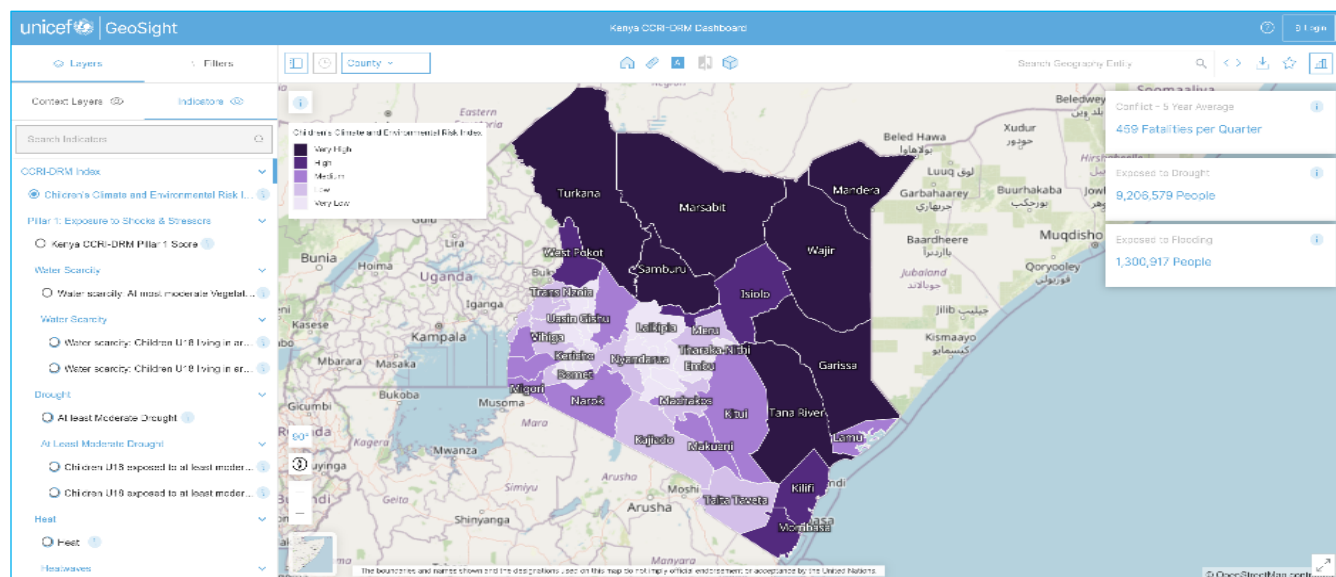# GeoSight
Geospatial Risk Analysis and Visualization

GeoSight is an open-source geospatial visualization and data analysis platform developed by UNICEF [1]. Its purpose is to support decision-making by providing non-experts and experts alike with easy access to powerful tools to understand risk and analyze risk factors such as child deprivation indicators and population exposure to various shocks and stresses at subnational levels.

GeoSight is linked to an administrative boundary management system called GeoRepo. GeoRepo allows users to reconcile differences and changes within administrative areas over time and provides an up-to-date global set of administrative boundaries down to at least the second administrative level. In GeoSight, GeoRepo ensures that all indicators are compatible with each other, facilitating analysis.

Key Features

Indicators. Datasets assigned to administrative boundaries. Visualized via flexible pre-set color rules.

Context Layers. Geospatial data not constrained by administrative boundaries. Point or raster layers.

Widgets. Summary graphs or figures that highlight aspects of an indicator dataset.

Trend Analysis. Visualize changes in indicators over time

Filters. Tools that isolate and display administrative areas according to defined thresholds.

Analysis Tools. Tools like 3D display or the compare layers tool let users dive into relationships.

1 Developed at UNICEF HQ the Risk Analysis and Preparedness Section in the Office of Emergency Programmes (RAPS/EMOPS) and the Frontier Data Tech Unit in the Division of Data Analytics, Planning and Monitoring (DAPM).

