Center for Progressive Reform

North Carolina Environmental Justice Network

Webinar

USING SATELLITE IMAGERY FOR DATA CENTER AND LAND USE TRACKING

February 24, 2026

1 PM ET

Thank you for joining; we will begin shortly.

HOUSEKEEPING

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- All participants will be muted during the webinar.
- If you have questions during the presentation, please type them into the Q&A box located at the bottom of your screen. Your questions will be visible to the moderator and presenters only.
- The webinar is being recorded and will be shared after the event.
- Members of the press may be joining today's webinar.

Center for Progressive Reform

North Carolina ENVIRONMENTAL JUSTICE NETWORK

Our Presenters

Dr. Federico Holm

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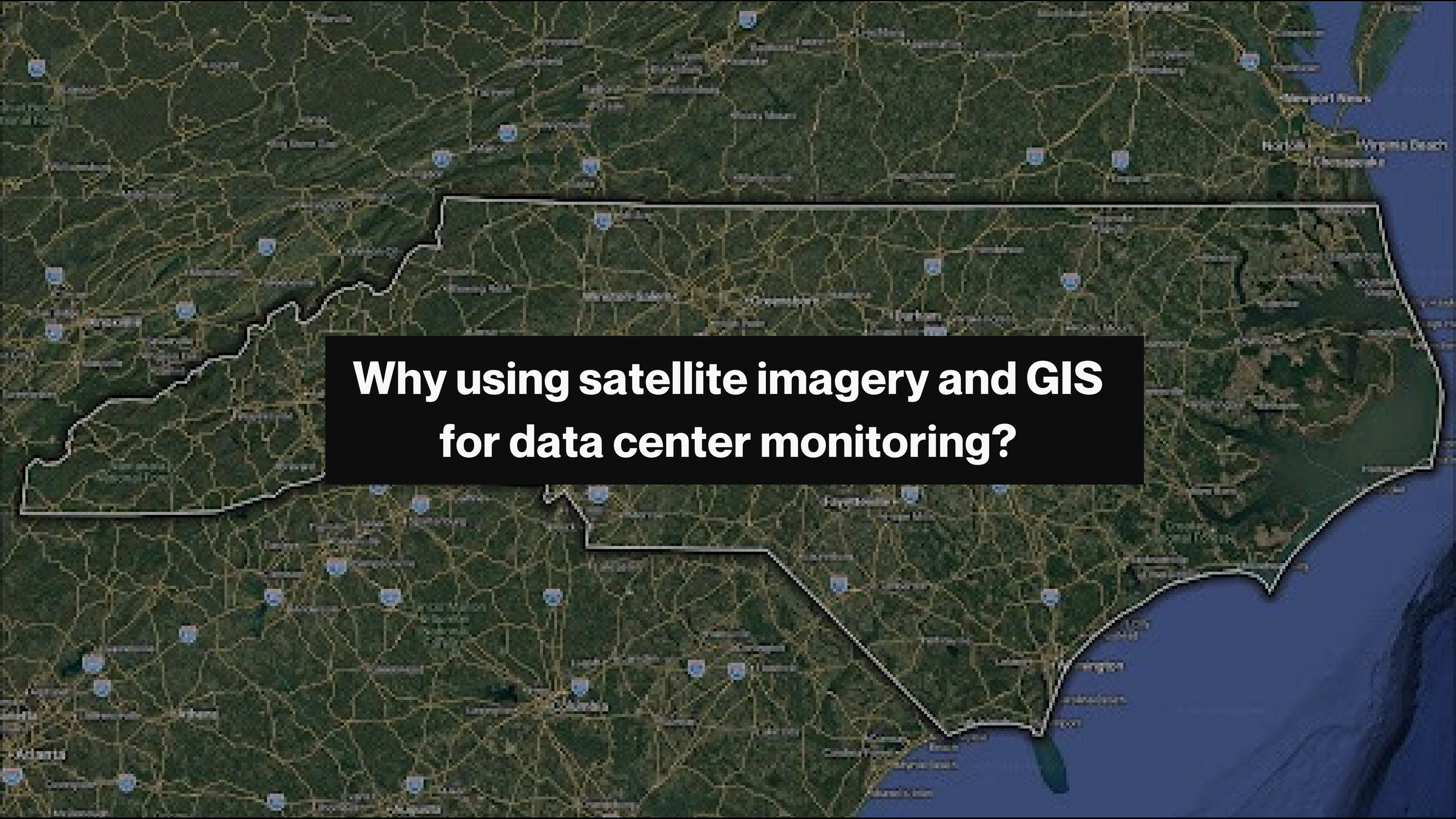
Center for Progressive Reform

Dr. Rania Masri

Co-Director,
NC Environmental Justice Network

Sophie Loeb (Moderator)

Policy Analyst,
Center for Progressive Reform


Why using satellite imagery and GIS for data center monitoring?

