

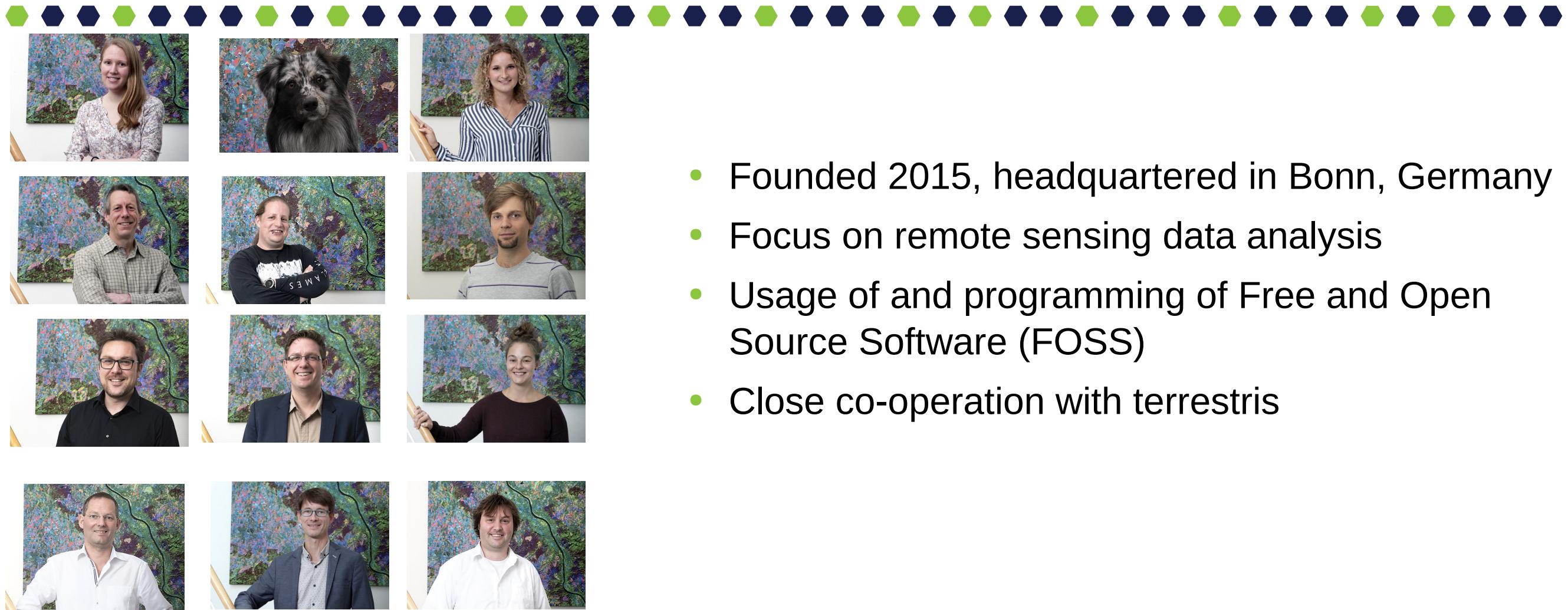
# HERMOSA

Supporting the UN Decade on Ecosystem  
Restoration utilizing Geo- and Remote  
Sensing Technologies



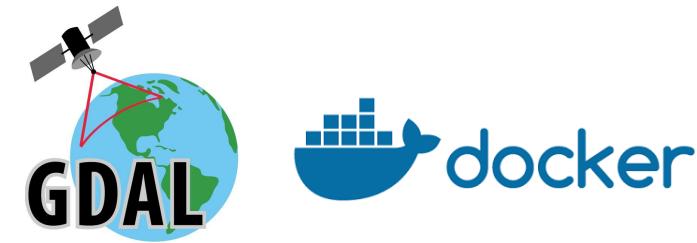
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# mundialis facts



- Founded 2015, headquartered in Bonn, Germany
- Focus on remote sensing data analysis
- Usage of and programming of Free and Open Source Software (FOSS)
- Close co-operation with terrestris

# Open Source Stack



kubernetes



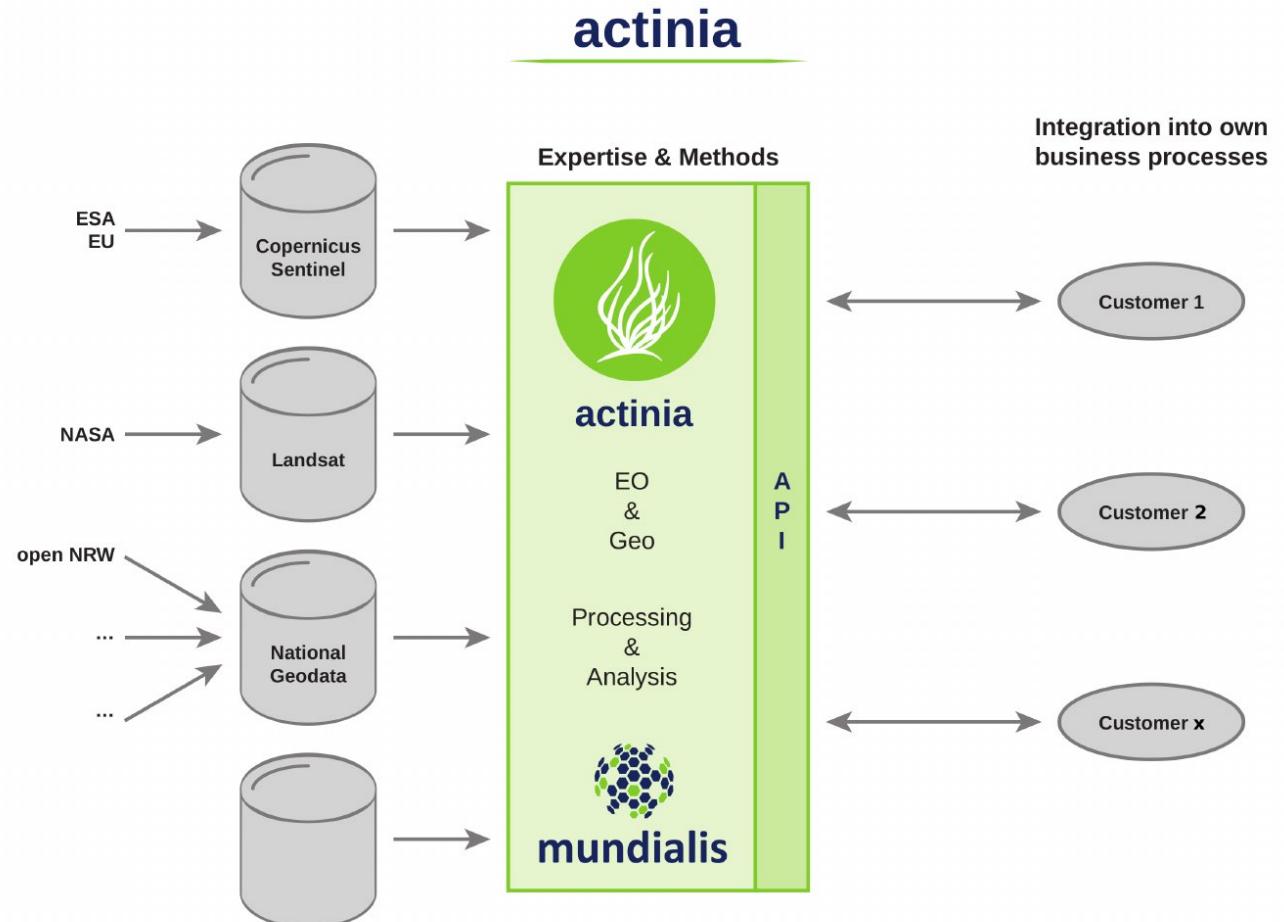


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# actinia - geoprocessing engine



