

ORBIFY SAMPLE NbS PROJECT REPORT

2023

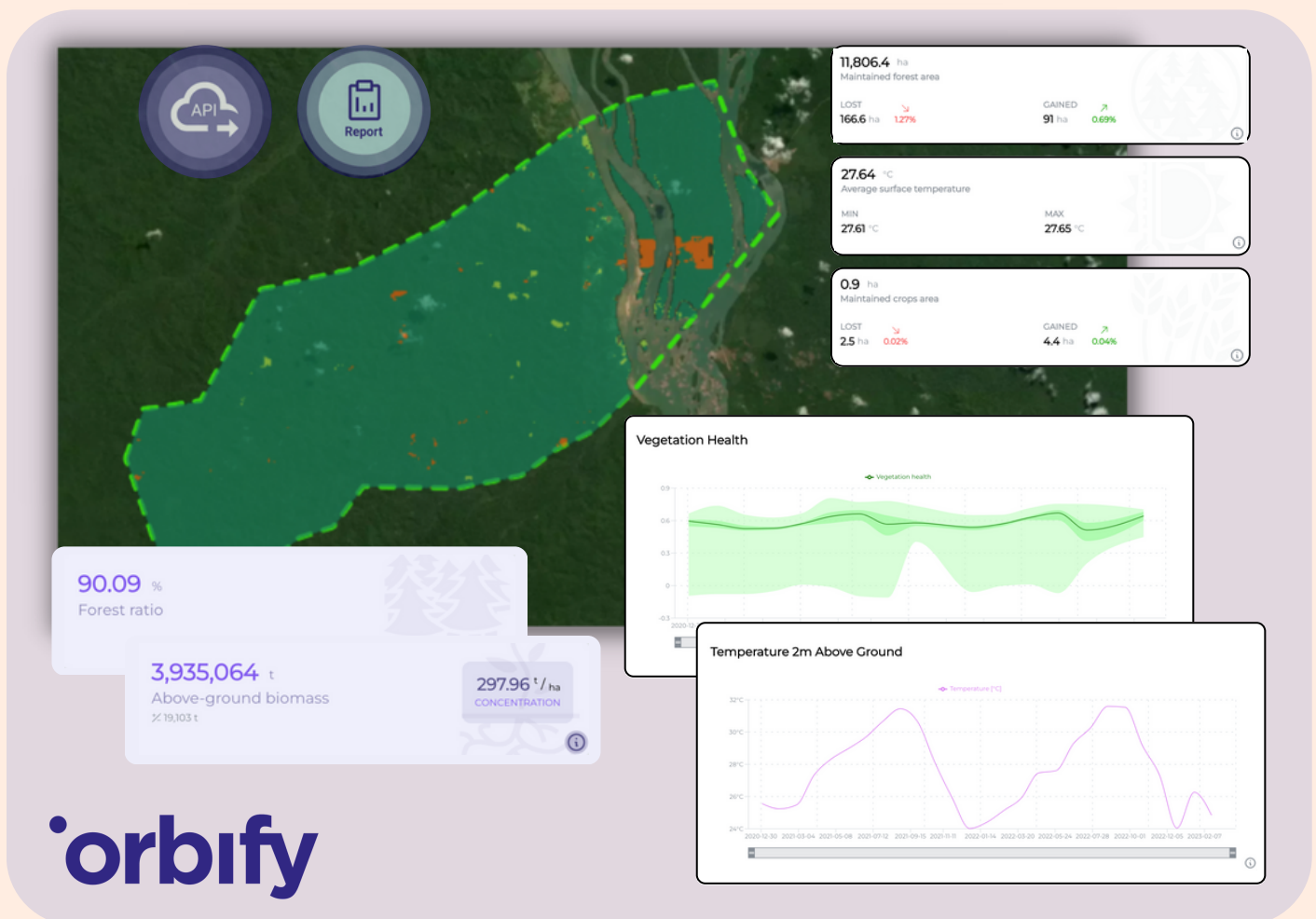


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INTRODUCTION

Orbify Geospatial Platform is an innovative solution for evaluating, monitoring, and marketing natural assets.

Our platform uses three types of satellite imagery to conduct the analysis:

1- Optical imagery provided by

- Multiple providers, primarily the [Copernicus Sentinel-2](#) mission, launched by European Space Agency, and the Landsat program operated by NASA. As needed, supplemented with data coming from commercial providers like [Axelspace](#) or [Planet](#) to ensure high enough revisit time and spatial resolution appropriate for the specific project. All satellites provide imagery in, at least, four basic bands (visible red, green, and blue, and near- infrared), while the Sentinel-2 mission goes up to 10m spatial resolution and 13 bands of spectral resolution (besides visible and near-infrared, e.g., vegetation red edge and short-wave infrared).