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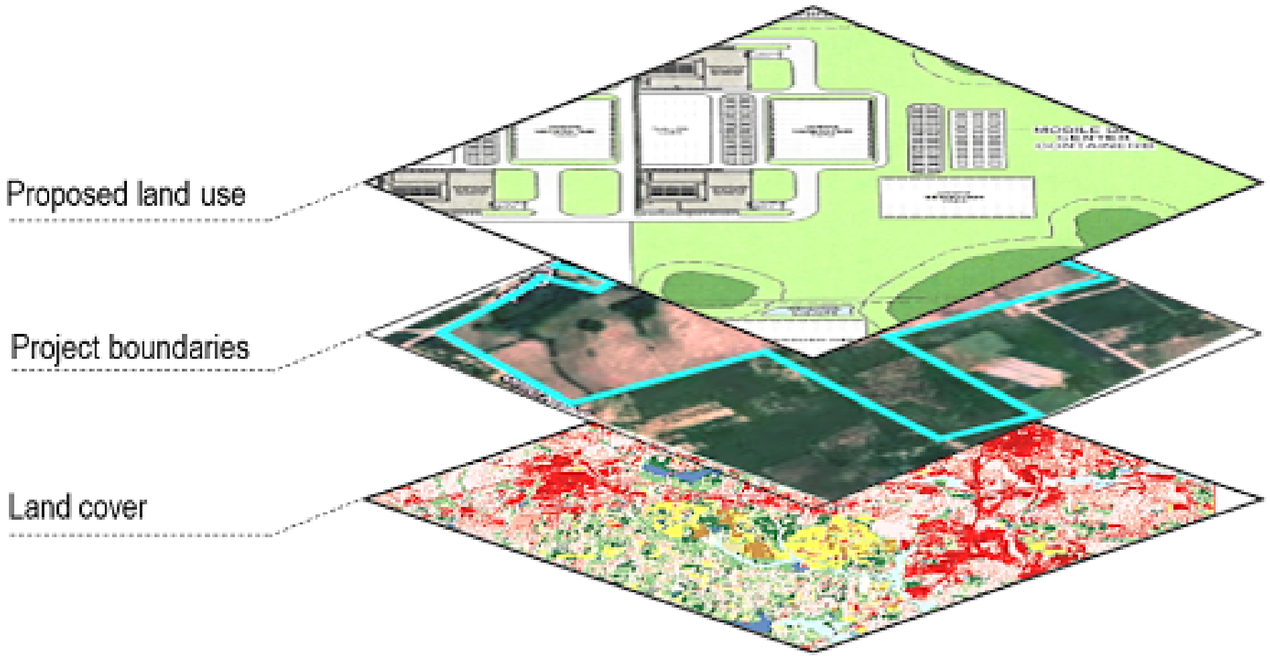
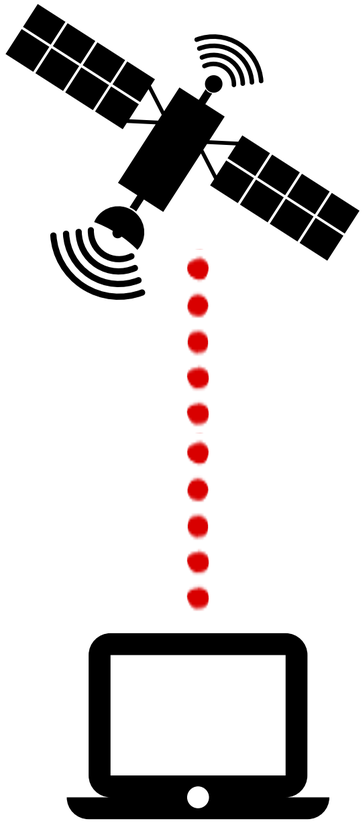


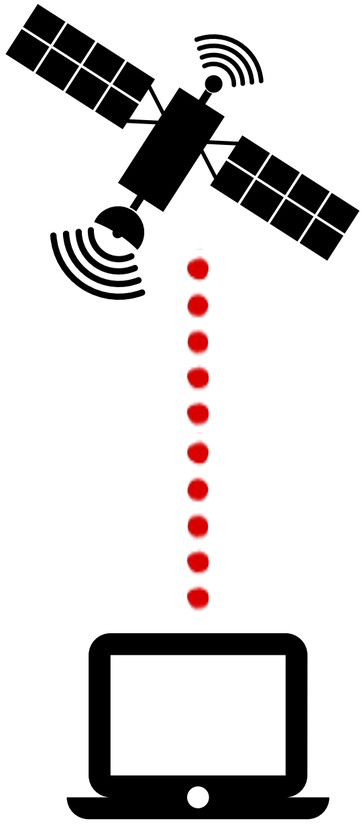
- Create visual representations of the Earth and provide new perspectives on climate, geography, and manmade structures
- Track the physical environment (water, air, land, vegetation) and the changing human footprint across the globe
- Accessibility (at least financial) and rate of update