- Processing of massive data
- Cloud based
- Scalable
- Focus on spatial and temporal analyses
- Use of EO archives e.g. Sentinel



<https://actinia.mundialis.de/>

A photograph of a massive forest fire. The scene is filled with intense orange and yellow flames that are engulfing numerous tall, thin trees. The smoke from the fire is thick and billowing, creating a dark, hazy atmosphere. In the foreground, some green plants and smaller trees are visible, partially obscured by the smoke. The overall impression is one of a major, uncontrollable wildfire.

The world is burning – literally.

**The climate is changing and  
there is either too little water ....**



... or too much.



**Damages  
caused by  
natural  
disasters are  
increasing ....**



**... and humankind  
is engaged in  
unsustainable  
practices  
destroying  
ecosystems.**





01 MAR 2019 | PRESS RELEASE | ECOSYSTEMS AND BIODIVERSITY

On March 01<sup>st</sup> 2019 the United Nations declared 2021 to 2030 the Decade on Ecosystem Restoration

New UN Decade on Ecosystem Restoration offers unparalleled opportunity for job creation, food security and addressing climate change

Through the German contribution to ESA by DLR, mundialis was awarded a contract in July 2019 for a 2 year demonstration project called

esa Council Meeting at Ministerial Level Space19+

Seville, 27-28 November 2019

Holistic Ecosystem Restoration Monitoring, repOrting, Sharing and mArketplace  
for short - HERMOSA

# HERMOSA is a web-based application located at <https://hermosa.earth>





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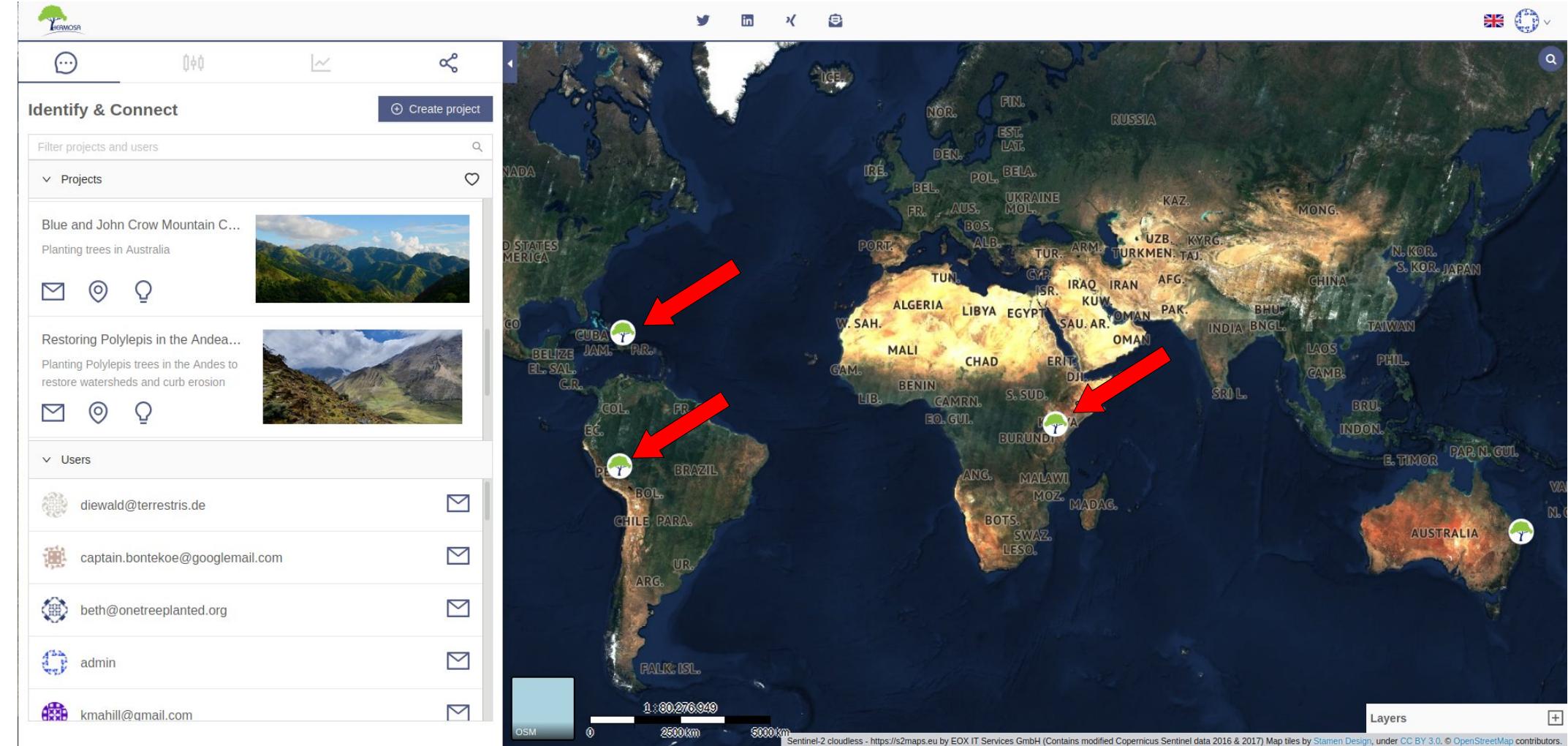




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# Identify projects on the map

The screenshot shows the HERMOSA platform interface. On the left, there is a sidebar titled "Identify & Connect" with sections for "Projects" and "Users". The "Projects" section lists two entries:

- Blue and John Crow Mountain C...**: Planting trees in Australia. It includes a thumbnail image of a mountainous landscape.
- Restoring Polylepis in the Andea...**: Planting Polylepis trees in the Andes to restore watersheds and curb erosion. It includes a thumbnail image of a mountainous landscape.

The "Users" section lists five users with their email addresses and contact icons:

- diewald@terrestris.de
- captain.bontekoe@googlemail.com
- beth@onetreeplanted.org
- admin
- kmahill@gmail.com

On the right, a world map displays various projects as green circular icons with white tree symbols. Three specific projects are highlighted with red arrows pointing to them:

- A project in Cuba (labeled "CUBA")
- A project in Brazil (labeled "BRAZIL")
- A project in Kenya (labeled "KENYA")

At the bottom of the map, there is a scale bar from 0 to 5000 km and a copyright notice: "Sentinel-2 cloudless - https://s2maps.eu by EOX IT Services GmbH (Contains modified Copernicus Sentinel data 2016 & 2017) Map tiles by Stamen Design, under CC BY 3.0. © OpenStreetMap contributors."