2- LiDAR (Light Detection and Ranging) for measuring forest canopy height, canopy vertical structure, and surface elevation, obtained from

[NASA's GEDI](#) (Global Ecosystem Dynamics Investigation) mission that uses an instrument attached to the International Space Station

3- SAR (Radar) – from multiple providers primarily [the European Space Agency's Sentinel-1 SAR](#) (Synthetic Aperture Radar) satellite operating in the C-band spectrum providing a 10m spatial resolution and 12-day temporal resolution, supplemented by commercial imagery as needed.

The data is interpreted by machine learning, regression and classification models. When available we make use of in-situ measurements serving as the source of ground truth and calibration.

AVAILABLE INDICATORS



Land Use Analysis

- Project & buffer area mapping
- Change analysis
- Change patterns



Vegetation Condition

- AGB for carbon stock assessment
- Canopy Height
- Forest Canopy Cover
- Vegetation Health
- Vegetation Stress index



Environmental Conditions

- Air quality
- Water quality
- Freshwater resources mapping
- Humidity
- Temperature
- Wind



Natural & Anthropogenic Hazards

- Drought analysis
- Air pollution analysis
- Flood analysis
- Landslide analysis
- Thermal extremes
- Wildfire analysis



Biodiversity Classification

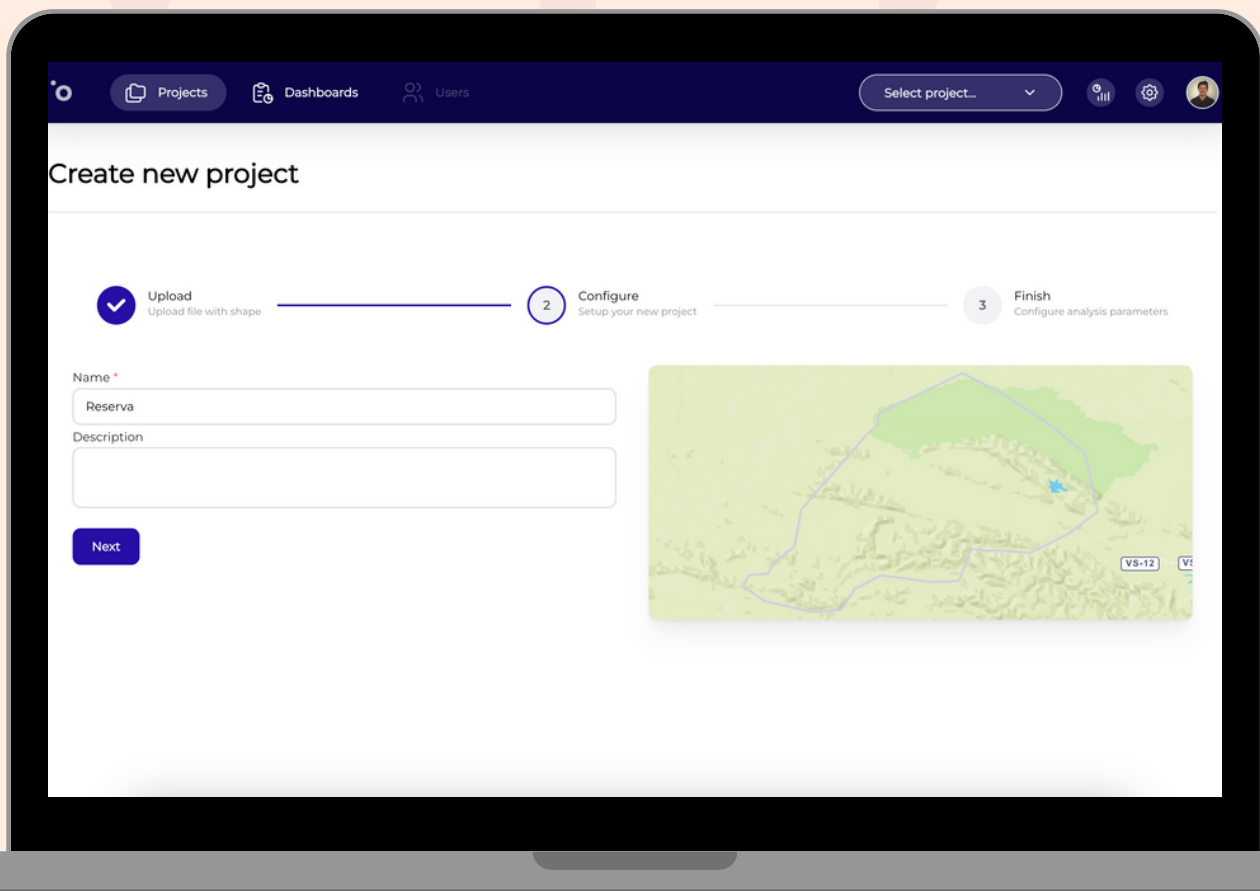
- Distribution of biodiversity

USER MANUAL

On the Orbify Geospatial Platform dashboard, users can easily access detailed information for each of the featured indicators. This information includes the data type, accuracy level, spatial resolution, temporal resolution, description, credits, and license.

This level of transparency allows users to fully understand the data and analysis being presented, and to confidently use the insights gained for decision-making purposes.

Whether assessing land use patterns, estimating carbon stock, or monitoring biodiversity, users can be assured of the quality and reliability of the data being presented.

