FOREST MANAGEMENT PLANNING INFORMATION SYSTEM – WEB APPLICATION

Updated: 11 December 2025

1. Introduction

1.1 Purpose

The web application is designed to visualize map data integrated into the Forest Management Planning (FMP) Information System. It provides interactive access to key spatial datasets such as Forest Land Use Zones (FLUZ), forest disturbance information, forest categories, forest types, elevation, slope, rainfall, and other relevant layers. The system supports better analysis, planning, and decision-making for forest management activities.

1.2 Key Features

The key features of the web application include:

• **Visualization of thematic map layers** to display various geospatial datasets.

• **Interactive viewing of attribute information and parameters** for integrated datasets (e.g., FLUZ data, forest disturbance data, forest categories, and other spatial layers).

1.3 Users and Accessibility

The web application is publicly accessible, allowing all users to view the available map data. Access is limited to view-only mode, ensuring that no user can edit or modify the data.

Users of the system can be categorized into two main groups:

Group 1: Forestry Sector Professionals

This group includes users who work directly in the forestry sector, such as the Department of Forestry (DoF), the Forest Inventory and Planning Department (FIPD), forestry companies, forest management boards, and other related government or private organizations.

Group 2: General Users and Interested Stakeholders

This group includes individuals, researchers, organizations, and any stakeholders who are interested in forestry-related information and wish to view the data for reference or study purposes.

1.4 Available Datasets

In this version of the web application, the following datasets are available for visualization and analysis:

#	Layer Name	Description	Data source
1	Lao boundary	Boundary of Lao PDR	Project
2	Province boundary	Boundary of provinces	Project
3	District boundary	Boundary of districts	Project
4	Village boundary	Boundary of villages (only core villages currently)	FIPD
5	House/Building location	Location of houses and buildings, derived from high resolution satellite imagery	Open data
6	New disturbances 2025	Areas disturbed newly in the first 5 months of 2025	Project
7	New disturbances 2024	Areas disturbed newly in 2024	Project
8	Forest category	Forest category (Protected areas; Protection forest areas; Production forest areas).	Project
9	Preliminary FLUZ- Good forest zone	Preliminary good forest zone identified and used for FLUZ mapping	Project
10	Preliminary FLUZ- Agroforestry/non-forest zone	Preliminary agroforestry/Non- forest zone identified and used for FLUZ mapping	Project
11	FLUZ- Good forest zone	Good forest zone from FLUZ data validated by village	FIPD
12	FLUZ- Agroforestry/non-forest zone	Agroforestry/Non-forest zone from FLUZ data validated by village	FIPD
13	FLUZ- Village conservation forest	Village conservation forest, derived by FLUZ data	FIPD
14	FLUZ- Village protection forest	Village protection forest, derived by FLUZ data	FIPD
15	FLUZ- Village use forest	Village use forest, derived by FLUZ data	FIPD
16	Forest not disturbed last 15 years	Forests not disturbed last 15 years (2009-2023)	Project
17	Forests disturbed 8-15 years ago	Forests disturbed 8-15 years (2009-2016)	Project
18	Forests disturbed last 7 years	Forests disturbed last 7 years (2017-2023)	Project
19	Forests disturbed last 15 years	Forests disturbed last 15 years (2009-2023)	Project
20	Permanent non forest	Permanent non forest	Project

#	Layer Name	Description	Data source
21	Slope	Slope classified (0-15°; 15-25°;25-35°; >35°)	Project
22	Elevation	Elevation classified (<200m; 200-500m; 500-1000m; 1000-1500m; 1500-2000m; 2000-2500m; >2500m)	Project
23	Forest type 2022	Forest types from National forest inventory data grouped into 7 classes (Current forest; Potential forest; Other vegetated areas; Cropland; Settlement; Other lands; Above-ground water source)	FIPD
24	NDVI	Normalized Difference Vegetation Index, derived from Sentinel-2 imagery in 2025 (Currently)	Free data
25	Sentinel-2, 2025	Sentinel-2 imagery in 2025	Free data
26	Sentinel-2, 2023	Sentinel-2 imagery in 2023	Free data

1.5 Environment and Internet connection

The web application can be accessed through standard web browsers (e.g., Chrome, Firefox, Microsoft Edge) on any device with an active internet connection. No additional software installation is required.

2. Getting Started

2.1 Accessing the Web Application (URL)

The FMP Information System web application can be accessed at the following URL:

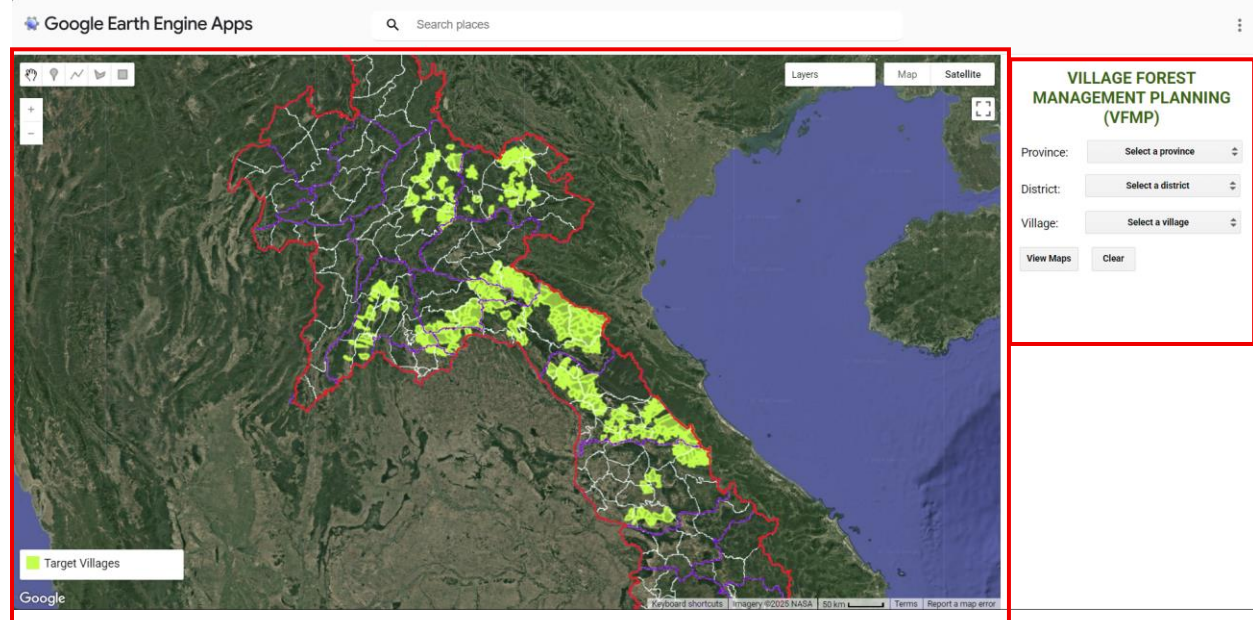https://ee-dongformis.projects.earthengine.app/view/fmplllv2

Users can access the application using popular web browsers, including:

- Google Chrome
- Mozilla Firefox
- Microsoft Edge
- Safari (Mac and iPhone)

No additional software installation is required; an active internet connection is sufficient.

2.2 Web application user interface (UI)

The web application interface consists of the following key components:

Map Window

The Map Window is the main area of the application where spatial data is displayed. Users can:

- Change the **basemap** (e.g., Satellite, Terrain)

- Toggle **interactive layers** (e.g., administrative boundaries, FLUZ data, forest categories, forest types/NFI)

- Use **zooms controls** (Zoom In, Zoom Out, scroll wheel)

- Use the **Pan tool** to move the map by clicking and dragging

Village Forest Management Planning (VFMP) Window

This window allows users to navigate to individual villages and visualize map data specific to each village.

3. Using the Application Features

3.1 Administrative boundary Visualization

The web application allows users to visualize and display administrative boundaries at multiple levels, including national, provincial, district, and village levels.