Data acquisition

Data acquisition



Data acquisition



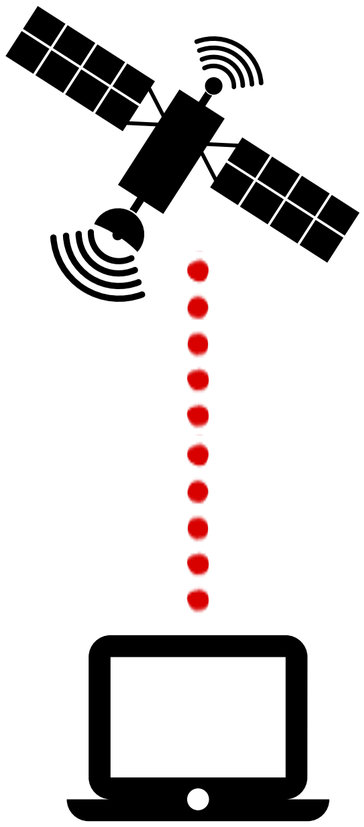
Google Earth Engine

- Retrieval via Sentinel-2 harmonized compositing
- 10-meter resolution

Python

R

Data acquisition



Google Earth Engine

- Retrieval via Sentinel-2 harmonized compositing
- 10-meter resolution

Python

R

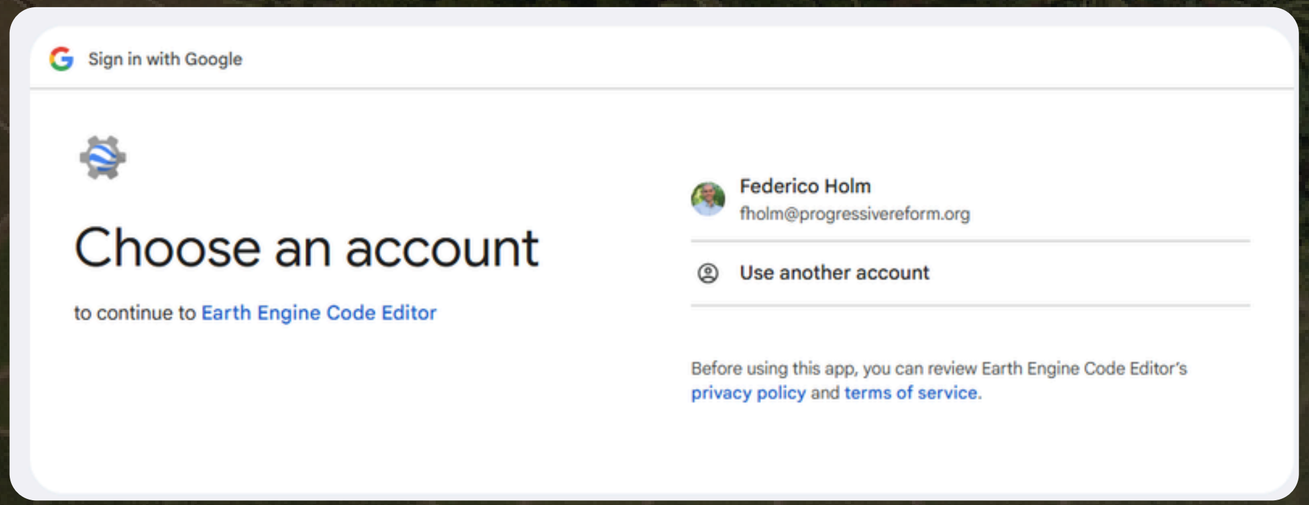
Data acquisition

- CPR developed a pipeline in R that allows users to export **high-resolution (10 m) Sentinel-2 tiles** for two time periods for a given center using *'rgee'*

- The code allows for local and Google Drive export

- We've split the code into three scripts:

  - **Core functions** necessary for the download
  - **Processing pipeline** for connecting to Google Earth, creating the box, and download the image
  - **Definition of key parameters** for download (dates, county FIPS code, center point coordinates, etc.)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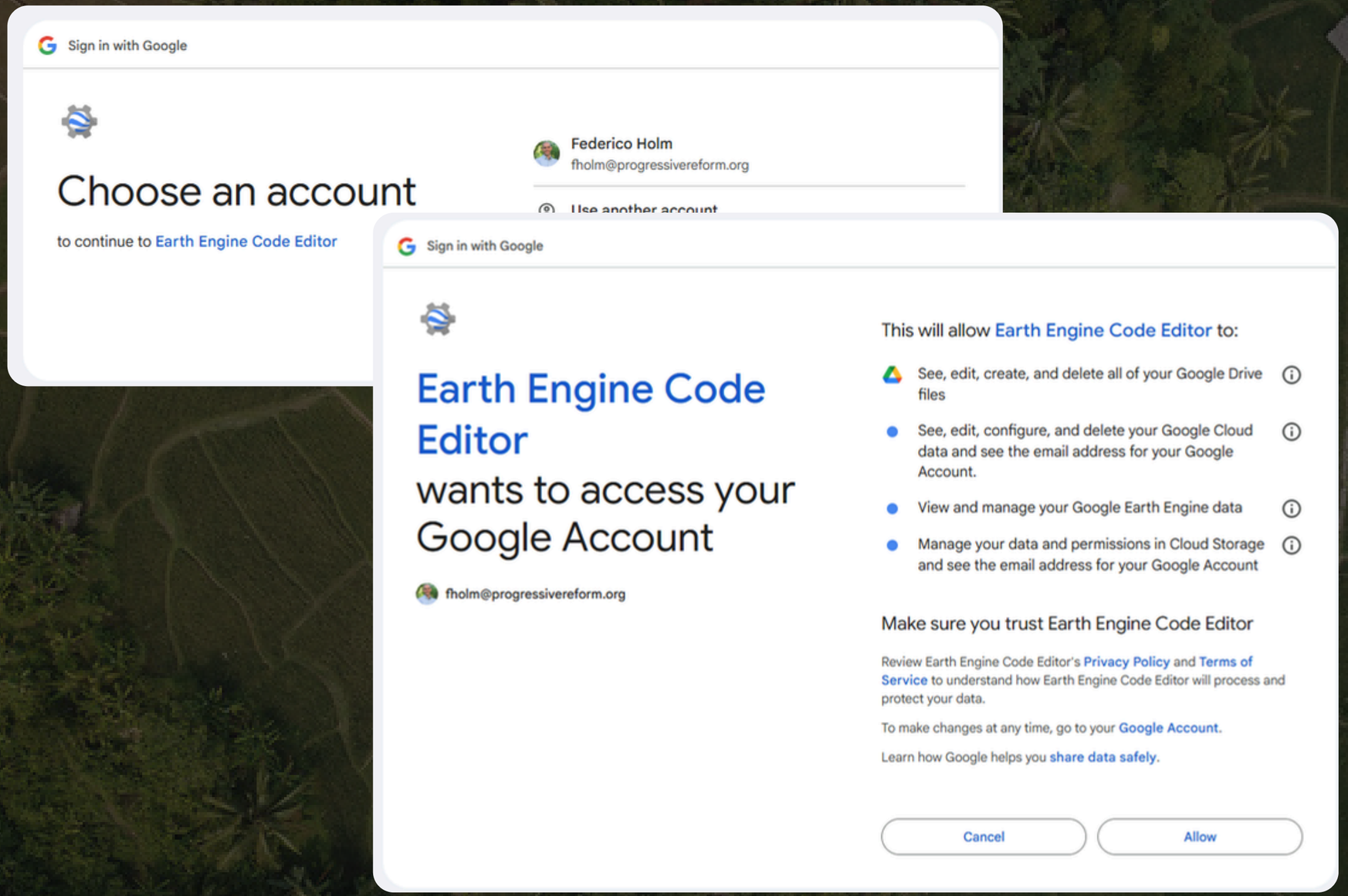