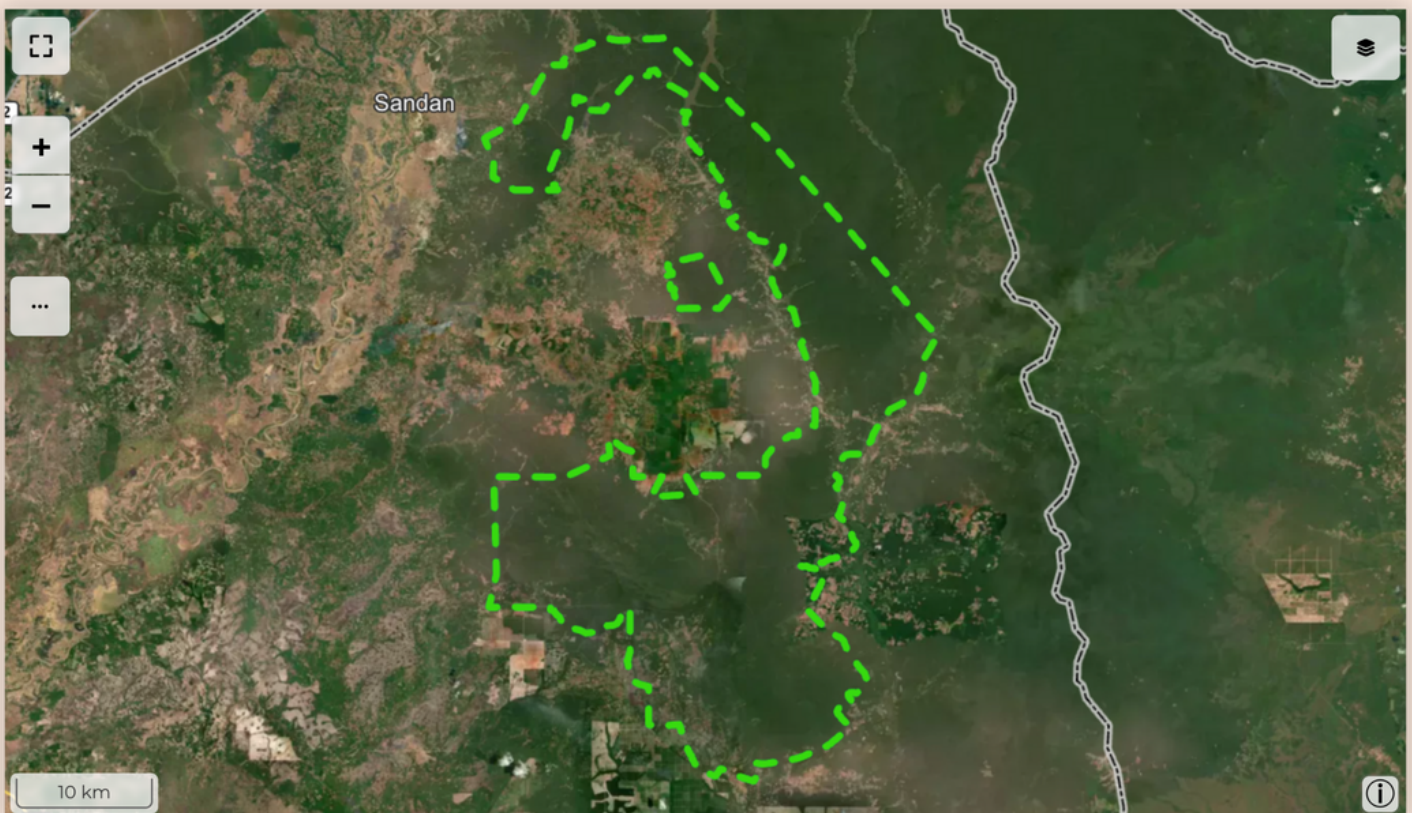


PROJECT REPORT

Project Information

This sample report is featuring TUMRING REDD+ PROJECT (TRP) , located in Kampong Thom, in the central part of Cambodia, to the west of the Mekong River. The project is developed by The Royal Government of Cambodia, Forestry Administration Kandall and Wildlife Works, and listed on [Verra Registry](#).

- VCS Project Type: Agriculture Forestry and Other Land Use