Within this function, users can view both the map data and the names of administrative units, depending on the zoom level:

- **National boundary** – Boundary of Lao PDR
- **Provincial boundary** – Boundaries of provinces
- **District boundary** – Boundaries of districts
- **Village boundary –** Boundaries of villages
- **Administrative unit names** – Displayed according to map scale; names appear or hide based on the zoom level

This feature helps users easily identify and locate administrative areas within the FMP system.
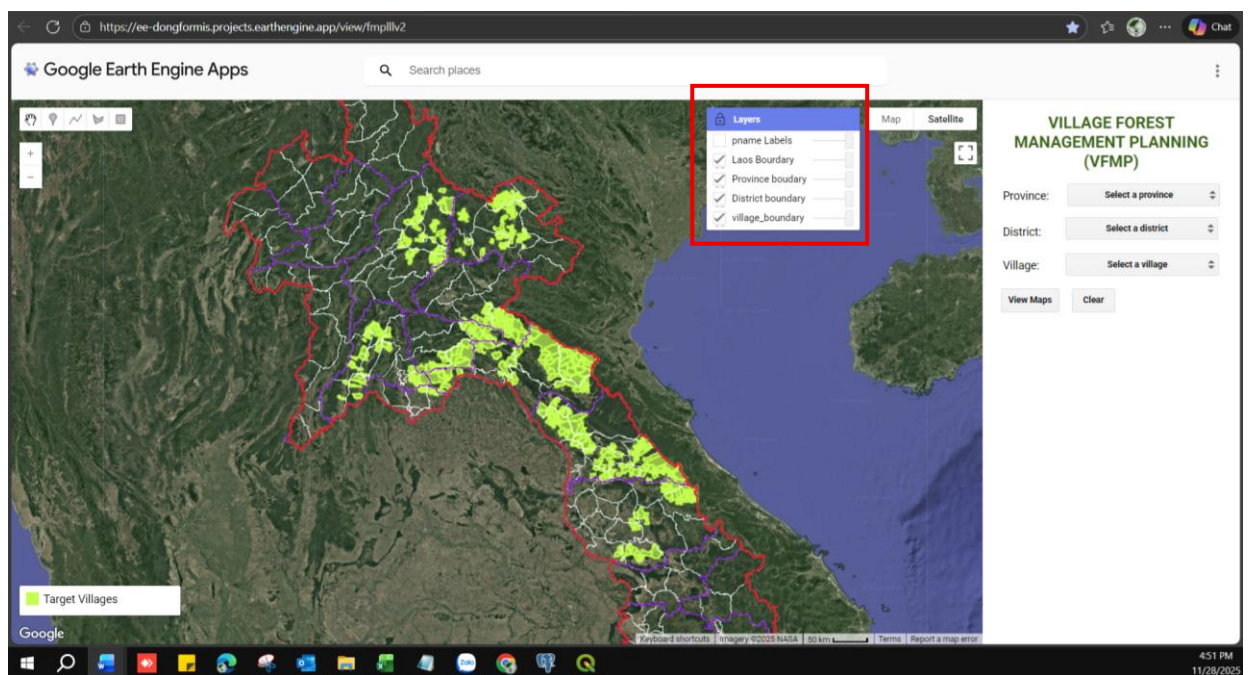
A note is that administrative layers can turn on or turn off in the "Layers" panel list.

3.2 Village Forest Management Planning (VFMP) Navigation

In the VFMP window, users can navigate to a specific village and visualize its associated map data by following these steps:

- **Select a Province** – Choose the desired province from the drop-down list.
- **Select a District** – Choose the corresponding district within the selected province.
- **Select a Village** – Choose the village of interest from the list of available villages.
- **View Maps** – Click the "View Maps" button to display the integrated maps for the selected village.

This process allows users to quickly access detailed village-level forestry data within the web application.
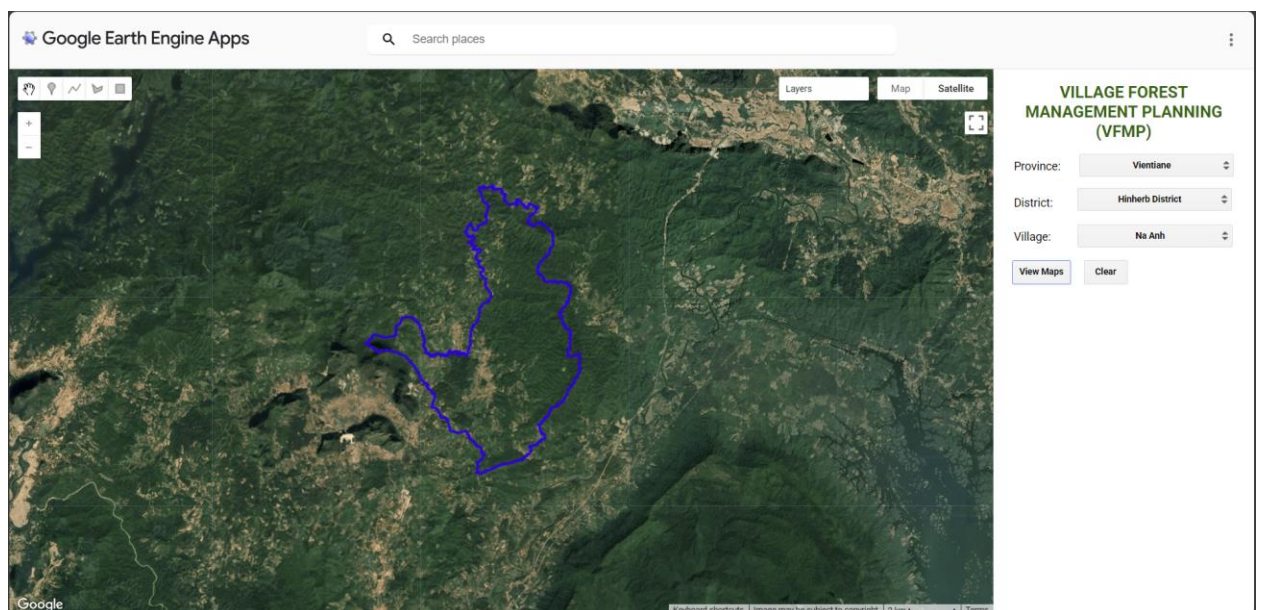
3.3 Visualizing integrated datasets

After navigating to a village, users can view the list of available datasets in the "Layers" panel.

To manage the visibility of each dataset:

- **Turn On a Layer** – Check or toggle the layer to display it on the map.
- **Turn Off a Layer** – Uncheck or toggle the layer to hide it from the map.