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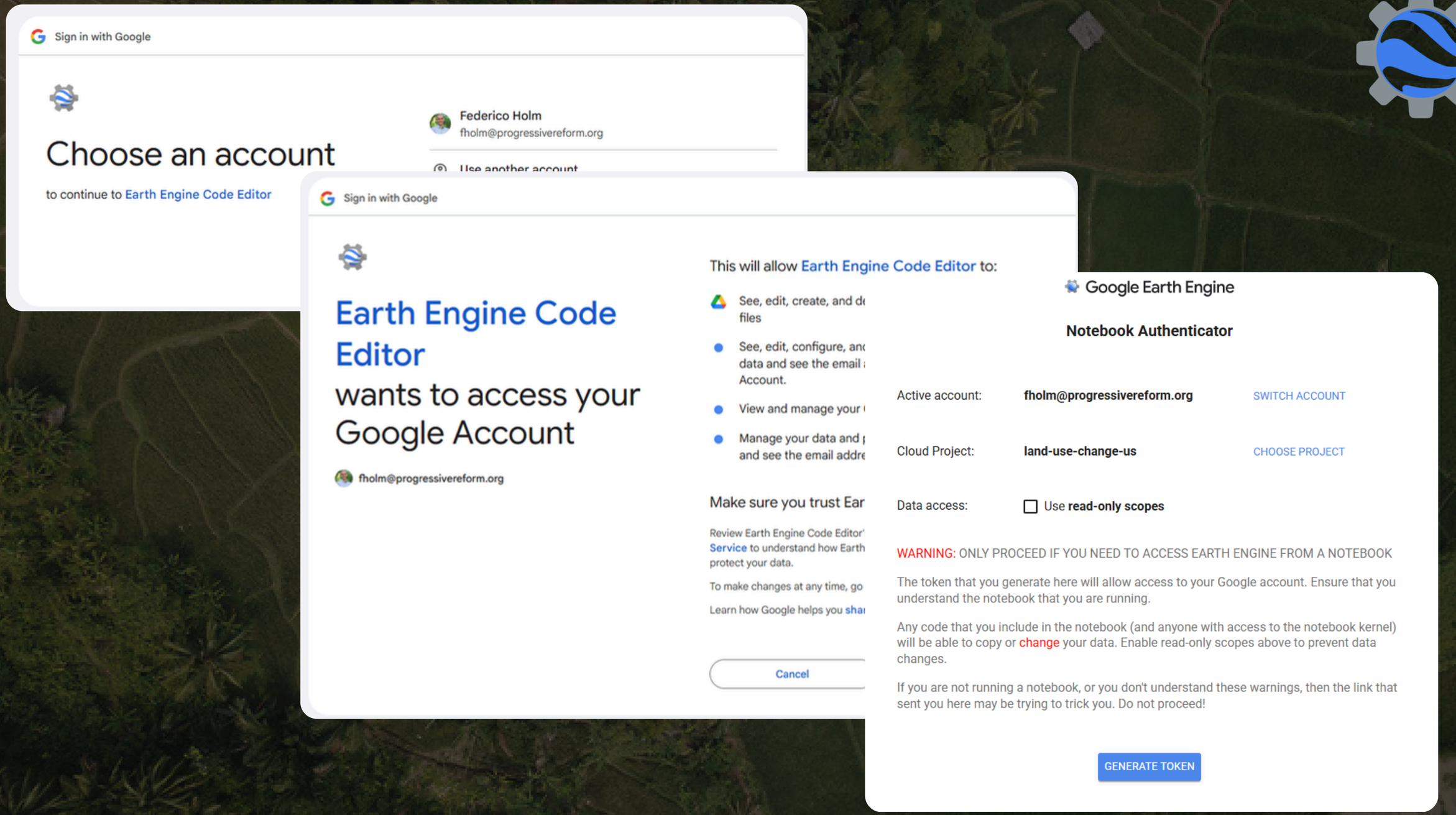
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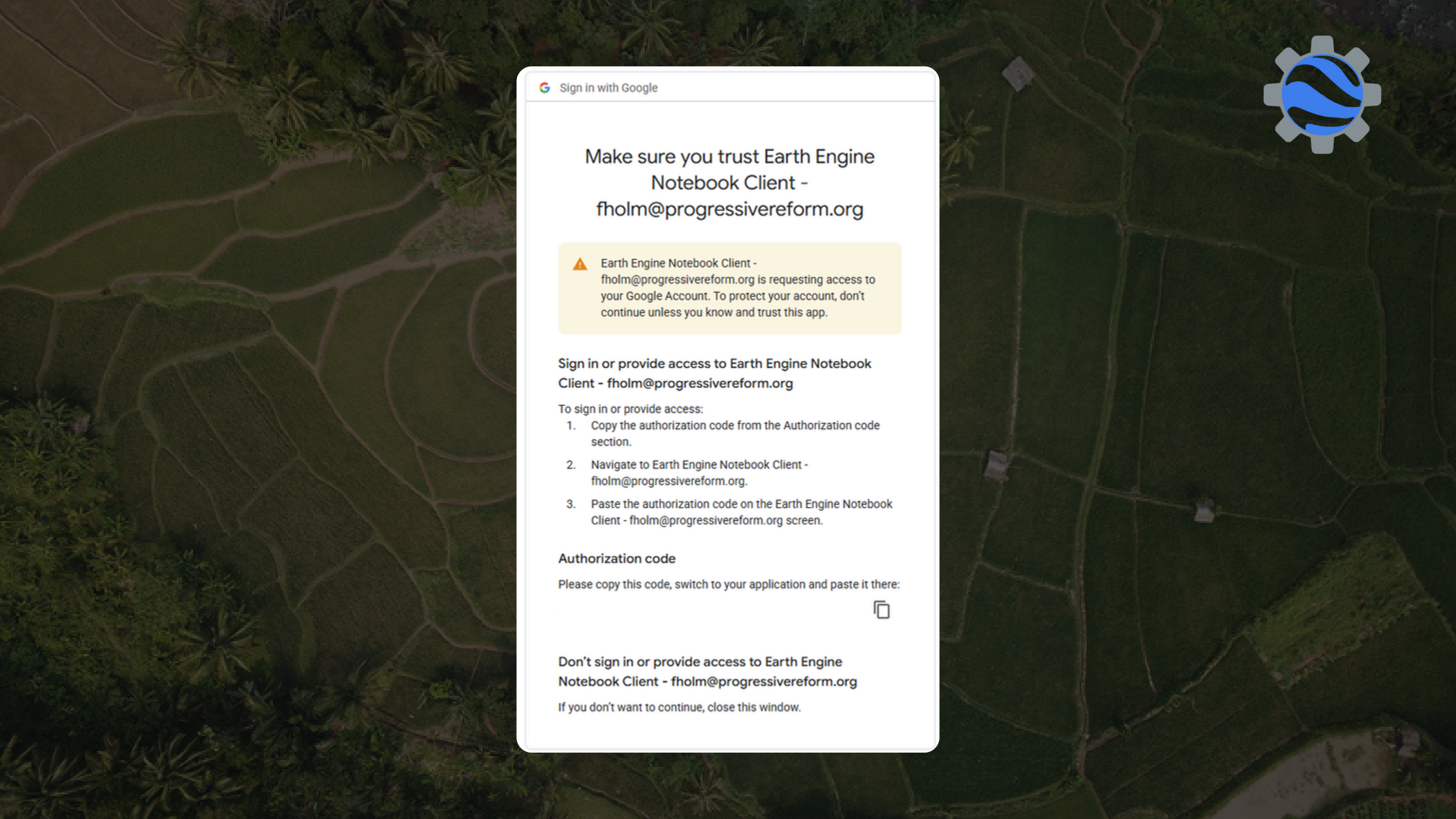
GENERATE TOKEN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Authorization code
Please copy this code, switch to your application and paste it there:
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Data acquisition