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# Filter projects and users and easily connect with them



The screenshot shows the HERMOSA platform interface. On the left, a sidebar titled "Identify & Connect" contains a search bar labeled "Filter projects and users" with a red border, and sections for "Projects" and "Users". The "Projects" section lists two entries with small thumbnail images and contact icons. The "Users" section lists five email addresses. The main area is a world map with various countries highlighted in different colors (green, yellow, orange) and labeled with their names. A legend at the bottom left indicates "OSM" and shows a scale from 0 to 5000 km.



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# Create projects of your own to let the world know about them



The screenshot shows the HERMOSA platform interface. On the left, a sidebar titled "Identify & Connect" lists "Projects" and "Users". The "Projects" section contains two entries: "Blue and John Crow Mountain C..." and "Restoring Polylepis in the Andea...". The "Users" section lists several email addresses. A red box highlights the "Create project" button at the top right of the sidebar. The main area is a world map with various countries labeled and small green tree icons indicating projects. A legend at the bottom left shows "OSM" and a scale bar from 0 to 5000 km.



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# Add general information like name, location, status and description

The screenshot shows the HERMOSA platform interface. On the left, there is a sidebar titled 'Identify & Connect' with sections for 'Projects' and 'Users'. A red box highlights the 'General' tab in the top navigation bar of the main content area. The main content area displays 'Project details - Ancient Cultures, Philippines'. The project details table includes:

Project name	Ancient Cultures, Philippines
Location	Rogonon 
Status	PENDING
Start date	November 9, 2020 7:59 PM
End date	November 9, 2020 7:59 PM
Description	About 50 clans live on an area of about 20,000 hectares in the Philippines of which only about 5,000 hectares remain. The rest have been lost to outsiders who have bought the land and started logging, mining as well as oil palm and coconut plantation operations. Currently our sacred forest, about 1,000 hectares, are under severe threat of also being sold to companies because of food insecurity and poverty amongst our people. We are looking for funding to buy our land so that we can protect the forest and preserve the rich biodiversity - and our livelihoods, because we depend on the forest.
Tags	oil palm, coconut plantation, indigenous, food security, land tenure, logging, poverty, philippines

To the right of the table is a photograph of several people in traditional clothing standing near a waterfall in a lush green forest. Below the photo is the caption 'Ancient Cultures, Philippines'.



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# Add images or videos

The screenshot shows the HERMOSA platform interface. At the top, there is a decorative bar consisting of a repeating pattern of green and dark blue hexagons. Below this is a header with the HERMOSA logo (a tree icon), the project name "Mount Kilimanjaro Reforestation", social media icons (Twitter, LinkedIn, etc.), and a language selector (UK). The main area is titled "Project details - Mount Kilimanjaro Reforestation". On the left, there is a sidebar with tabs for "Identify & Connect" (selected) and "+ Create project". Under "Identify & Connect", there are sections for "Projects" (listing "Test - EBL" and "Beth's Test") and "Users" (listing several email addresses). The right side of the screen shows three tabs: "Common", "Images" (which is highlighted with a red box), and "Participants". Below these tabs is a grid of five images showing people engaged in reforestation activities like planting trees and working in fields. To the right of the images is a dashed box with a "+ Upload" button.



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# Connect with other users of HERMOSA

The screenshot shows the HERMOSA platform interface. At the top, there is a decorative header consisting of a repeating pattern of green and dark blue hexagonal shapes. Below this is a navigation bar with the HERMOSA logo, the project name "Mount Kilimanjaro Reforestation", social media icons (Twitter, LinkedIn, GitHub), and language selection (UK, DE). The main content area has a title "Project details - Mount Kilimanjaro Reforestation". On the left, there is a sidebar titled "Identify & Connect" with sections for "Projects" (listing "Test - EBL" and "Beth's Test") and "Users" (listing several email addresses). The main panel shows tabs for "Common", "Images", and "Participants", with "Participants" highlighted by a red box. A dropdown menu titled "Select a user" lists several email addresses under "Admins" and "Users".

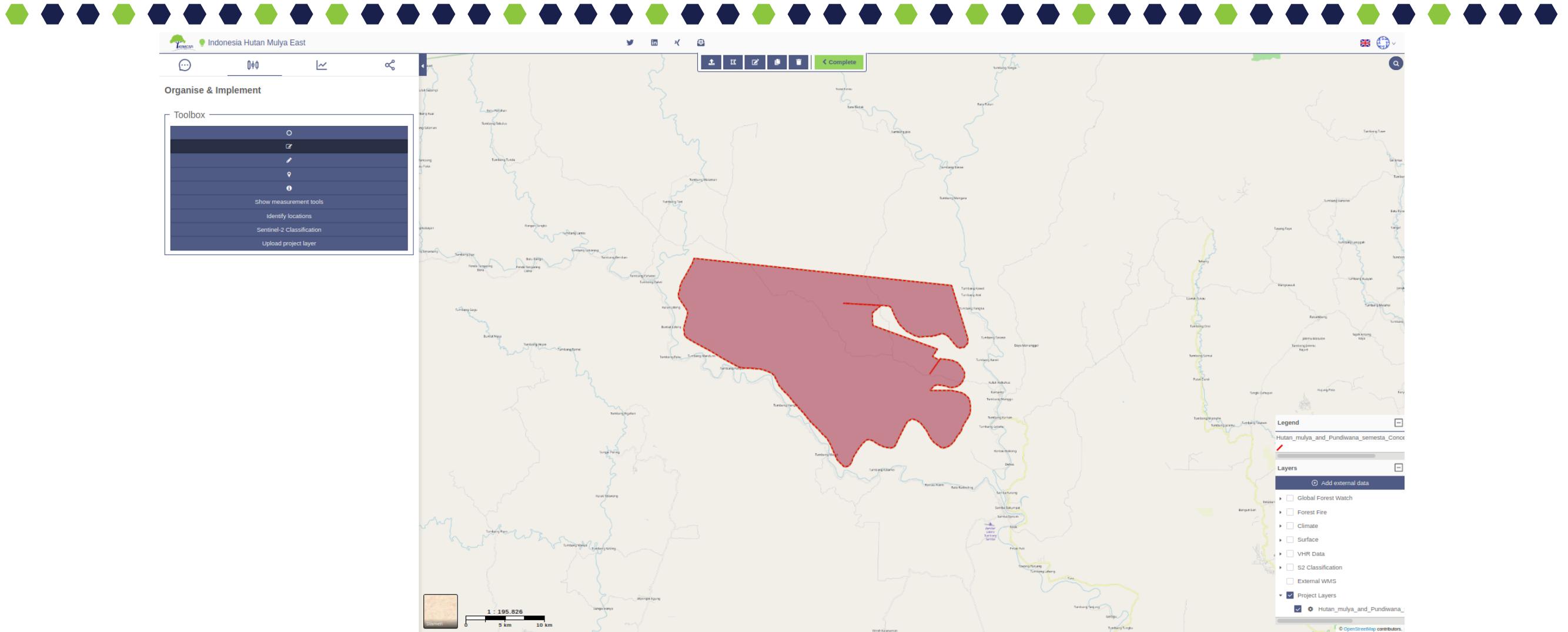
Category	Email Address
Admins	pauline@ecosystem.org
	sarah@ecosystems.org
	chester@ecosystem.org
	heather@ecosystem.org
	olga@ecosystem.org
	steven@ecosystem.org
Users	peter@pan.com
	steve@pan.com