This functionality allows users to customize the map display and focus on the specific data relevant to their analysis.
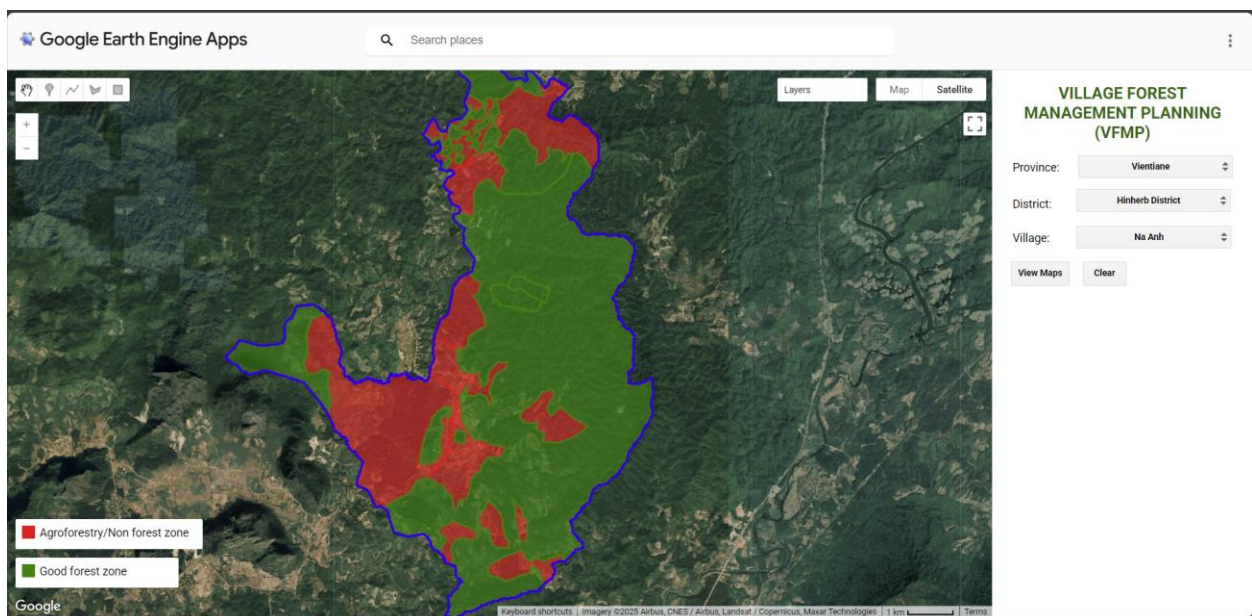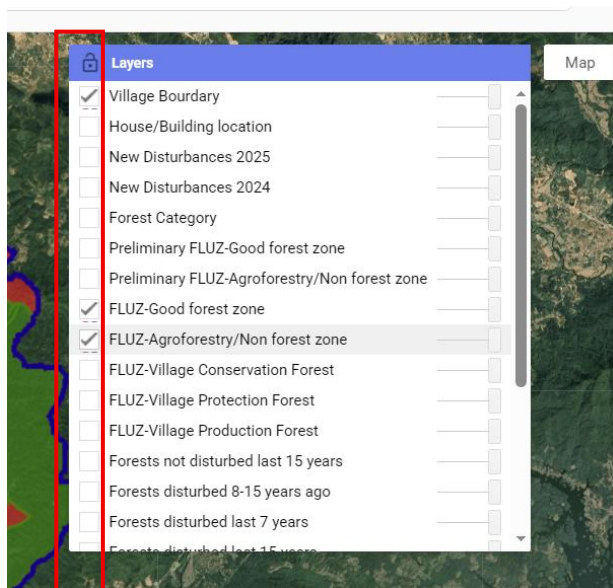
Users can adjust the transparency level of each map layer using the transparency sidebar.

- **Increasing transparency** allows underlying layers to be more visible.
- **Decreasing transparency** makes the selected layer more prominent on the map.

This feature helps users compare multiple datasets effectively and enhances map visualization.
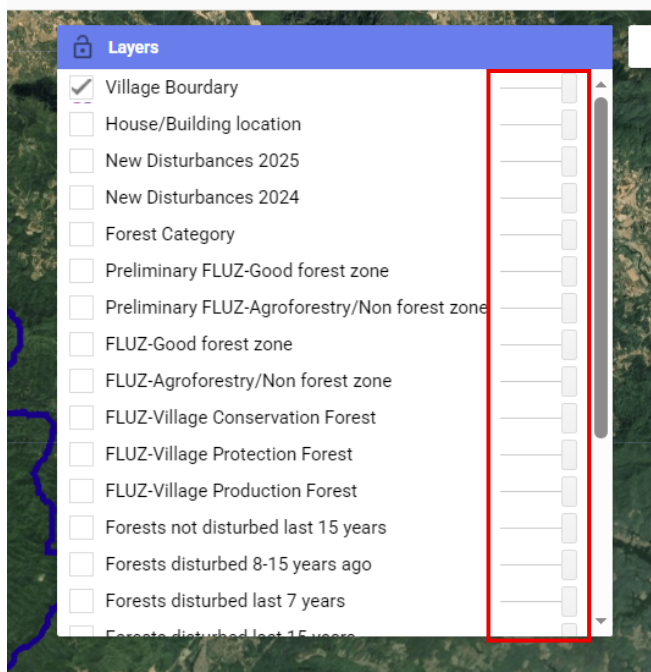

3.4 Viewing information of FLUZ data and Disturbance data

Users can view detailed information for each FLUZ dataset and forest disturbance dataset by interacting directly with the map:

- Click on a polygon representing a FLUZ or disturbance area.
- A popup window will display the associated attributes and relevant information for the selected polygon.

This functionality allows users to explore the characteristics and details of specific forest management zones and disturbance events.
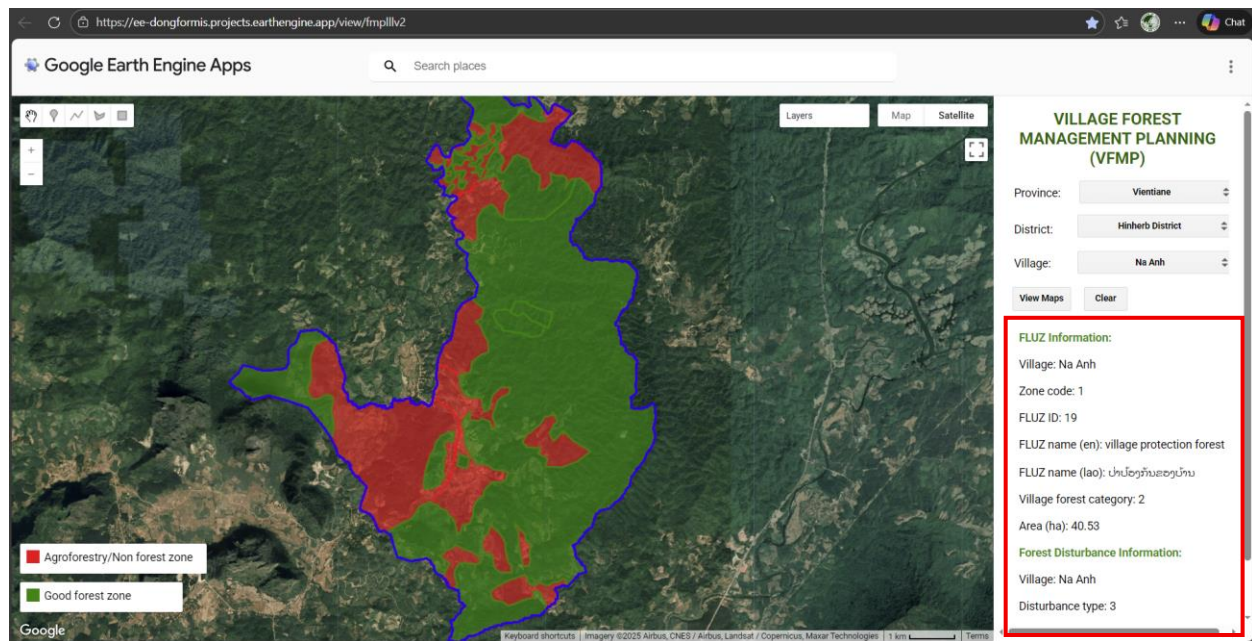
4. Characteristics and visualization of data layers

4.1 Visualizing administrative boundaries

The web application displays the administrative boundaries of Lao PDR at multiple levels—**nation, province, district, and village**—in the map window.