Key Steps

- Initialize *rgee* (interactive authentication if needed).
- Define key parameters.
- Run *export_county_tile* (..., download_via = "drive", drive_folder = "rgee_backup").
- Use the returned *drive_name / drive_folder* to locate the file in Drive.

Data acquisition

- **County FIPS** - *county_fips <- "37065"*
- **Center point coordinates** - *center_coords <- c(-77.690599, 35.920392) # c(lon, lat)*
- **Box length size in km** - *size_km <- 6 # production tile side length (km)*
- **Resolution** - *scale <- 10 # 10 m (Sentinel-2 native resolution)*
- **Time window to pick the right image to minimize cloud coverage** - *window_days <- 30*
- **Output directory** - *output_dir <- "production_outputs" # local folder for previews/metadata*
- **Drive folder** - *drive_folder <- "rgee_backup"   # Drive folder where rgee will place exported files*
- **Time window between images in months** - *prev_months <- c(12)   # include 1 year ago*

Data acquisition

```
── rgee 1.1.8 ──────────────────────────────────────────────────────────────────────────────── earthengine-api 1.7.4 ──
 ✓ user: not_defined
 ✓ Google Drive credentials:

Auto-refreshing stale OAuth token.

 ✓ Google Drive credentials:  FOUND
 ✓ Initializing Google Earth Engine:  DONE!
 ✓ Earth Engine account: projects/                    /analysis
 ✓ Python Path: C:/Users/fholm/miniconda3/envs/rgee_py311/python.exe
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Data processing and outputs


What can we do with this?

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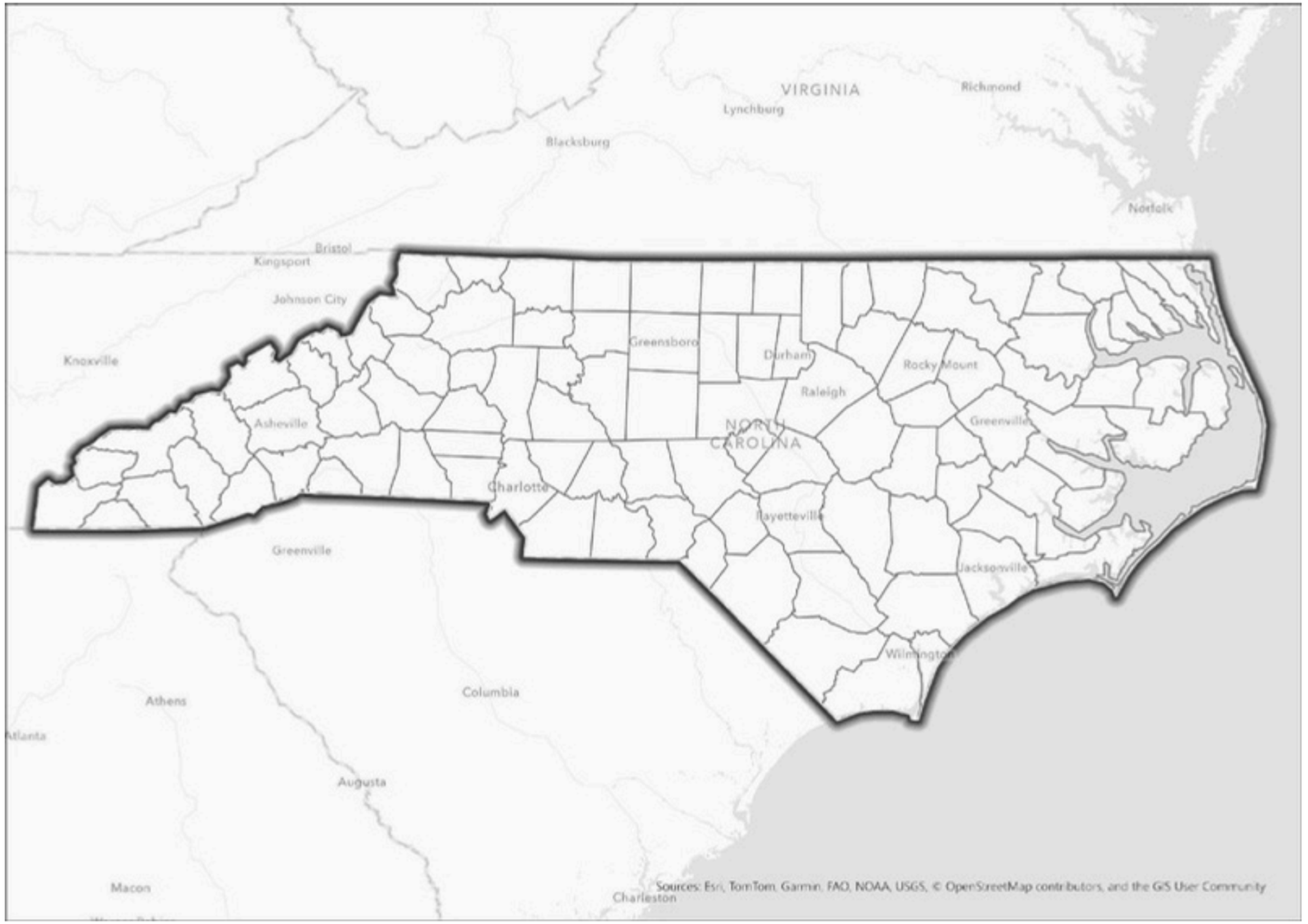
