Planification (DEP), DRC

Direction des Soins de Santé Primaires (DSSP), DRC
Division du Système National d'Informations Sanitaires (DSNIS), DRC
Division Provinciale de la Santé (DPS) du Haut-Katanga, Kasaï, Kasaï-Oriental, Kinshasa, and Lomami, DRC
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Gavi, the Vaccine Alliance, Switzerland
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Global Good, USA
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International Medical Corps (IMC), USA
Médecins Sans Frontières (MSF), Switzerland
Ministère de l'Environnement et Développement Durable (MEDD), DRC
Ministère de la Santé publique, Hygiène et Prévention, DRC
Ministère du Genre, Famille et Enfant, DRC
Novel-T, Switzerland
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VII. References

Center for International Earth Science Information Network (CIESIN), Columbia University and Novel-T. 2020. GRID3 Democratic Republic of the Congo Settlement Extents Version 01, Alpha. Palisades, NY: Geo-Referenced Infrastructure and Demographic Data for Development (GRID3). Source of building Footprints “Ecopia Vector Maps Powered by Maxar Satellite Imagery”© 2020. DOI: https://doi.org/10.7916/d8-cpry-wv37. Accessed DAY MONTH YEAR