Batch Management Tools. Classify and format multiple indicators simultaneously.

Access Controls. Control who can see what data, down to individual users and single data sets.

Interoperability. GeoSight can ingest data from other systems and share data back the other way.

Low Costs. GeoSight is open-source software, and use incurs zero licensing fees.

Communicating with External Platforms and Information Sharing

GeoSight talks to other platforms. Via Application Programming Interfaces (API), which are essentially doors for systems to exchange data online, users can integrate external sources into GeoSight. Using APIs, users can add datasets as context layers, for instance, datasets on current conflict events or early warning information on natural hazards obtained from early warning systems, or add programme data as indicators if connected to appropriate administrative boundaries. In the other direction, GeoSight also has an API and can use this to share data out to any other geospatial platform. It also enables easy downloads of all indicators in common formats such as Excel. Interoperability is a cornerstone of GeoSight's design.

GeoSight and the CCRI-DRM

GeoSight allows users to easily analyze and visualize indicators and scores of a country's subnational Children's Climate Risk Index – Disaster Risk Model (CCRI-DRM) model in an online dashboard, plus gives access to all the features above. Subnational analysis lets users see how sectoral deprivations and the population's exposure to shocks and stresses – and the combination of the two – vary across a country and focus on areas with the highest risk. On top of this, GeoSight can add data on, for example, cyclone or flood warnings or recent conflict events to understand how current or near-future conditions intersect with current vulnerabilities. These forms of analysis (along with other tools such as filters) help users understand the situational context and target areas of concern to serve children, their families and communities in need through risk-informed resilient programming and emergency preparedness that clearly focuses on reducing and managing risks to leave no one behind. Using GeoSight for the GeoSight CCRI-DRM subnational analysis allows partners with different roles in different sectors to share a common view of risk and facilitates joint strategic planning. CCRI-DRM can also support advocacy, strengthening partnerships, and resource mobilization.

GeoSight is interoperable with other systems and provides modalities to engage in information sharing. This gives four main ways that UNICEF country teams and partners can use GeoSight and CCRI-DRM data:

→ **UNICEF GeoSight dashboard instance:** A country-specific dashboard with all features and benefits noted above, hosted on UNICEF servers.

→ **External GeoSight dashboard instance:** Because it is open source, anyone can install – and customize – a GeoSight instance on local servers at no cost. This requires external users to have the proper resources to manage this instance.
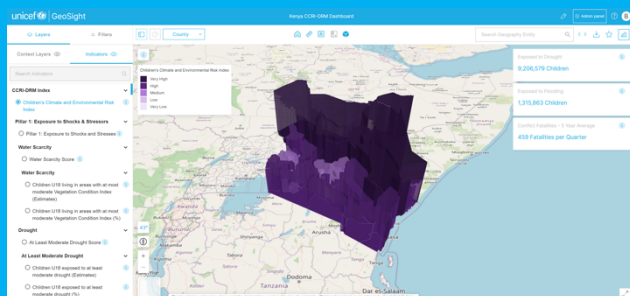
→ **Data sharing to a separate platform:** Many datasets used by Geosight for analysis and visualization are stored in warehouses with APIs dedicated to data exchange. These can be connected to other mapping platforms.

→ **Embed:** As with any dashboard, it can be embedded into other websites using the IFRAME method. Please note that this can reduce user experience and make your site difficult to visualize on mobile phones.

To begin implementing a country's CCRI-DRM results into a geospatial platform such as GeoSight, it is important that those responsible for its development and maintenance as a public resource are prepared to enable an easy transition to national partners. This process involves multiple steps, including ensuring data is aligned with the proper administrative boundaries, confirming the platform destination/data type, and performing any necessary training for all parties. It is important that during this process an open line of communication is maintained, and roles are properly defined to ensure the longevity of the CCRI-DRM subnational model and analysis. This section aims to establish a shared framework, language and resource catalogue for the publication of geospatial resources of the CCRI-DRM.