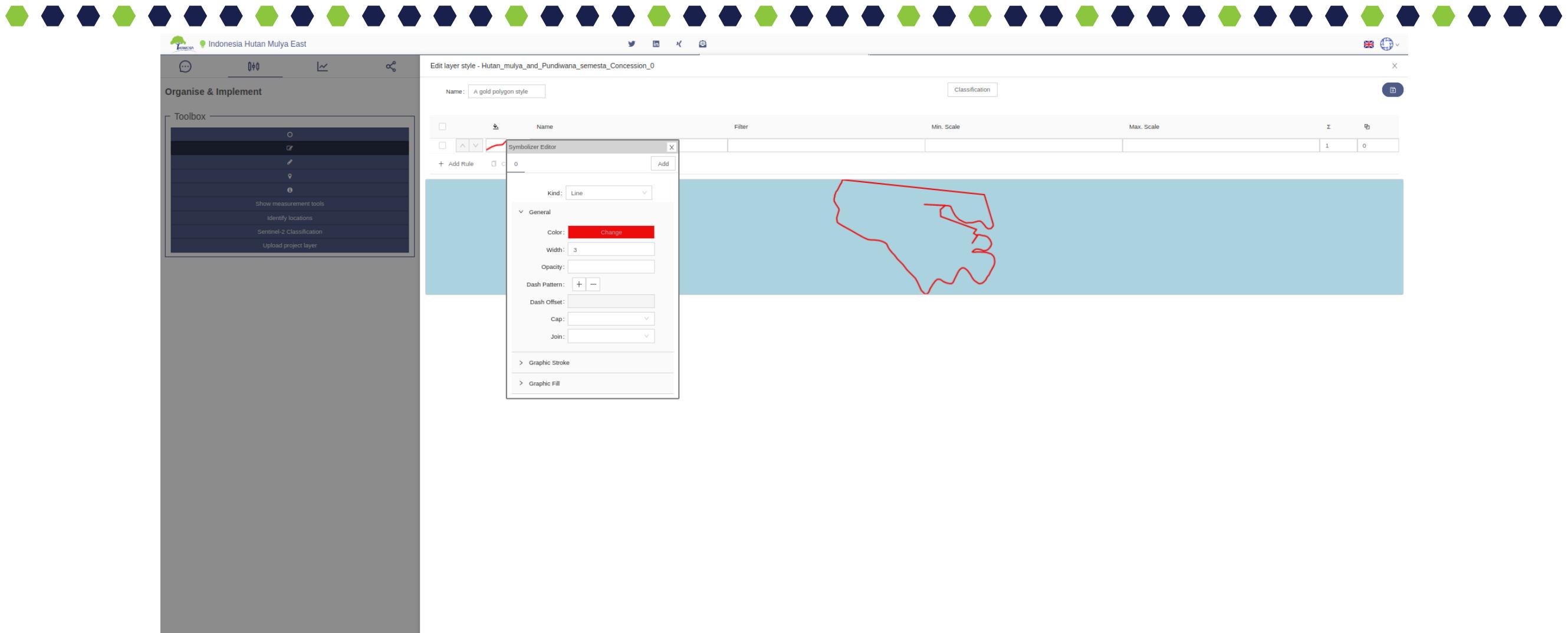
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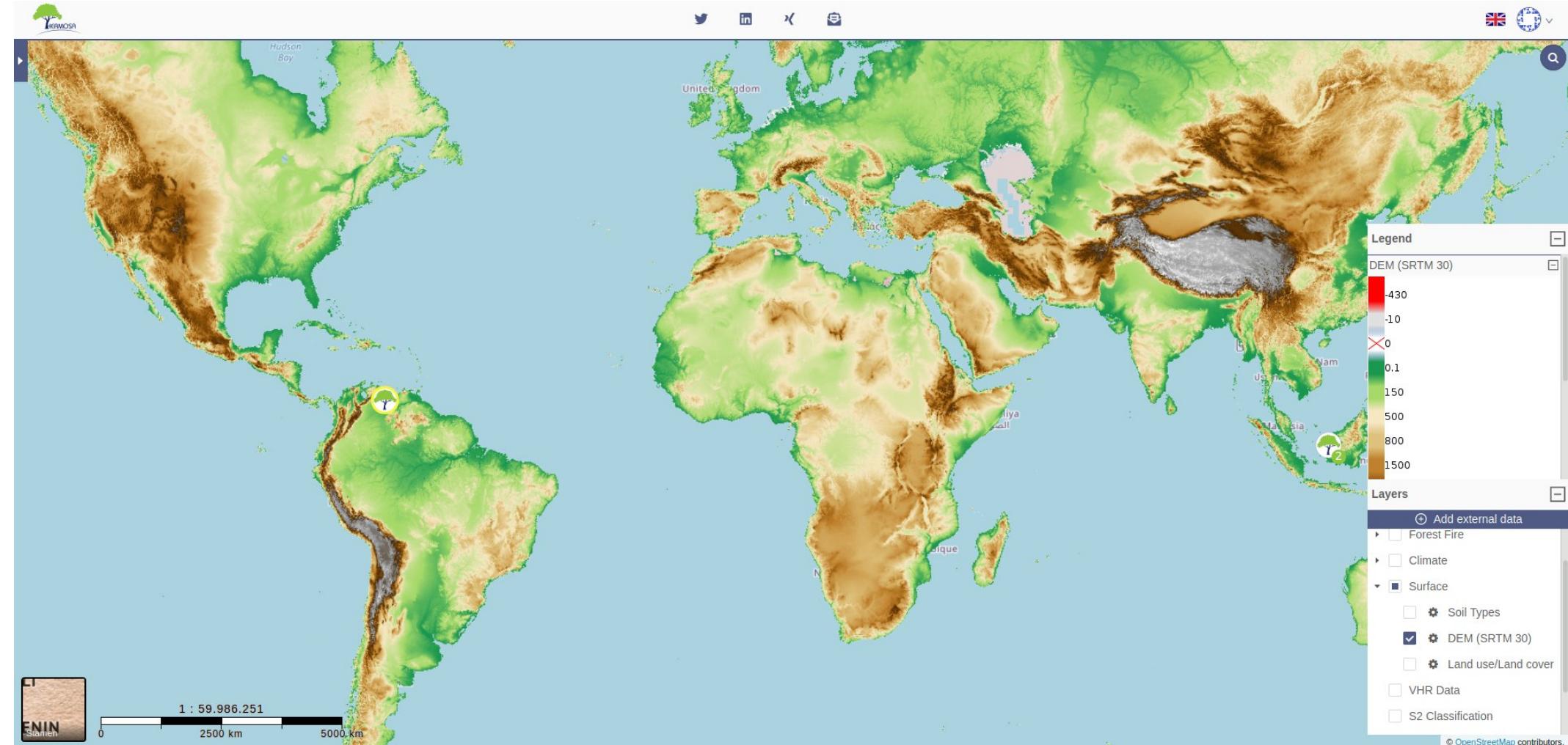
# Display own geodata