- AFOLU Activity: REDD
- VCS Methodology: VM0009
- Hectares: 41,196 ha
- Project Crediting Period Term: 1st, 01/01/2015 - 31/12/2044



PROJECT REPORT

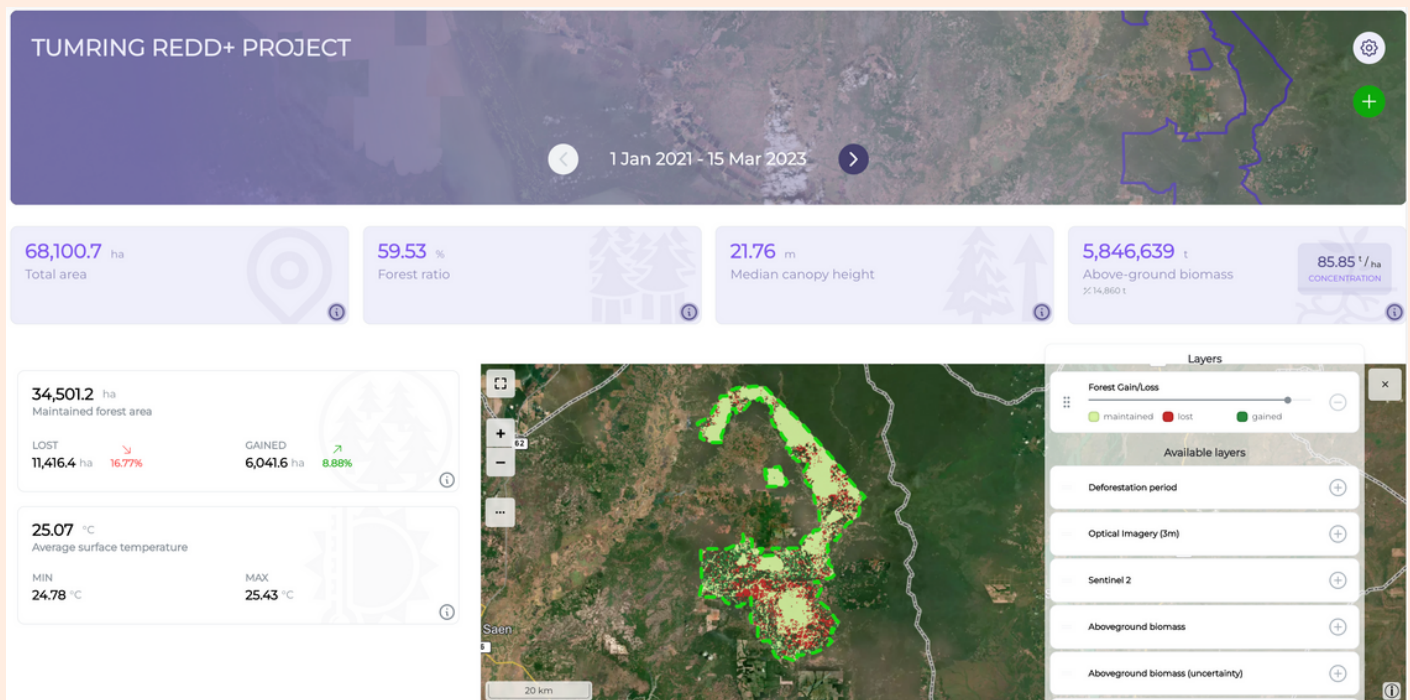
Project Information

Essential Geospatial Indicators

After uploading the shapefile of the project zone (which includes the project accounting area), that can be found on the [Verra](#) project page, we can see the dashboard and map with the indicators.