Users can view these boundaries to understand the administrative context of the mapped areas. Depending on the zoom level, the names of administrative units may be displayed to provide additional reference.
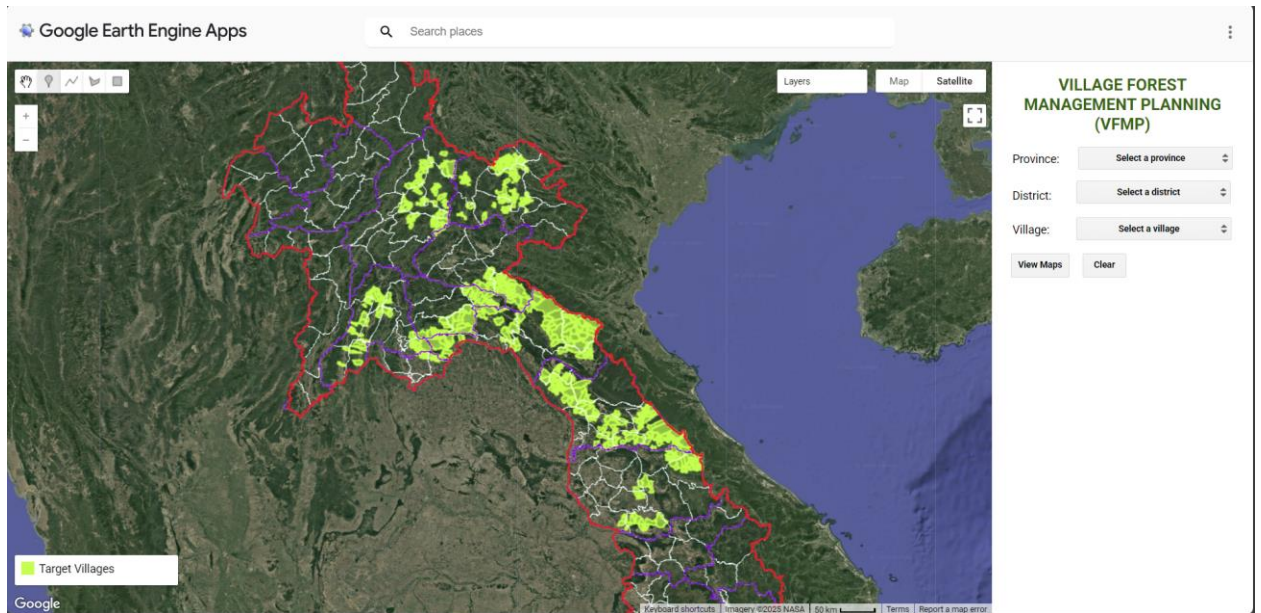
4.2 Visualizing House/Building location

The **house and building locations** are extracted from **Open Buildings V3**, which is derived from high-resolution (50 cm) satellite imagery.

These locations are displayed on the map window, allowing users to identify the spatial distribution of settlements within the mapped area.
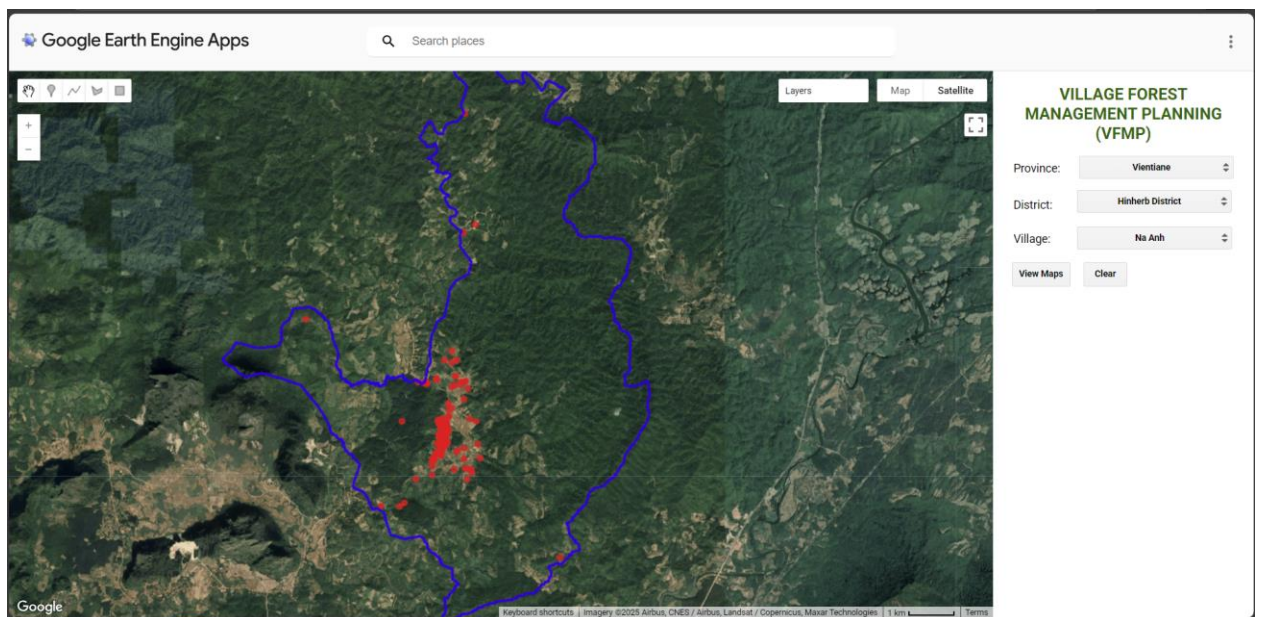
4.3 Visualizing forest disturbances newly 2024 and 2025

The new forest disturbances dataset is derived from satellite imagery for 2024 and the first months of 2025.

These areas are displayed on the map to help users identify recent changes or disturbances in forest cover, supporting monitoring and management activities.
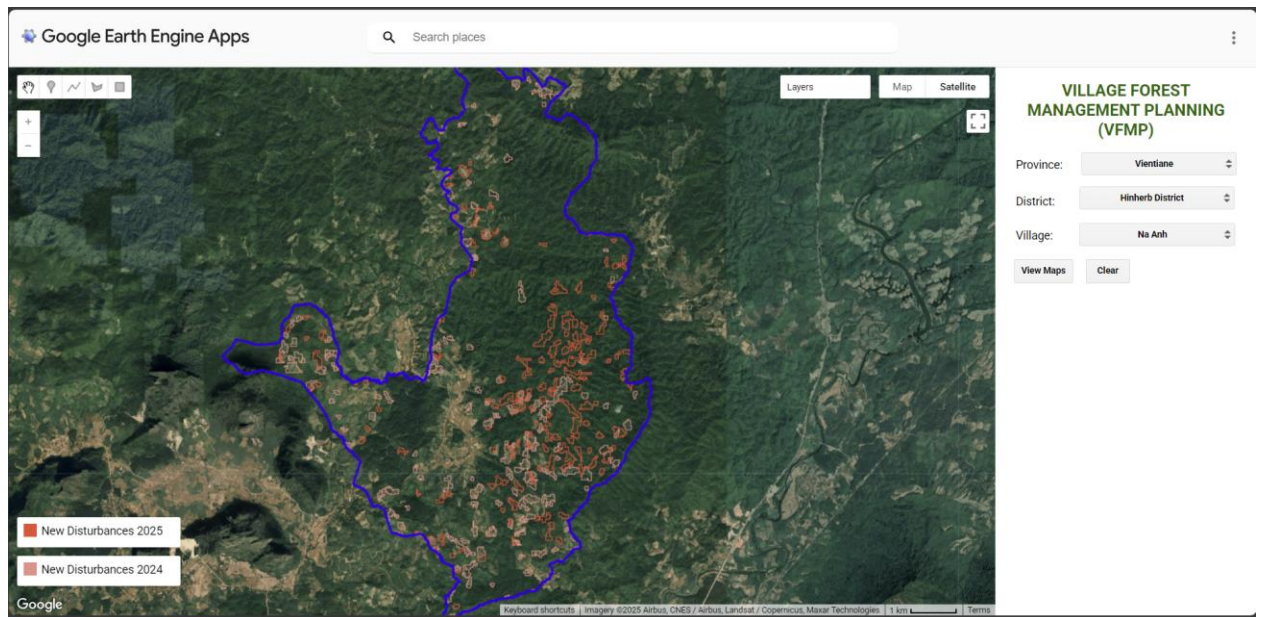

4.4 Visualizing forest category (PA, PtFA, PFA)

This dataset represents the three main forest categories in Laos:

- **Protected Areas (PA) / Forest Conservation Areas –** Areas strictly protected for conservation purposes.
- **Protection Forest Areas (PtFA) –** Forests designated to protect soil, water, and biodiversity while allowing limited sustainable use.
- **Production Forest Areas (PFA) –** Forests managed primarily for timber and other forest product production.