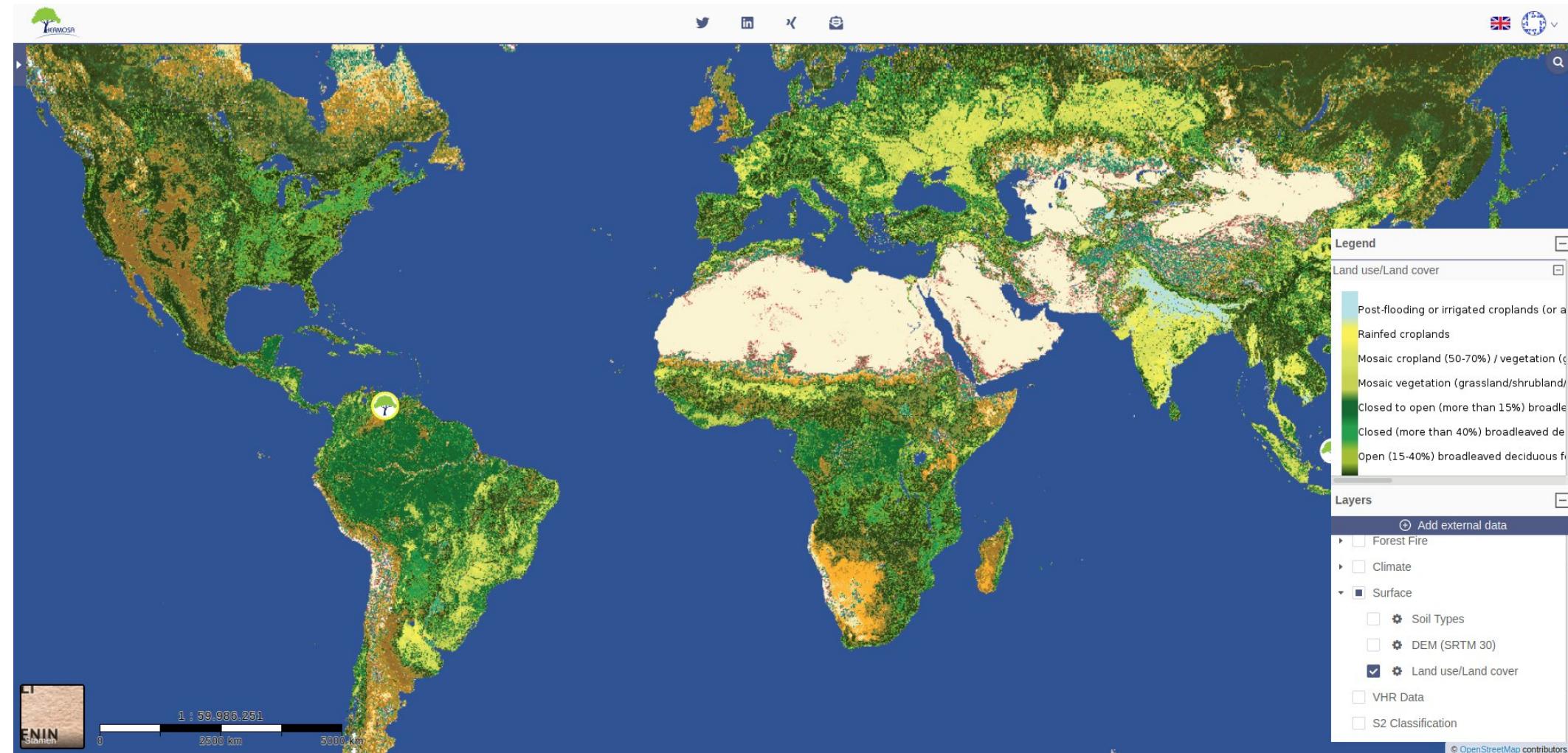
# Modify own geodata



# Easily access global datasets – e. g. DEM



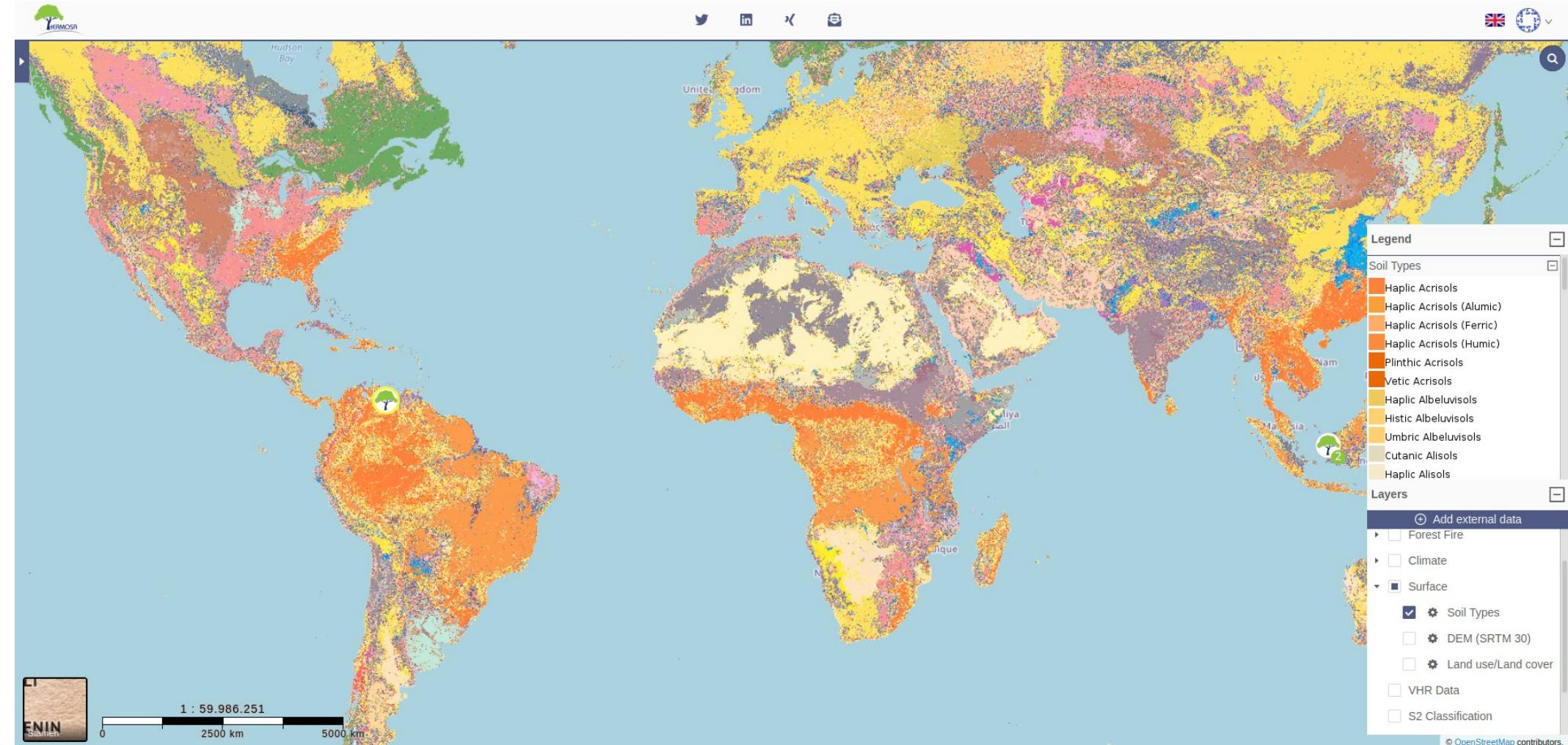
# Easily access global datasets – e. g. LULC