- Total area = 68,100.70 ha
- Forest ratio = 59.53%
- Maintained forest = 34,501.2 ha
 - Forest loss = 11,416.4 ha (16.77%)
 - Forest gain = 6,041.6 ha (8.88%)
- Median canopy height = 21.76m
- Above ground biomass = 5,846,639 t
 - Concentration = 85.85 t/ha

Period: Jan/2021 - Mar/2023



PROJECT REPORT

Description

TUMRING REDD+ PROJECT

The TUMRING REDD+ PROJECT (TRP) is a project in Cambodia covering 68.100,70 hectares on the southwestern edge of the PLWS (Prey Long Wildlife Sanctuary). 41,196 ha is the project accounting area, which is the real area used for the project emissions avoidance. The PLWS is a primary watershed for central Cambodia, regulating water and sediment flow to the Mekong River and Tonle Sap Lake. The area contains the largest remaining lowland evergreen forest in Cambodia, and is home to many endangered species. Over 700,000 Cambodians rely on these watersheds for irrigation, and the region is important for agriculture and densely populated. More than 250,000 people, mainly indigenous Kuy, live in or near the forests. The project was open for public comment from 25 November to 25 December 2019 for its first CCB verification.

The TRP aims to reduce forest clearing and logging in the Project area by establishing community forests. The forests under threat of deforestation are given to the local community to manage. Each community forest enters into a Conservation Agreement with the FA (Forest Administration) to protect the forests and meet the needs of local communities. The project also supports small-scale farming to increase productivity and reduce the need for deforestation. The FA is strengthening its enforcement and patrol teams to manage the complex dynamics of local populations, and promoting conservation awareness among locals. A long-term strategic action plan is in place to address underlying causes of deforestation and forest degradation, including effective forest land-use planning, managing migration, and stakeholder engagement.

PROJECT REPORT

Methodology

Satellite analysis was carried out using a geospatial data platform developed by Orbify, Inc. (USA).

Orbify platform uses three types of satellite imagery to conduct vegetation assessment:

1. a. b. 2. 3. The data is interpreted by machine learning regression and classification models, trained with in-situ measurements serving as the source of ground truth and calibration, using all bands described below when they are relevant as input signals for calculating respective vegetation indicators.

1- Optical imagery provided by

- Multiple providers, primarily the Copernicus Sentinel-2 mission, launched by European Space Agency, and the Landsat program operated by NASA. As needed, supplemented with data coming from commercial providers like Axelspace or Planet to ensure high enough revisit time and spatial resolution appropriate for the specific project. All satellites provide imagery in, at least, four basic bands (visible red, green, and blue, and near- infrared), while the Sentinel-2 mission goes up to 10m spatial resolution and 13 bands of spectral resolution (besides visible and near-infrared, e.g., vegetation red edge and short-wave infrared).