These categories are visualized on the map, helping users understand the spatial distribution and management objectives of different forest types.
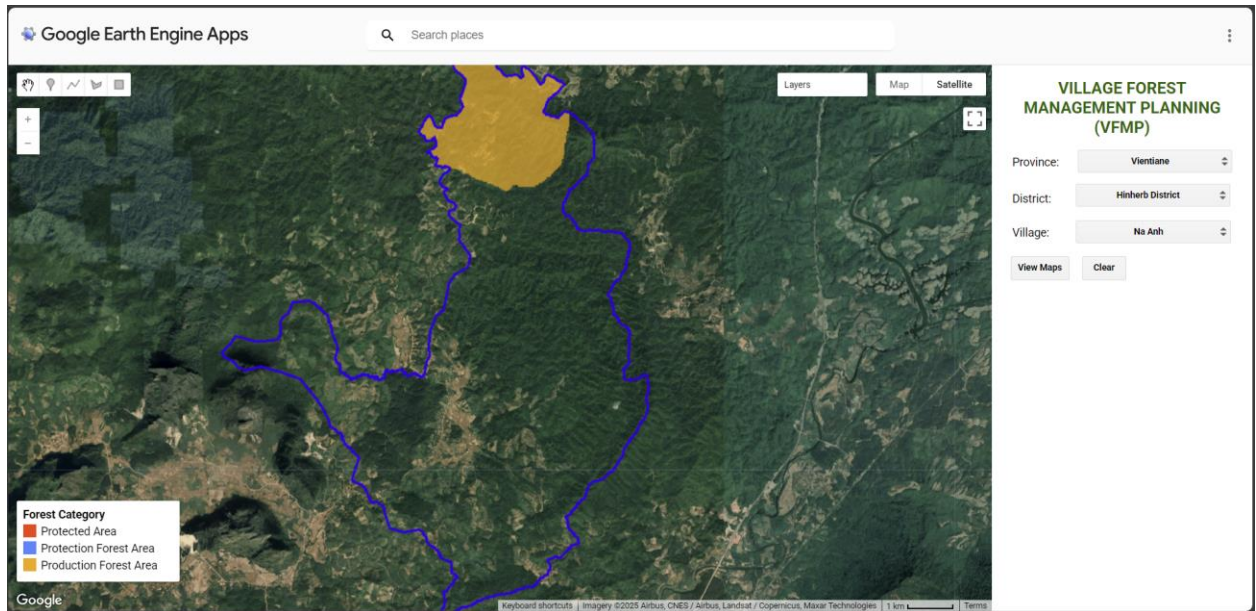
4.5 Visualizing preliminary FLUZ data

The preliminary FLUZ dataset represents an initial mapping of forest land use zones and is used as a first step in FLUZ validation.

It incorporates information on forest disturbances over the past 15 years (2009–2023) and provides a foundation for further validation and refinement with village-level input.

This layer helps users understand the preliminary classification of forest zones before final validation and village-based adjustments.
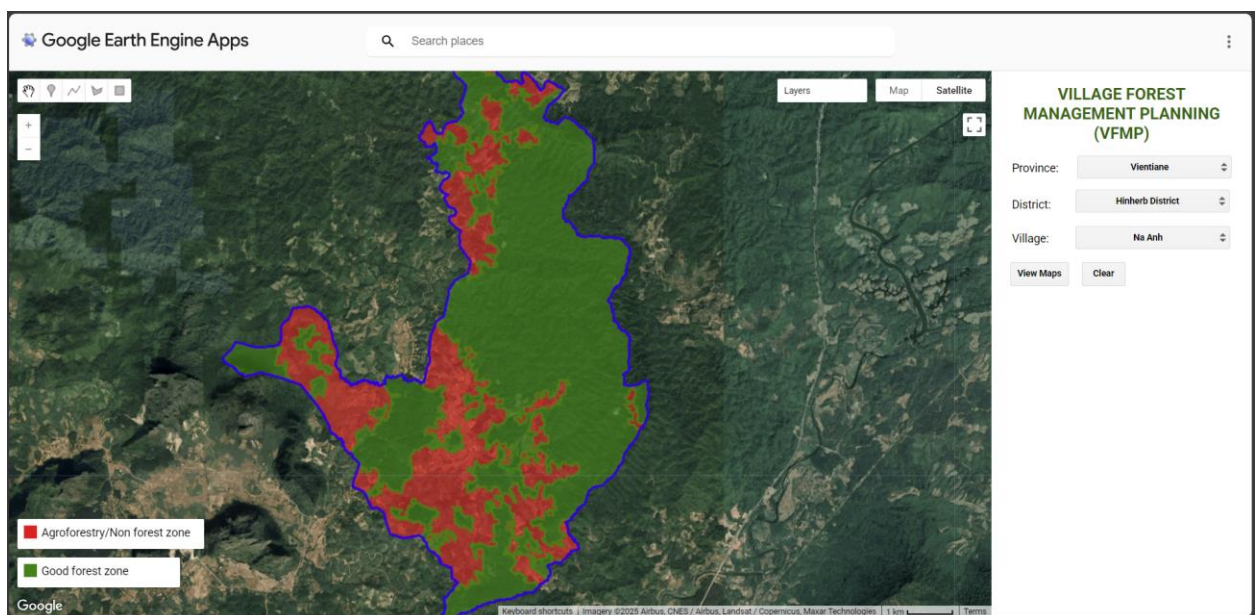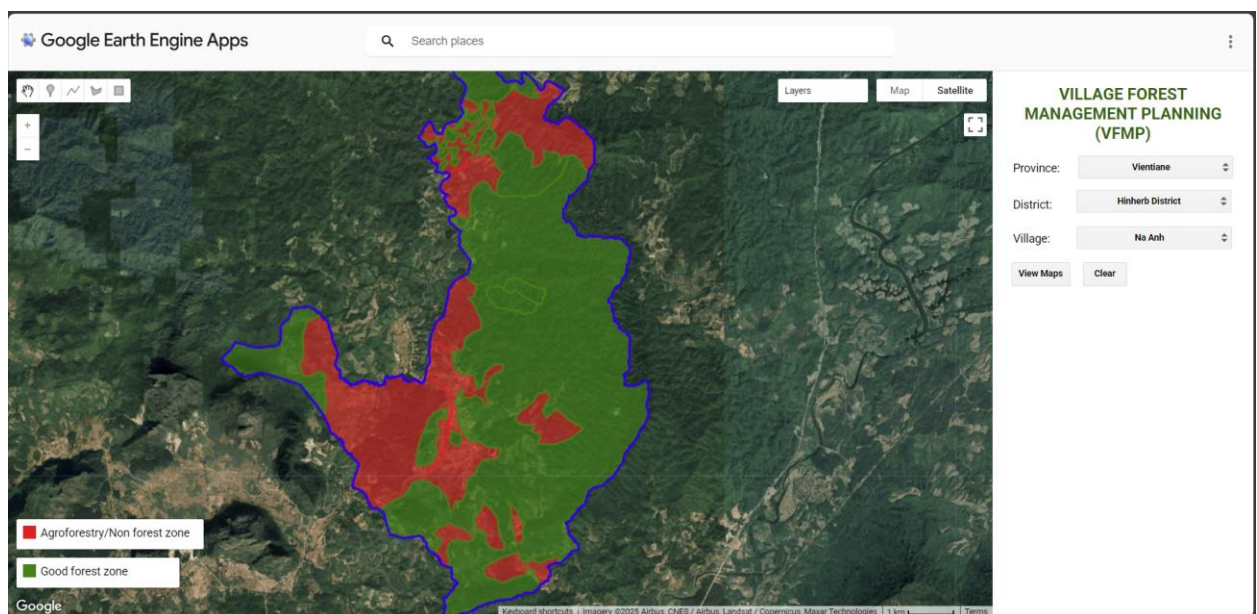
4.6 Visualizing FLUZ data

The Forest Land Use Zoning (FLUZ) datasets are validated by village communities, ensuring accuracy and local relevance.