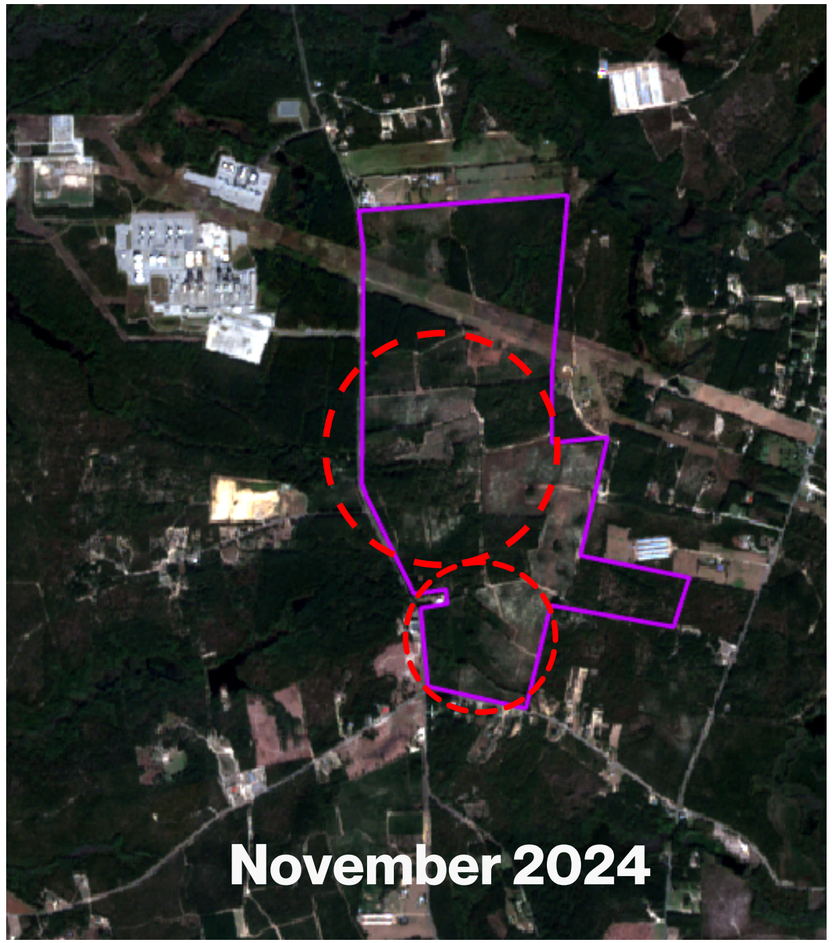


Use # 1: Change detection

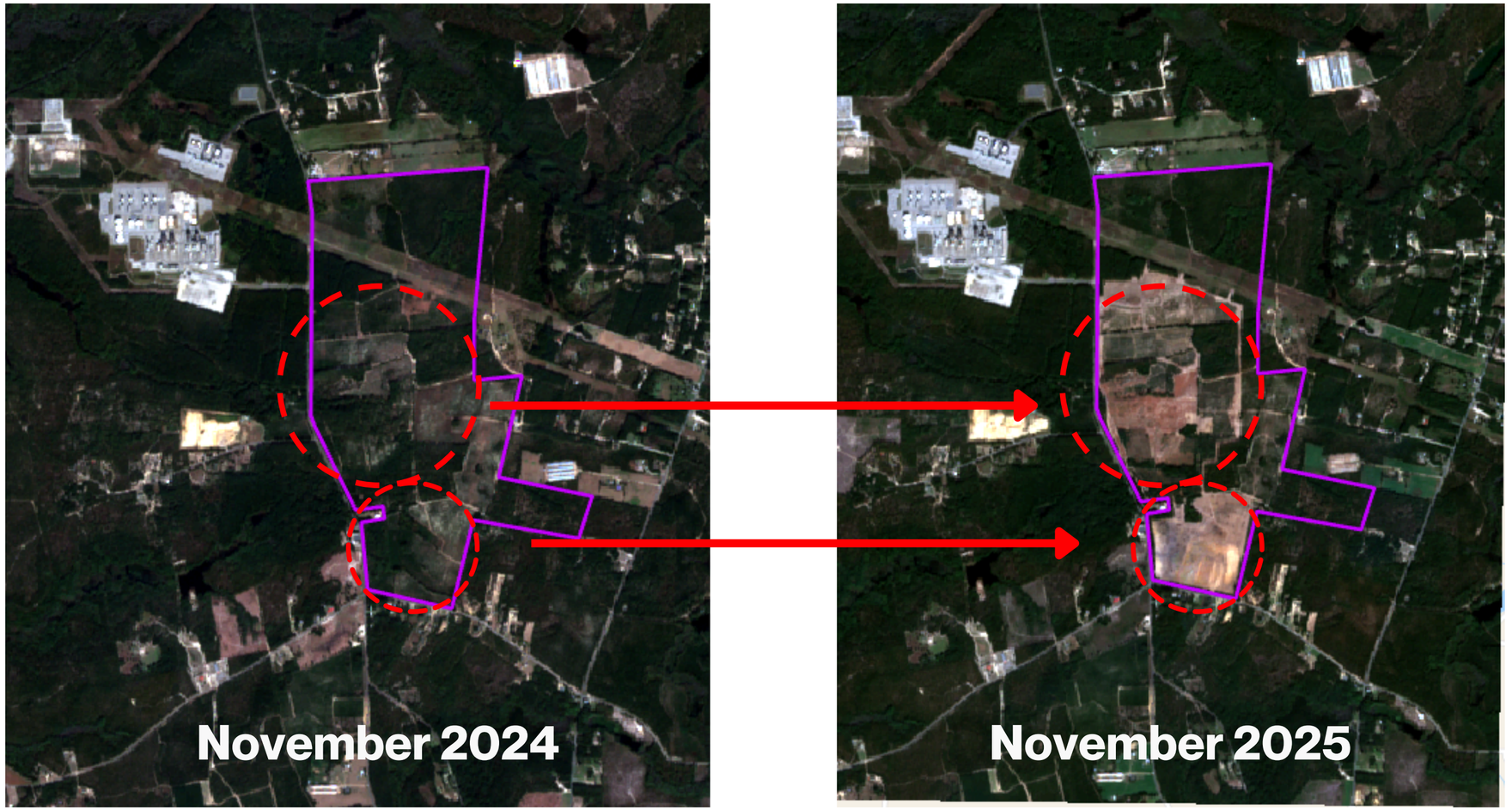
AWS Energy Way



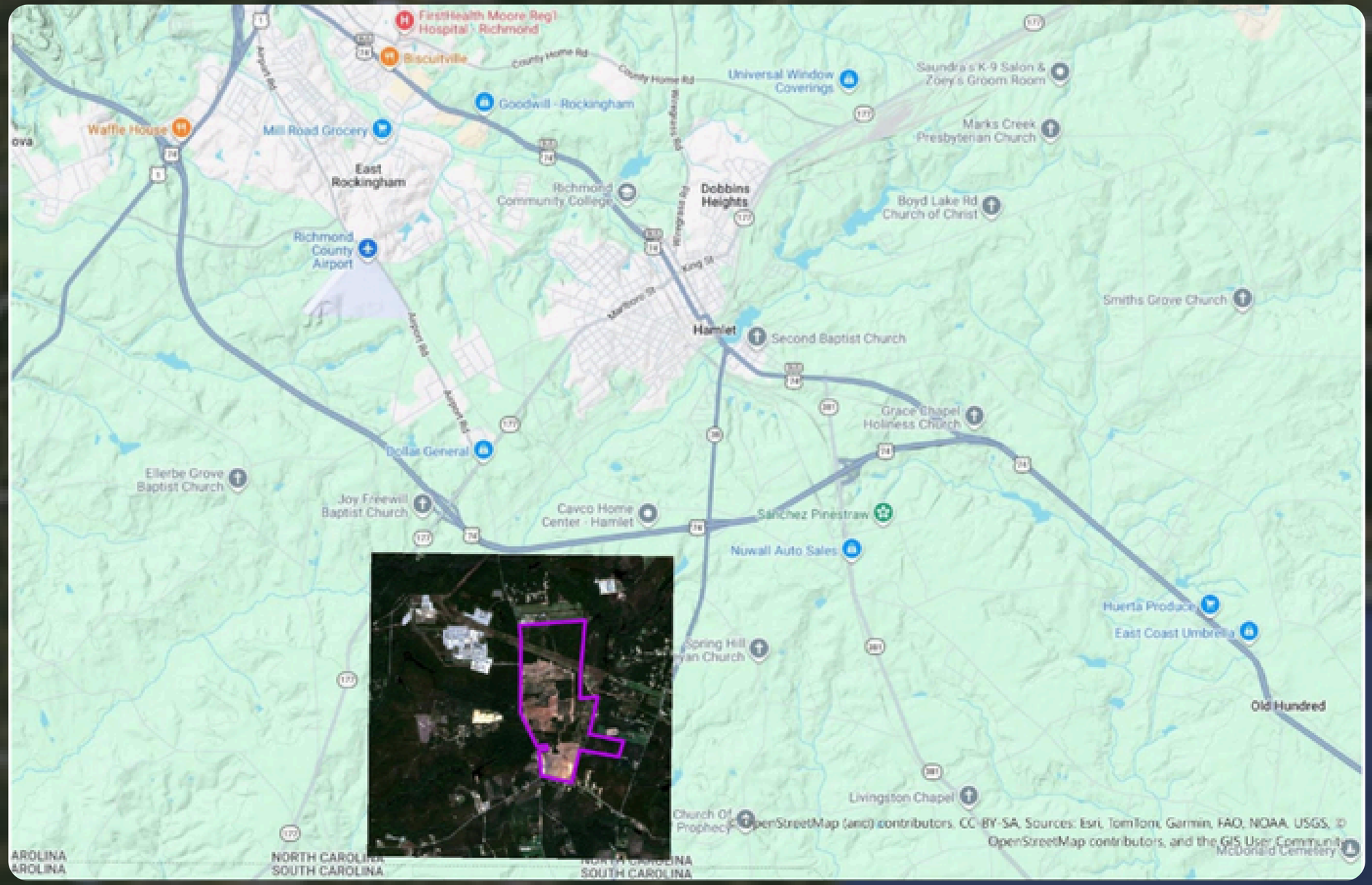
November 2025

Use # 1: Change detection

AWS Energy Way



Use # 2: Communication – Scale



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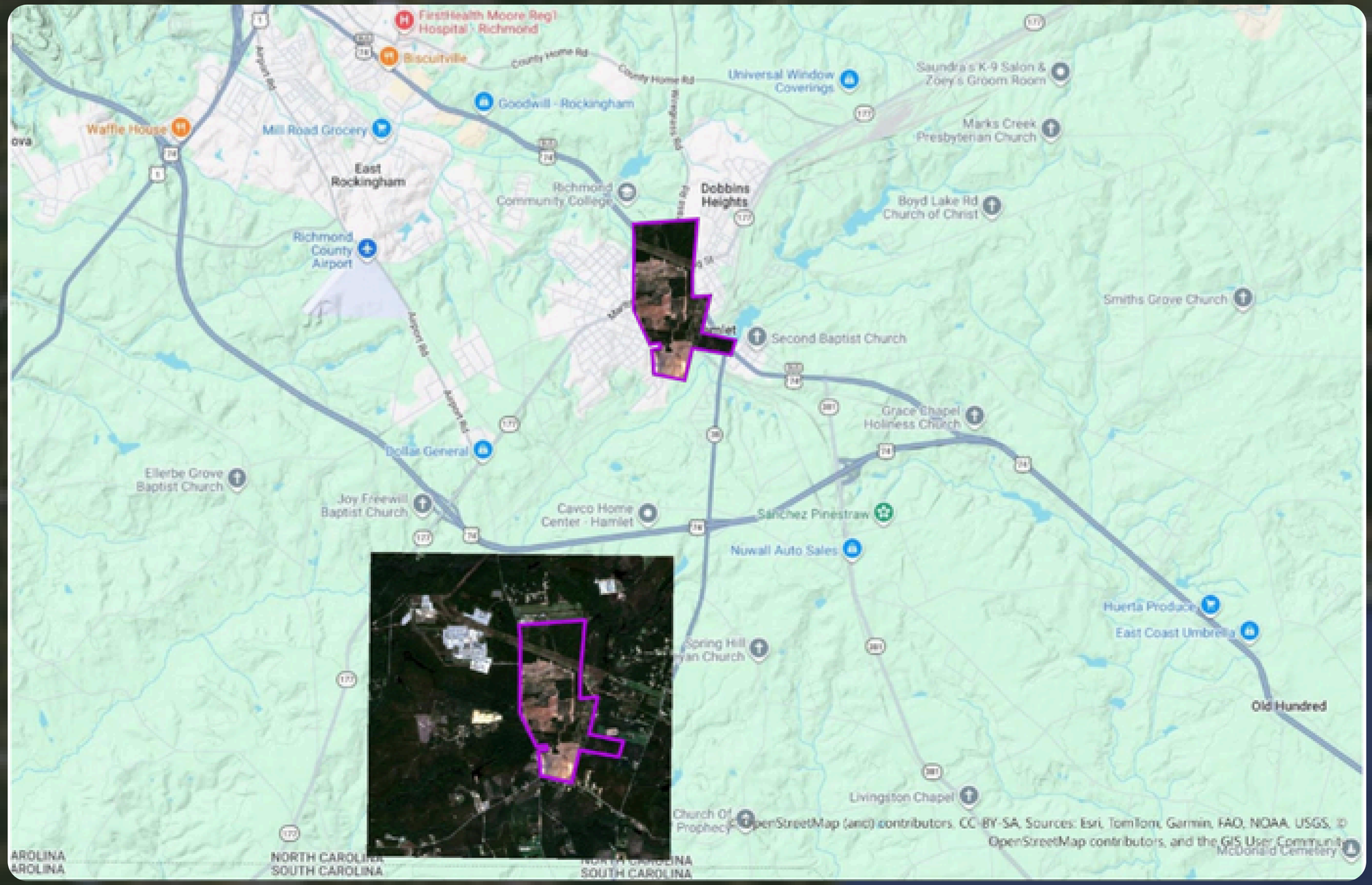
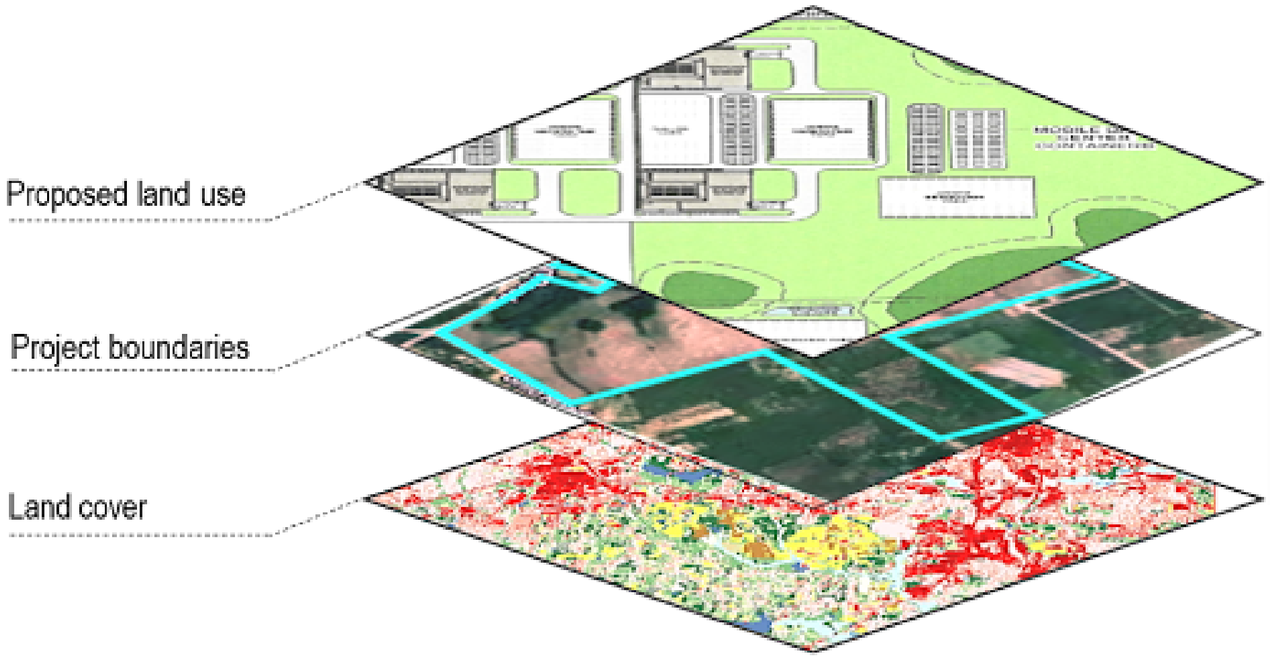


Use #3: Estimation of Impacts (next steps)



- **Habitat degradation/fragmentation**
- **Tree/forest cover loss**
- **Increased runoff** (pollution, turbidity)
- **Water depletion** (local, municipal, and agricultural water supplies)
- **Greenhouse gas emissions/air pollution**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Q&A


Thank you!