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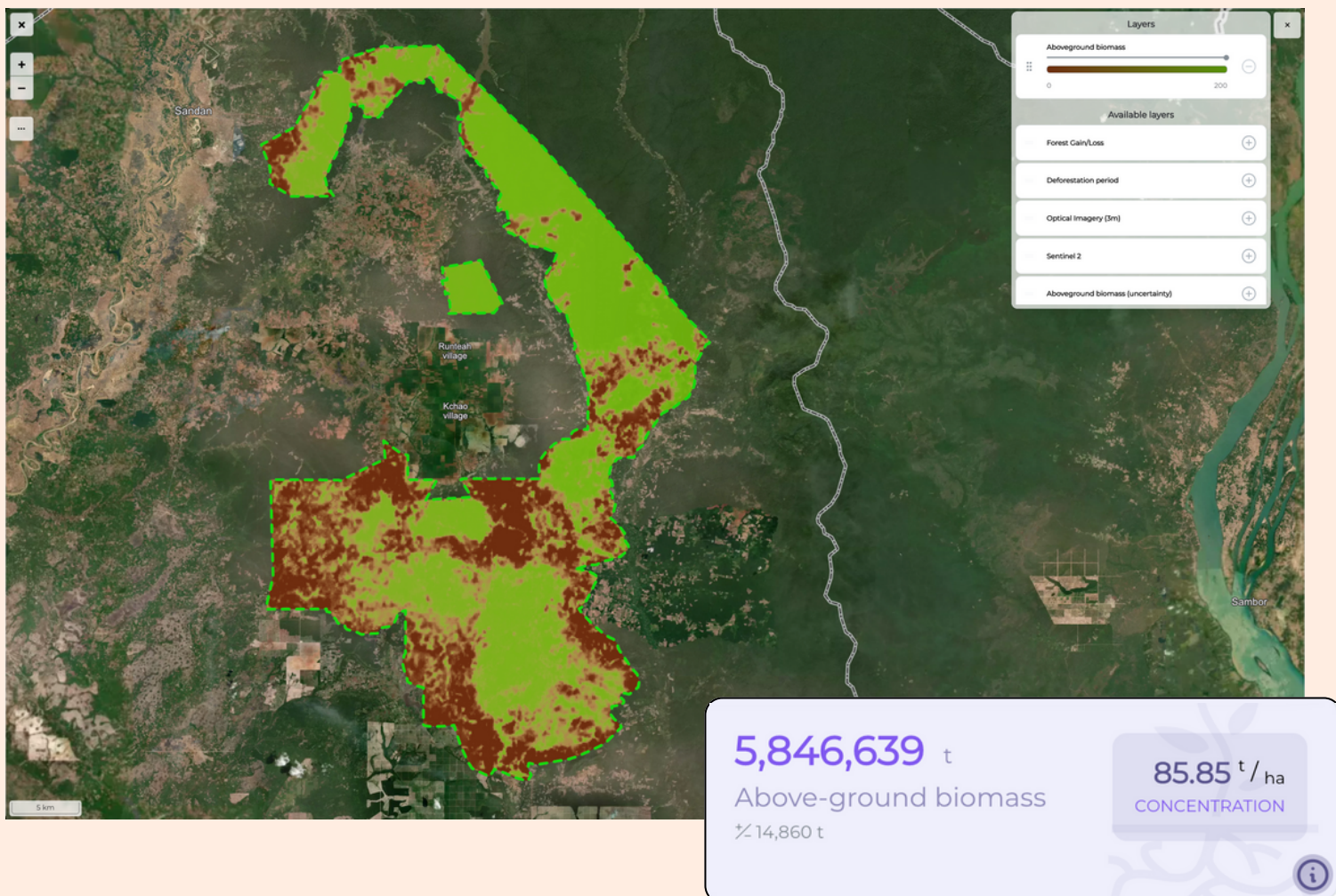
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Indicators

Above Ground Biomass

According to the ESA CCI Biomass Initiative data Santoro, M et al 2021 . At the Project Registration Date total above ground biomass was 5,846,000 Mg. That amounts to average AGB per hectare of 85.8 Mg/ha.

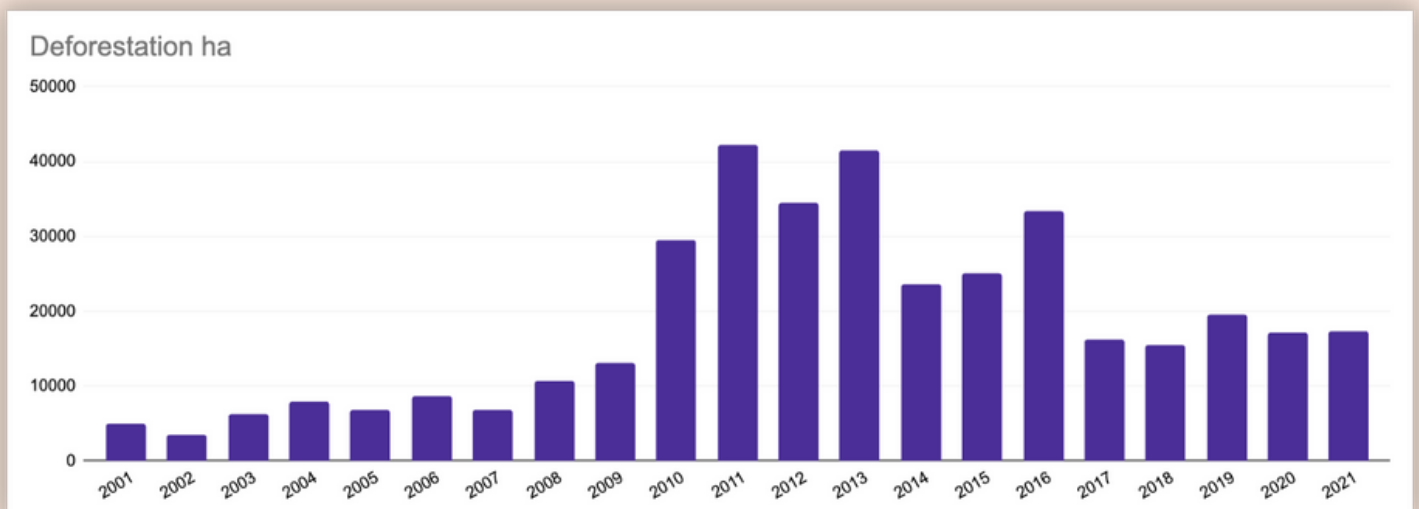
This translates to 157.4 MgCO₂eq/ha of stored carbon dioxide equivalent according to the conversion methodology outlined in “IPCC Good Practice Guidance for LULUCF”