Users can view different FLUZ categories on the map, including:

- **Good Forest Zone** – Forest areas suitable for conservation or sustainable management
- **Agroforestry / Non-Forest Zone** – Areas designated for agroforestry or non-forest use

This visualization helps users understand local forest management plans and the spatial distribution of FLUZ zones.


4.7 Visualizing village forest category

This layer is a subset of the FLUZ dataset, representing forest areas managed at the village level. It includes three categories:

- **Village Conservation Forest** – Forests conserved by villages for biodiversity and ecosystem protection.
- **Village Protection Forest –** Forests protected by villages to maintain soil, water, and environmental services.
- **Village Production Forest –** Forests managed by villages for sustainable production of timber and other forest products.

These layers help users understand village-level forest management and the spatial distribution of locally managed forest areas.
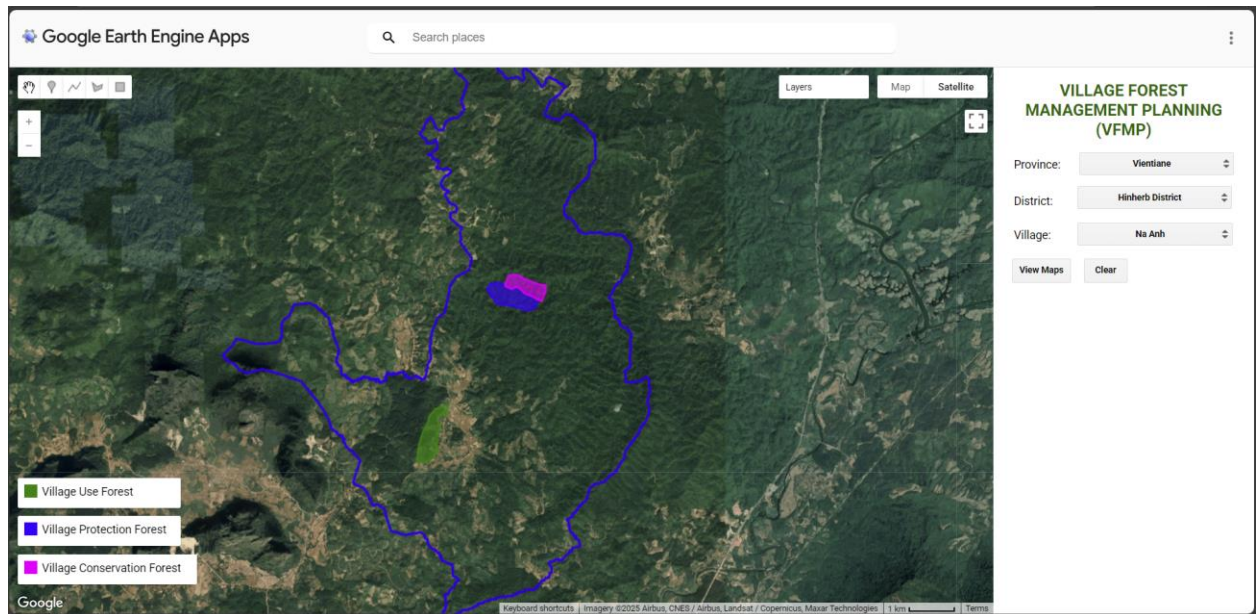
4.8 Visualizing forest disturbances

This dataset represents forest disturbances over the past 15 years (2009–2023) and is divided into five classes:

- **Forests not disturbed during 15 years** – Areas with no recorded disturbance from 2009 to 2023.
- **Forests disturbed 8–15 years ago** – Areas disturbed between 2009 and 2016.
- **Forests disturbed during the past 7 years** – Areas disturbed between 2017 and 2023.
- **Forests disturbed during the past 15 years** – Areas disturbed at any time during 2009–2023.
- **Non-forests** – Areas classified as non-forest land.

This classification allows users to analyze long-term forest change and identify patterns of disturbance across Laos.
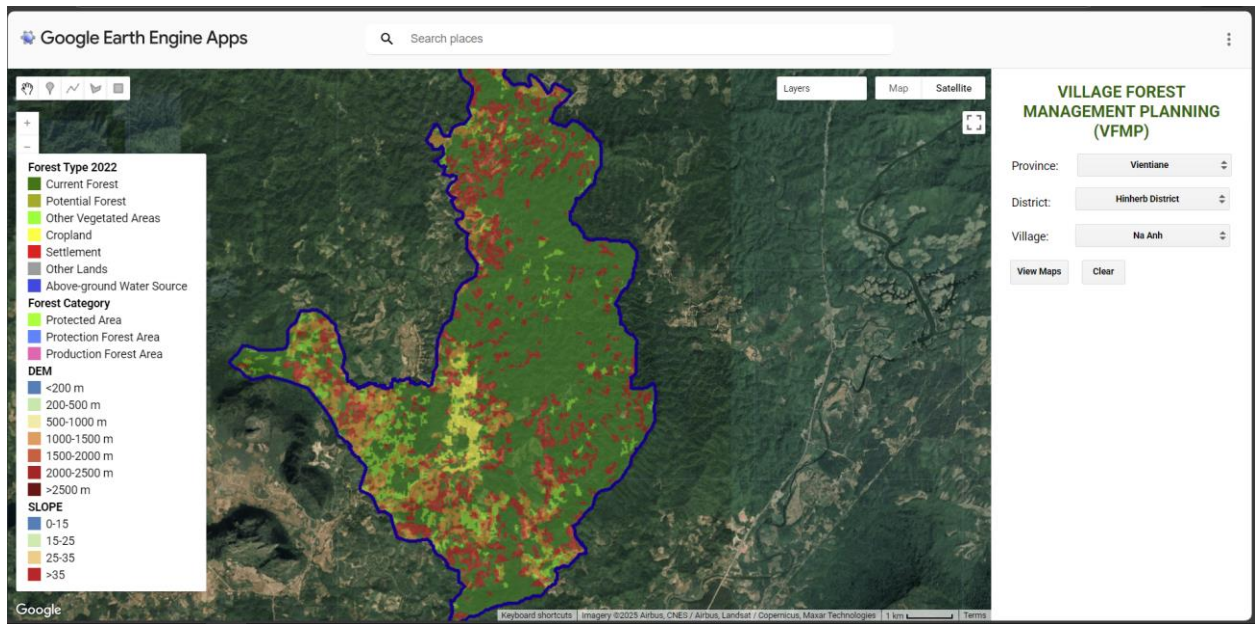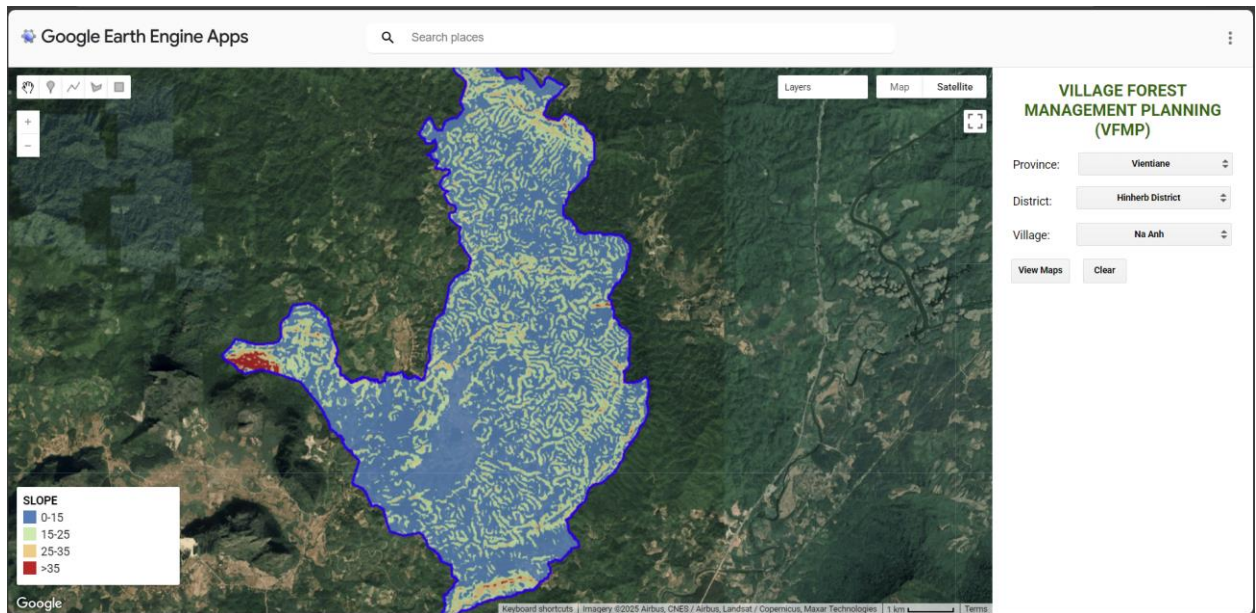
4.9 Visualizing slope classification