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# Easily access global datasets – e. g. Soil Types





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# Create training data for EO data classification





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# Dynamically calculate classifications using free satellite data, e. g. Copernicus programme

The screenshot shows the HERMOSA web application interface. The top navigation bar includes the HERMOSA logo, project name "Indonesia Hutan Mulya East", social media icons, and a language selector. The main interface features a satellite map of a forested area with a green polygon highlighting a specific region. Within this polygon, several orange diamond-shaped points are scattered. On the left, a "Toolbox" panel contains various tools and parameters for classification, such as "Sentinel-2 Classification" which is currently selected. The right side of the interface displays a "Layers" panel with a list of available data sources, including "S2 Classification" with two selected options: "HP\_FNF\_2020" and "NFF\_hutan\_mulya\_2019". A legend at the bottom left identifies "OSM" and shows a scale bar from 0 to 2 km.

# Utilize classifications at different points in time to compute change detection



Layer name ②:

Number of points per class ②:

 Training percent ②:  
  0 25 50 75 100

Start date ②: End date ②: **July 2019**

Cloud coverage ②:

 Cloud threshold ②:  
 0 25 50 75 100

Layer name ②:

Number of points per class ②:

 Training percent ②:  
  0 25 50 75 100

Start date ②: End date ②: **July 2020**

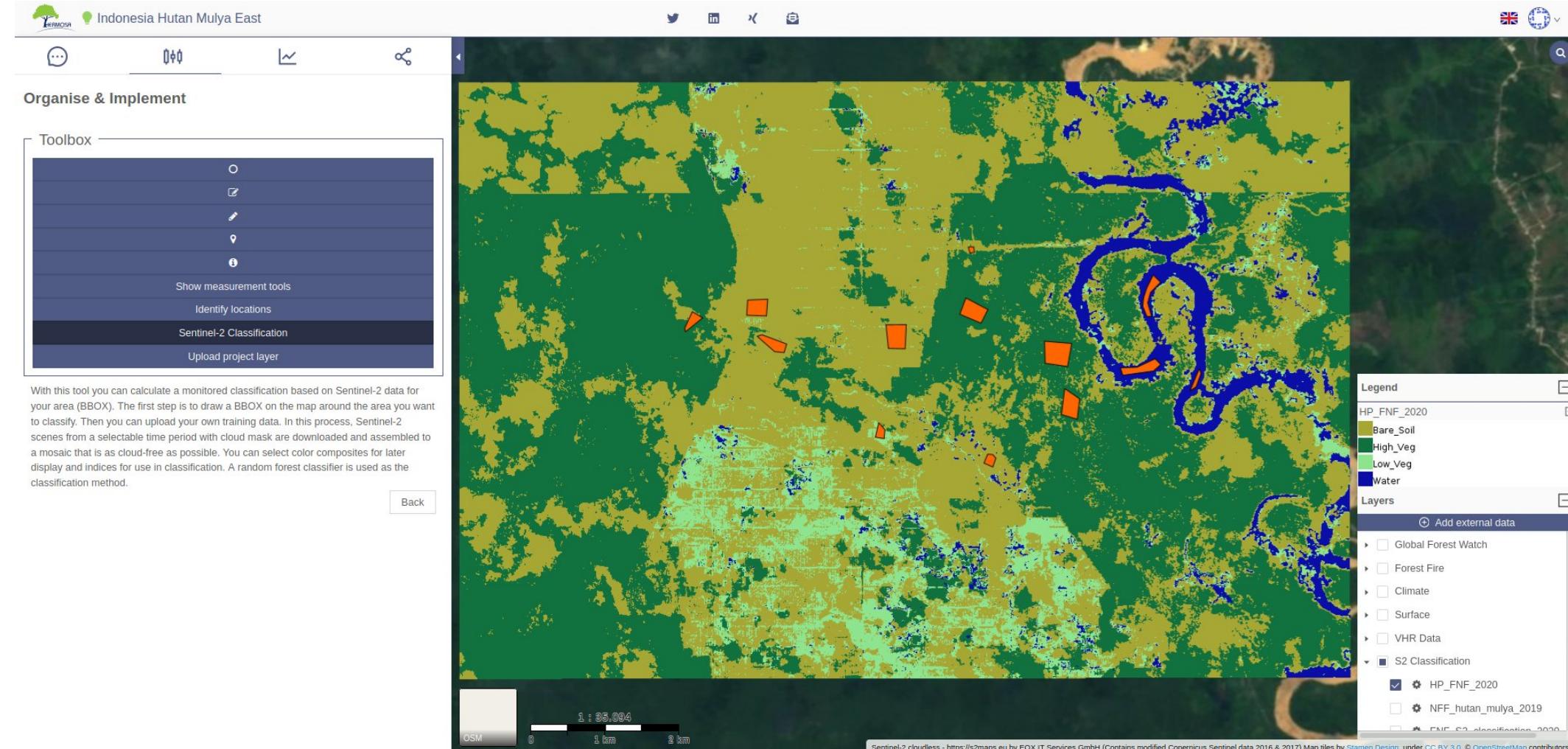
Cloud coverage ②:

 Cloud threshold ②:  
 0 25 50 75 100



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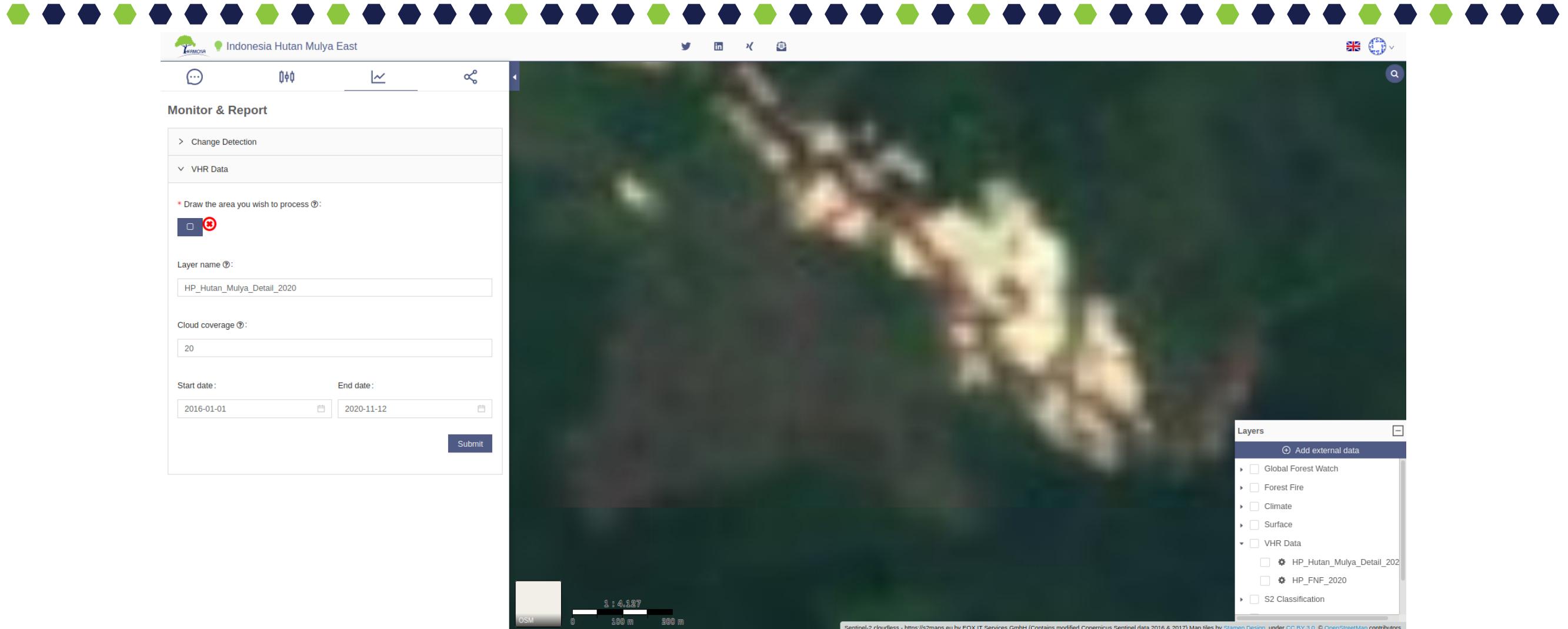
# Calculations can be repeated as often as necessary and results are used in the reporting





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# HR data is sometimes not good enough





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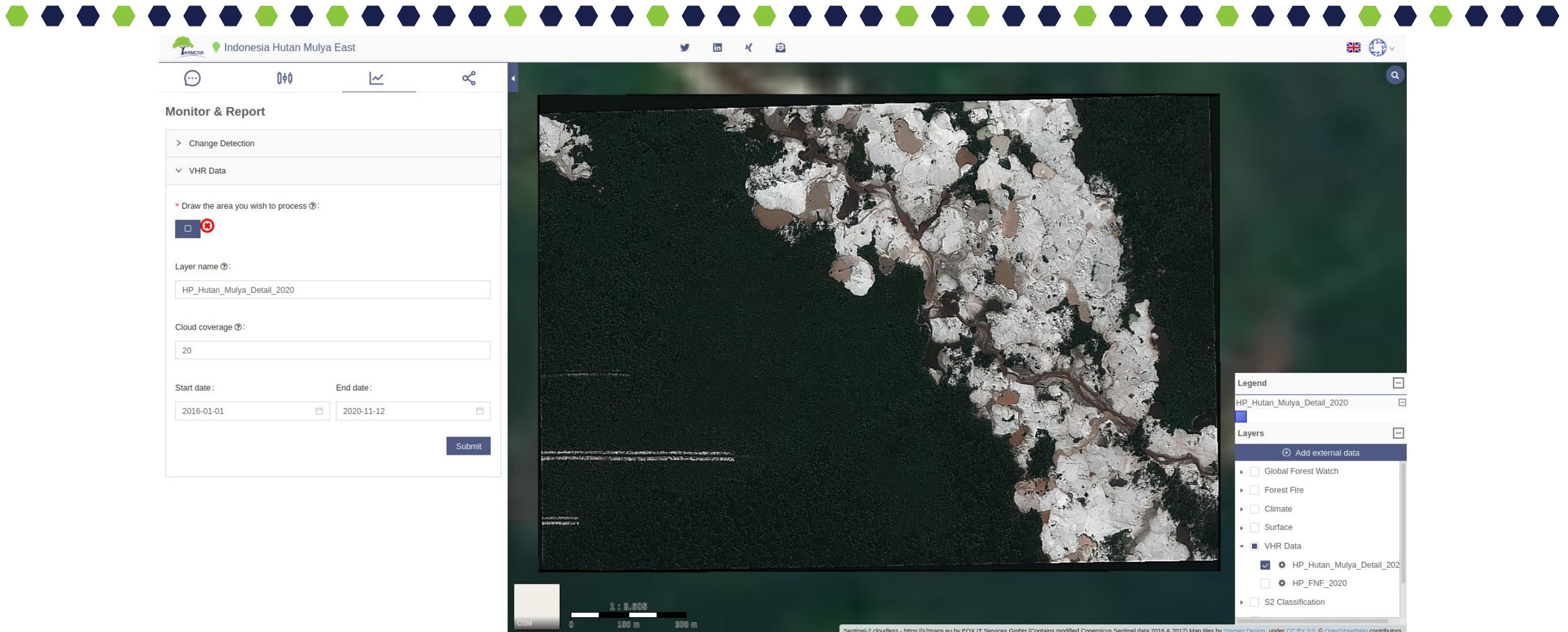
# Access VHR data through the API

The screenshot shows the HERMOSA web application interface. At the top, there is a decorative header consisting of a repeating pattern of green and dark blue hexagonal shapes. Below this is the main header bar with the HERMOSA logo, the text "Indonesia Hutan Mulya East", and social media sharing icons. The left side features a sidebar titled "Monitor & Report" with sections for "Change Detection" and "VHR Data". It includes fields for "Layer name" (set to "HP\_Hutan\_Mulya\_Detail\_2020"), "Cloud coverage" (set to 20), and date ranges from "Start date: 2016-01-01" to "End date: 2020-11-12". A "Submit" button is located at the bottom of this sidebar. The central part of the screen displays a map of a forest area with a large red rectangular overlay indicating a processing area. The map includes a scale bar (1:4,127) and distance markers (0, 100 m, 200 m). The bottom of the map has a footer note: "Sentinel-2 cloudless - https://s2maps.eu by EOX IT Services GmbH (Contains modified Copernicus Sentinel data 2016 & 2017) Map tiles by Stamen Design, under CC BY 3.0. © OpenStreetMap contributors." On the right side, there is a "Layers" panel with a tree icon and a "Add external data" button. Under "VHR Data", two layers are listed: "HP\_Hutan\_Mulya\_Detail\_2020" and "HP\_FNF\_2020". Other layers listed include Global Forest Watch, Forest Fire, Climate, Surface, and S2 Classification.