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Deforestation Rate

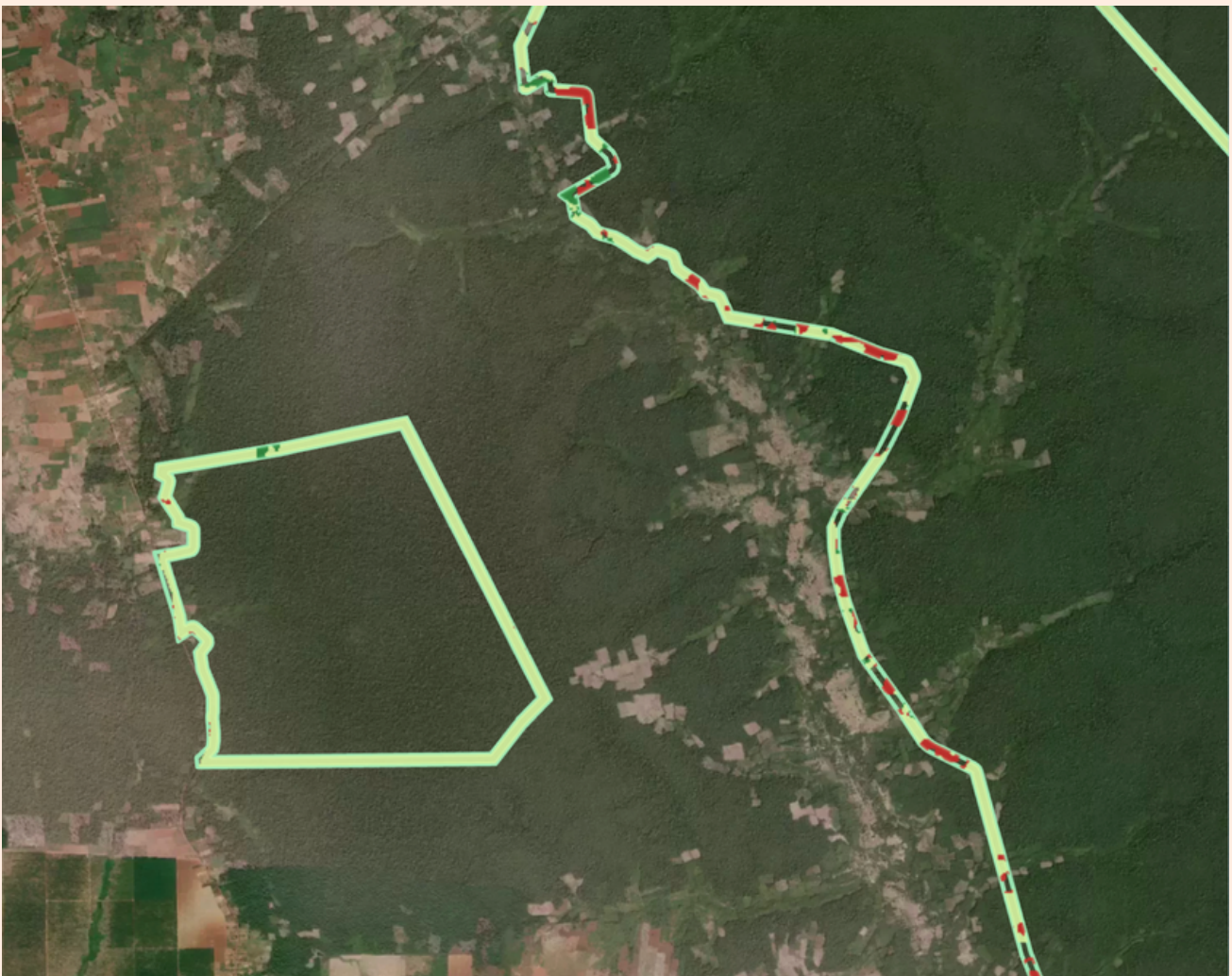
According to the project methodology one of the elements needed to establish the project baseline is the past deforestation rate in the province encapsulating the project in the Kampong Thom Province. The average deforestation rate in the 10 years before the project start (2005-2015) was 22,000 ha/year considering the Hansen data set for the analysis, with 80% of it happening in the later half of the period.