Terminology for GeoSight & Data Visualization

→ **Geospatial platform:** A website or online resource that allows for the visualization and analysis of geographical data, including the CCRI-DRM subnational model.

→ **National Platform:** A website or mapping resource owned by national partners who prefer to utilize their own resources rather than hosting the CCRI-DRM analysis on UNICEF servers.

→ **Import:** The process of uploading data to the desired platform.

→ **Geospatial Administrative Reference Dataset:** The specific version of administrative boundaries and sub-national codes dataset aligned with the study for importing it into the national platform.

→ **Shapefile:** A geospatial dataset that, in this case, is the reference dataset merged with the CCRI-DRM results for sharing and uploading the data linked to the proper location.

Options for CCRI-DRM Display processes

→ National partners, Country Office focal points, CCRI-DRM Analysts and those leading the development of the geospatial platform all must agree on a common administrative boundary reference dataset and geospatial platform to utilize throughout the process.

→ It is important that this reference dataset can be supported by the desired platform.

→ Developing a national platform depends on the technical requirements of the country-specific platform.

→ A shapefile format is preferred to share the CCRI-DRM results and underlying indicator data, as merging the reference dataset and results is easy.

→ This requires a discussion between CCRI-DRM analysts and National partners to determine technical requirements, specific goals and any guidance needed to interpret results.

→ Training on the CCRI-DRM dataset and data formats to build capacity for future updates by the UNICEF Country Office.

→ Developing a GeoSight dashboard is an option that can consistently see the development process supported by UNICEF. At the same time, it is important to develop a country-level capacity to utilize GeoSight, maintain the dashboard, and introduce any changes and updates in the future.

→ UNICEF will support and host a multi-hour training session on an introduction to geospatial data concepts, UNICEF's geospatial infrastructure and how to utilize the GeoSight platform.

→ Training on CCRI-DRM dataset and data formats to build capacity for future updates by the UNICEF CO.

Available Resources

→ Training on geospatial tools

→ Training on the UNICEF GeoSight platform

→ Training on CCRI-DRM subnational model development and analysis

→ Development support for the CCRI-DRM geospatial dashboard

→ Technical support for GeoSight instances

→ Consultation on national platform data requirements

→ Data sharing in multiple formats

→ Support for data interpretation and visualization of analysis

Lessons Learned from Phase I

→ The structure of the CCRI-DRM dashboard should be aligned with the final version of the theoretical framework of the subnational model.

→ Indicator short names and metadata should be finalized and reviewed for clarity before integrating the CCRI_DRM results and underlying indicator data into the geospatial platform.

→ Color schemes and symbology for visualization of the CCRI_DRM index and pillars should be standardized across subnational models (Please see the example below of Kenya CCRI-DRM).

→ Context layer, filter and widgets standardization should be encouraged to allow for efficient dashboard synthesis.

→ Shared complementary indicators can be integrated into the platform as long as they are aligned with the administrative boundary dataset used for the CCRI-DRM model.

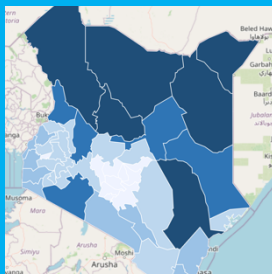Figure 1: Example of a standardized color schemes (Kenya CCRI-DRM Model)

Standard CCRI-DRM Color Sets for Pillars

CCRI-DRM Results
Example of the Kenya CCRI_DRM Subnational Mode

Pillar 1
Child Exposure to Hazards, Shock and Stresses
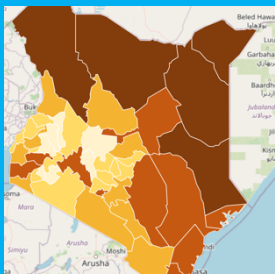
Pillar 2
Child Vulnerability

Kenya CCRI-DRM
Children's Climate and Disaster Risk Index