The slope dataset is derived from digital elevation data and is classified into four categories:

- Slope < 15°
- Slope 15°–25°
- Slope 25°–35°
- Slope ≥ 35°

This classification allows users to analyze terrain steepness, which is important for forest management planning, soil conservation, and land-use decisions.

4.10 Visualizing elevation data

The elevation dataset is classified into seven categories:

- Elevation < 200 m
- Elevation 200–500 m
- Elevation 500–1000 m
- Elevation 1000–1500 m
- Elevation 1500–2000 m
- Elevation 2000–2500 m
- Elevation ≥ 2500 m

This classification helps users analyze terrain variation, which is important for forest management, land-use planning, and environmental assessment.
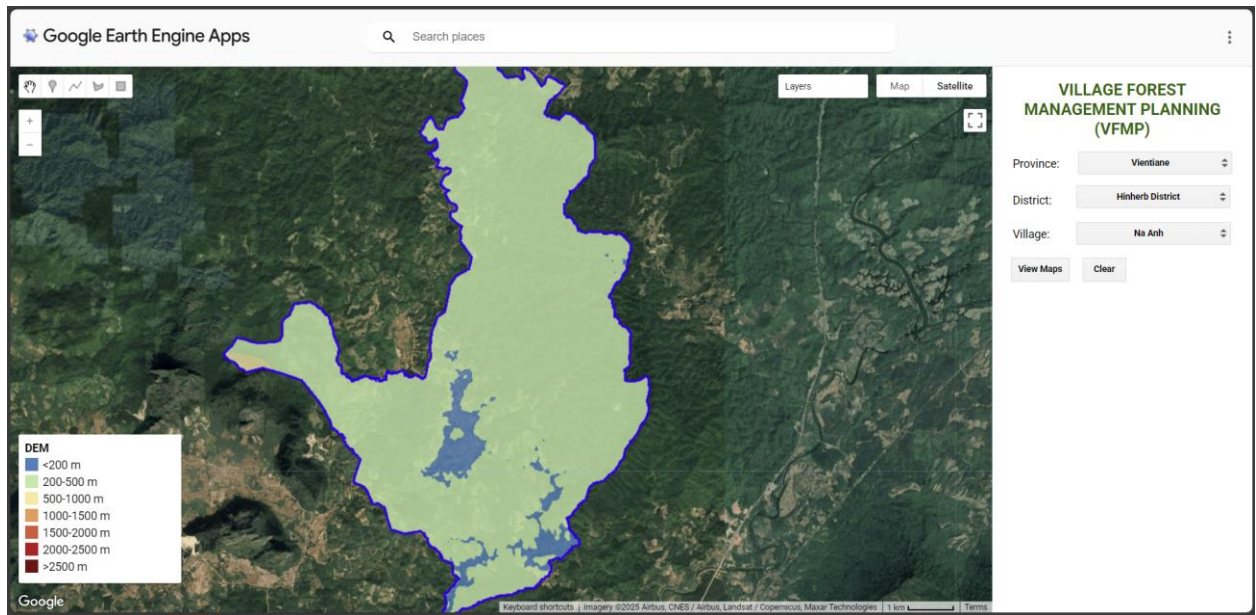
## 4.11 Visualizing forest type data 2022

The forest type dataset is derived from the most recent National Forest Inventory (NFI) program.

Forest types are grouped into seven classes:

- **Current Forest** – Areas currently covered by forest.
- **Potential Forest** – Areas suitable for forest regeneration or reforestation.
- **Other Vegetated Areas** – Non-forest vegetation such as shrubs or grasslands.
- **Cropland** – Areas used for agriculture.
- **Settlement** – Areas occupied by human settlements.
- **Other Lands** – Lands not included in the above categories.
- **Above-Ground Water Sources** – Rivers, lakes, and other water bodies.

This dataset allows users to analyze the spatial distribution of forest and land cover types for forest management planning.
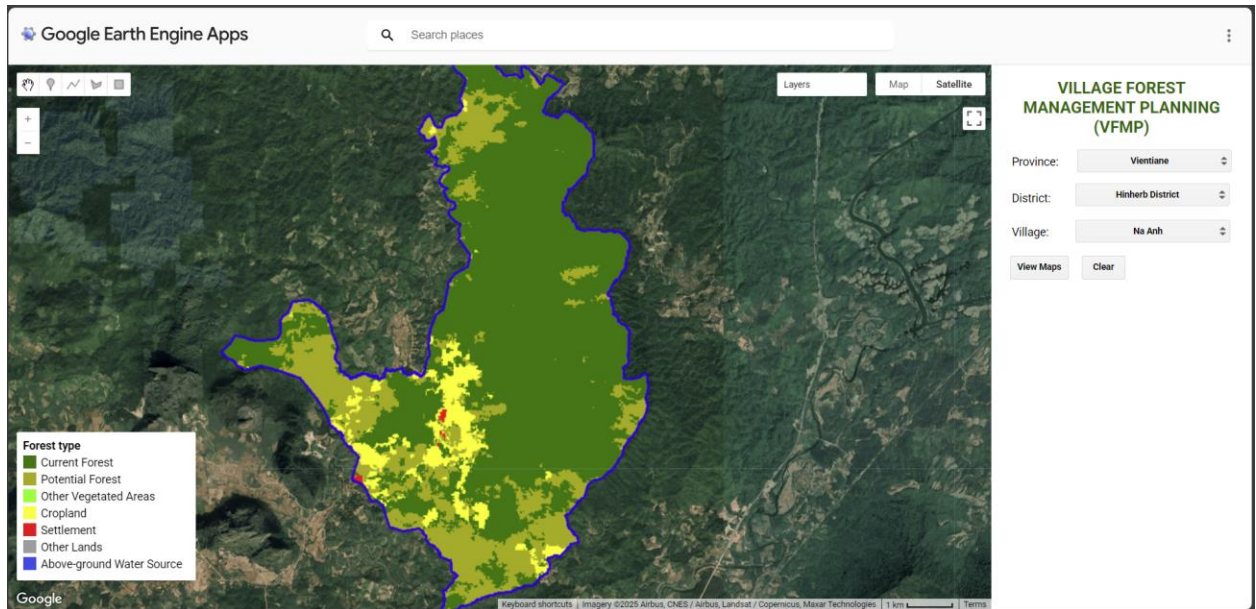
4.12 Visualizing the current NDVI data

The Normalized Difference Vegetation Index (NDVI) is a widely used remote sensing index for assessing vegetation health and density.

In the web application, NDVI is derived from Sentinel-2 imagery (2025).