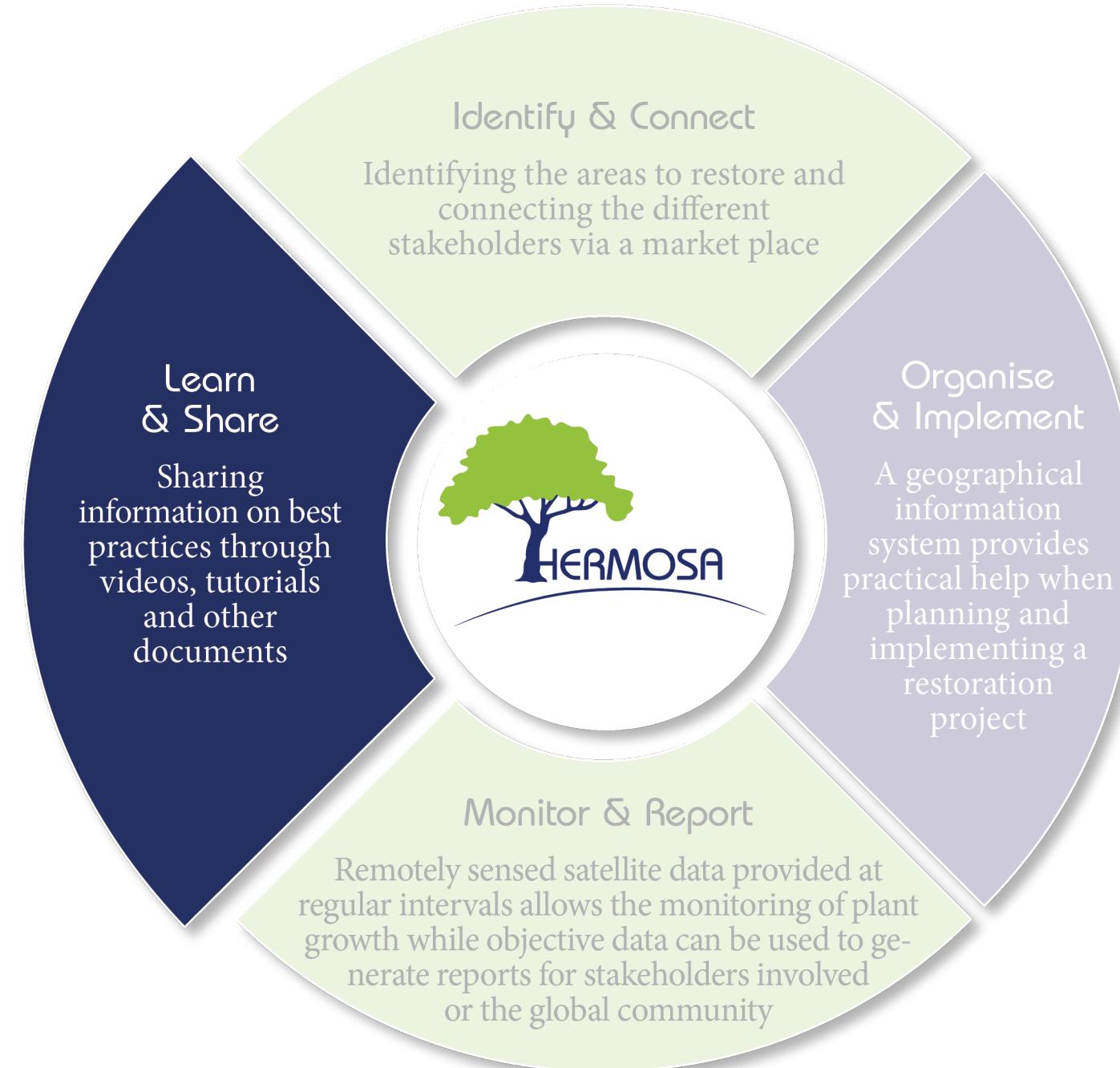
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# Spatial resolution down to 0.5 meters





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# Sharing own knowledge

The screenshot shows the HERMOSA platform interface. At the top, there is a decorative bar consisting of a repeating pattern of green and dark blue hexagons. Below this is a header with the HERMOSA logo (a tree icon), social sharing icons (Twitter, LinkedIn, X, Email), and a language selector (UK, DE). The main area has two sections: a left sidebar titled "Learn & Share" displaying a list of blog posts, and a right panel for creating a new blog post.

**Left Sidebar (Learn & Share):**

- Blog post: "agroforestry system: cashcrops ...", by admin, with tags: cashcrops, jabon tree, social forestry. It includes a thumbnail image of a field.
- Blog post: "Uganda still has one of the highe...", by admin, with tags: sustainable forestry, planta tree, deforestation. It includes a thumbnail image of a landscape.

**Right Panel (New blog post):**

**Title:** How to digitize boundaries

**Content (markdown):**

```
### Step 1: Go to http://geojson.io on the internet
### Step 2: Click on 'New' (see purple area in image above) to start the
digitization of your area (e.g. national park), point (e.g. peak of a mountain) or
line (e.g. new path)
Step 3: Navigate to your area of interest
There are several ways of positioning the map on your area of interest:
• use the mouse wheel to zoom in and zoom out
• use the '-' or '+' buttons on the right hand upper side of the map (see red
area in image above)
• left-click with the mouse and then drag the map to the desired position
• use the location search (click on the magnifying glass in the red area in the
image above) and type in a town close to your area of interest
```

**Tags:** geoinformation

**Logo:** blogpost logo

**Location:** [input field]



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# Communicating about the success stories



HERMOSA

Learn & Share

New blog post

Filter blog posts

agroforestry system: cashcrops ...  
... by admin

cashcrops jabon tree social forestry

Uganda still has one of the highe...  
... by admin

sustainable forestry planta tree deforestation


Blog post - agroforestry system: cashcrops peanuts and Jabon tree reforestation Indonesia

Overview Media

agroforestry system:  
cashcrops peanuts  
and Jabon tree  
reforestation  
Indonesia  
... by admin

Jabon trees are planted and surrounded by the peanuts! 🥜 🌳

This is what we called agroforestry, by plating another cash crops that can be harvested in such a short time between the trees. 🌳 🌳 The farmers can use their land better in more effective way and getting another income within such a short time by planting the cash crops. 🌳 🌳 -> check: [https://wwf.panda.org/our\\_work/our\\_focus/freshwater\\_practice/freshwater\\_news/?364413%2FBlueprints-for-bankable-nature-solutions-to-help-tackle-nature-and-climate-crises](https://wwf.panda.org/our_work/our_focus/freshwater_practice/freshwater_news/?364413%2FBlueprints-for-bankable-nature-solutions-to-help-tackle-nature-and-climate-crises)



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# Current status and outlook



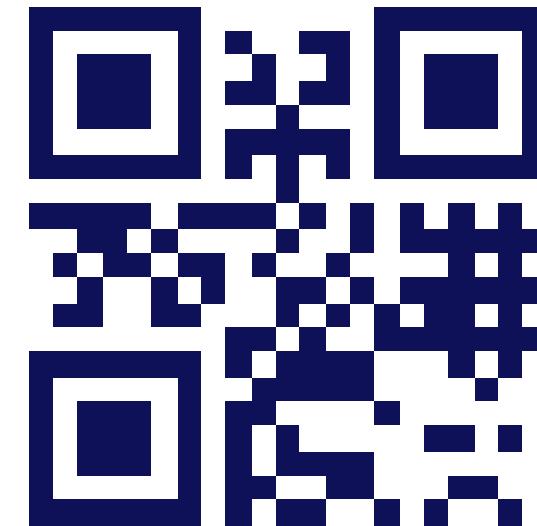
- HERMOSA is not finished yet!
- Work is ongoing to improve functionality and usability
- HERMOSA is based on international standards and aims to be open and inclusive
- Users are welcome to try out the platform
- Production-ready by the start of the UN Decade on Ecosystem Restoration in 2021
- Please visit <https://hermosa.mundialis.de> for more information

# Thank you for watching and listening! Please contact us for any questions.



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