Gap Analysis Viewer

November 12, 2025

Alliance Bioversity International & CIAT

Background & Purpose

- Collaboration between CIAT, Crop Trust, and CGIAR Genebanks.
- Framework identifies gaps in crop diversity collections.
- Predicts under-collected areas and supports new collection missions.

Objectives

- Visualize conservation gap analysis results by country and crop.
- Identify areas missing genetic samples using interactive maps.
- Generate customized collection routes.
- Export results and routes.

Key Features

- Interactive map visualization of gap analysis rasters.
- CSV/TIFF uploads for accessions and rasters.
- Route generation with Google Maps API.
- Export accessions.

System Architecture Overview

- Components: React web app, Python API, MongoDB, GeoServer, and data scripts.

- Integration with Google Maps API for routing.

System Context (Level 1)

- Actors: Administrator, End User.
- Data Sources: DBGAP (MongoDB), SGA (GeoServer), Google Maps API.
- Flow: User ↔ Web App ↔ API ↔ {Database, GeoServer, Google Maps}.

System Containers (Level 2)

- Web App (React + Leaflet): map viewer, uploads.
- Web API (Python): endpoints for crops, countries, accessions.
- MongoDB: metadata storage.
- Scripts: load data and publish to GeoServer.
- GeoServer: hosts and serves raster mosaics.

Web Application Components (Level 3)

- Visualization Module: map and raster overlay.
- Route Module: route planning and reporting.
- About Module: project and missions info.
- Admin Module: import data sources.

Technology Stack

- Frontend: React.js, Leaflet, Bootstrap
- Backend: Python (FastAPI/Flask), MongoEngine
- Database: MongoDB
- Geospatial: GeoServer (Java)
- Routing: Google Maps API
- File Handling: PapaParse, georaster-layer-for-leaflet

Technology Stack

1. Admin uploads CSV/TIFF to DB & GeoServer.

2. Data stored and published.

3. API retrieves layers & metadata.

4. User selects project/country/crop.

5. Map displays rasters & markers.

6. Routes and reports generated.

Hands On

https://viewer.gapanalysistools.org/