- **NDVI values** range from -1 to 1
- **High NDVI values** indicate areas with healthy, dense, and green vegetation
- **Low NDVI values** indicate sparse or stressed vegetation, bare soil, or non-vegetated areas

This layer helps users monitor vegetation conditions and supports forest management and environmental assessment.
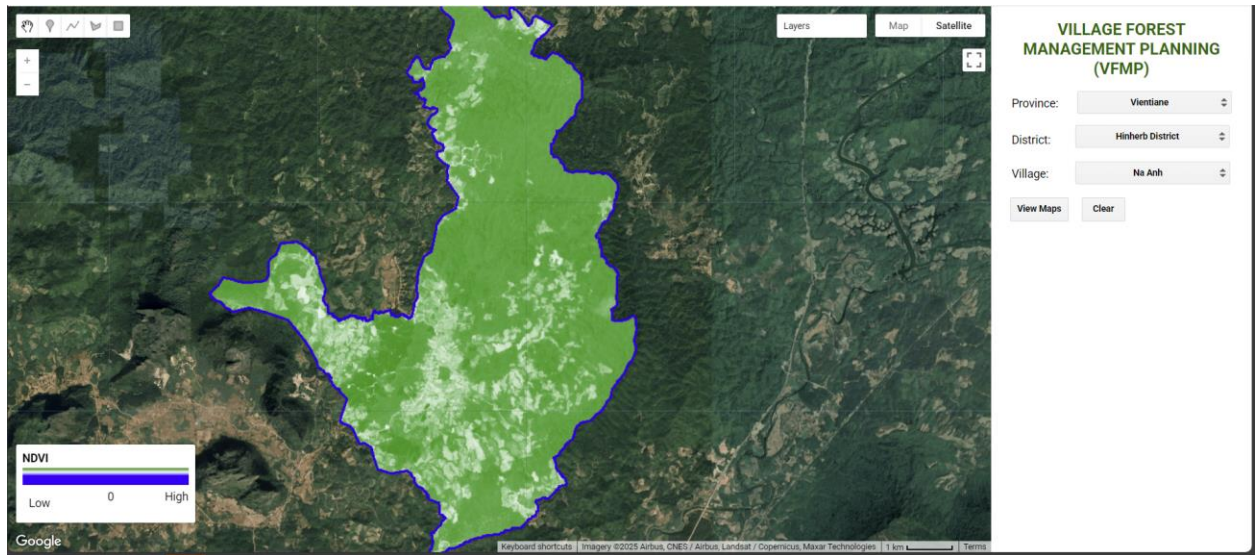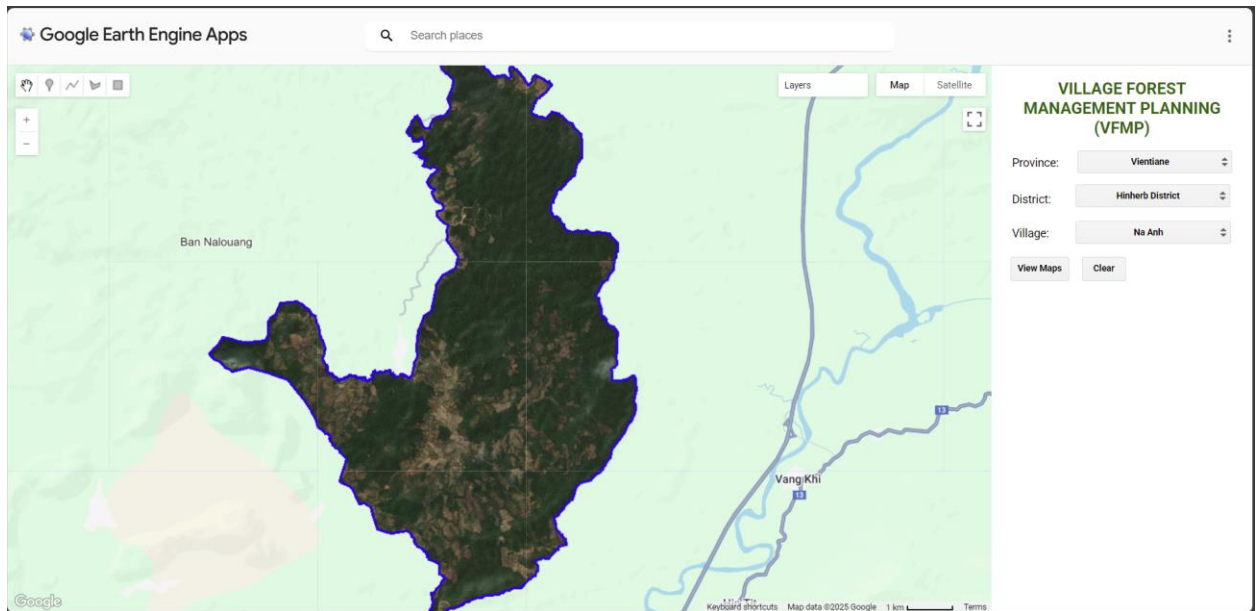
4.13 Visualizing the Sentinel-2 satellite imagery 2025 (Current)

The Sentinel-2 imagery is captured by the Sentinel-2 mission, part of the European Union's Copernicus Programme. It provides high-resolution multispectral data that can be used for:

- Vegetation monitoring
- Land-use mapping
- Water assessment
- Disaster management
- And other environmental applications

In the web application, the displayed imagery has a spatial resolution of 10 meters and is captured in 2025, allowing users to analyze recent land cover and environmental conditions.

4.14 Visualizing the Sentinel-2 satellite imagery 2023 (before FLUZ)

The Sentinel-2 imagery (2023) displayed in the web application has a spatial resolution of 10 meters and was captured in 2023.

This imagery provides a baseline view of land cover prior to the FLUZ validation process and can be used for vegetation monitoring, land-use analysis, and comparison with later imagery (e.g., 2025) to assess changes over time.
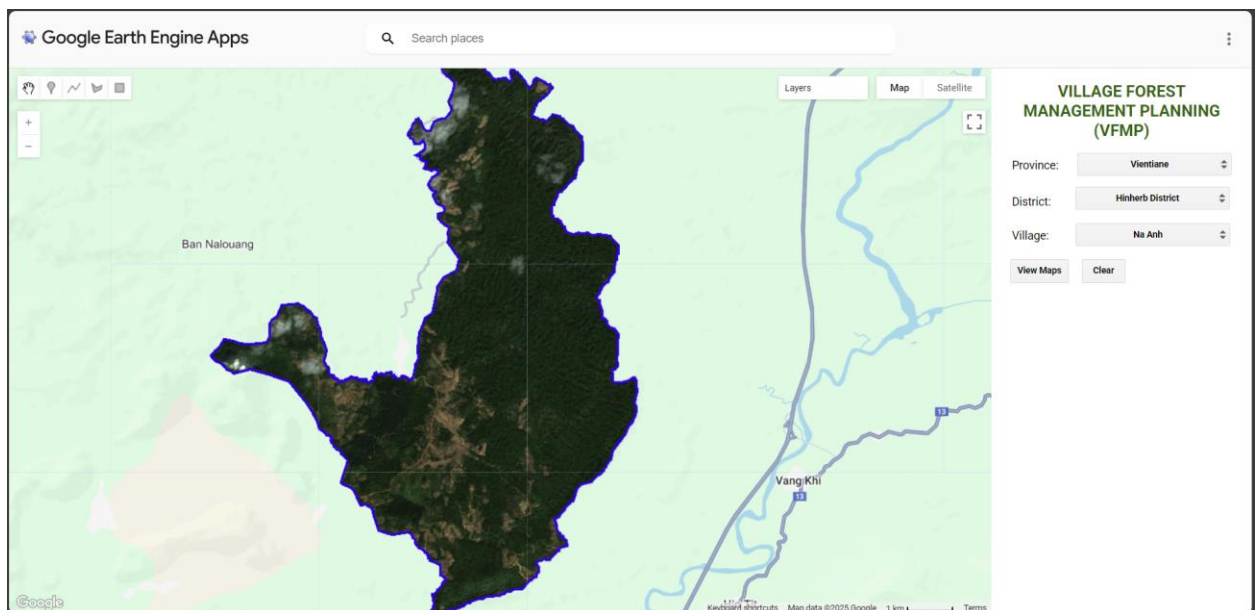
Certified by   **Prepared by**

National Project Coordinator

International Consultant