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After analyzing the project document, they extended their study to include the buffer zone around the project area, aiming to assess potential pressures and threats. We replicated their analysis using our platform and found that the project zone's boundaries are susceptible to specific threats. This discovery serves as an important alert for the project's overall safety.

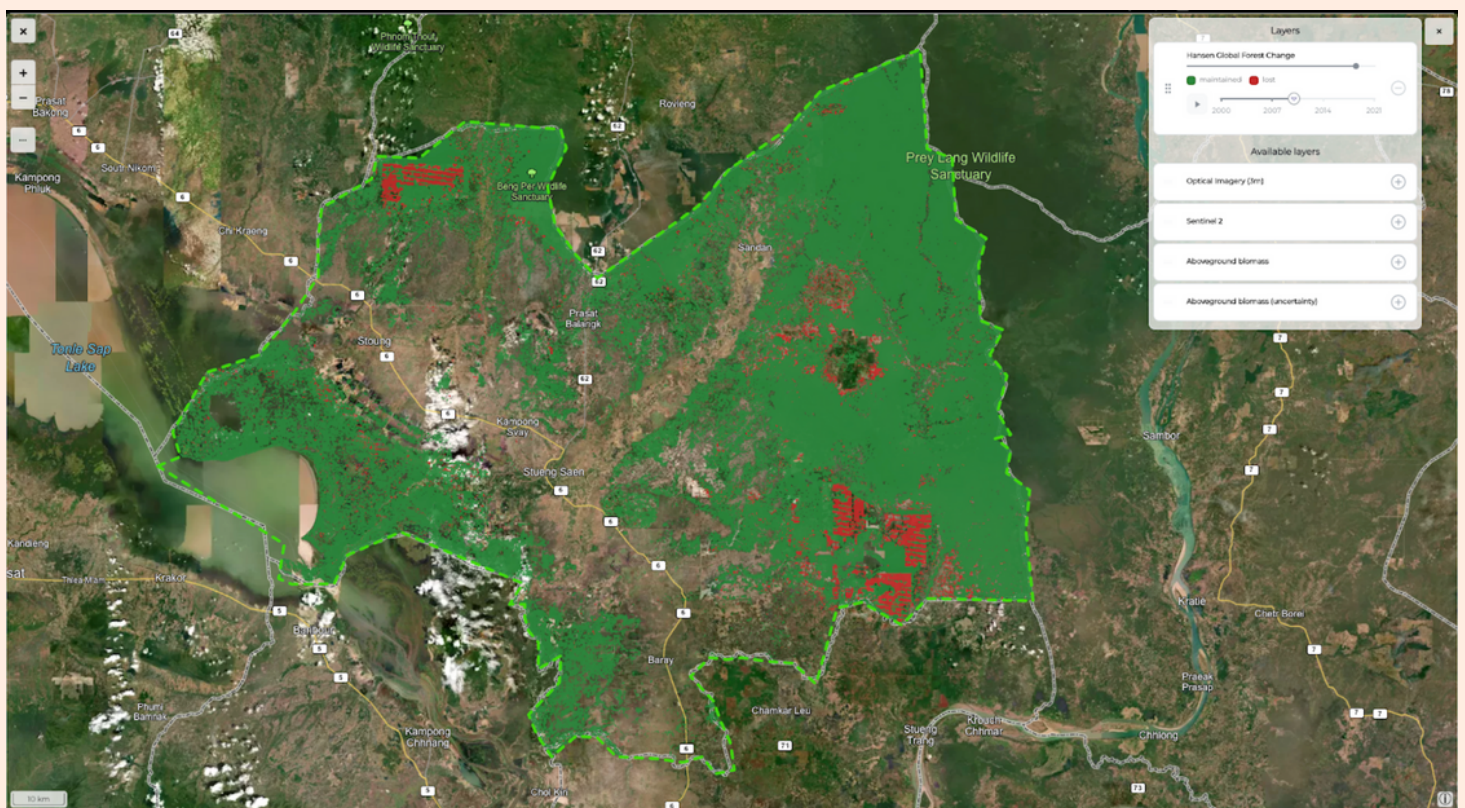
Figure below illustrates the deforestation at the region's edge: in red- forest lost since 2020.



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Global Forest Watch Dataset

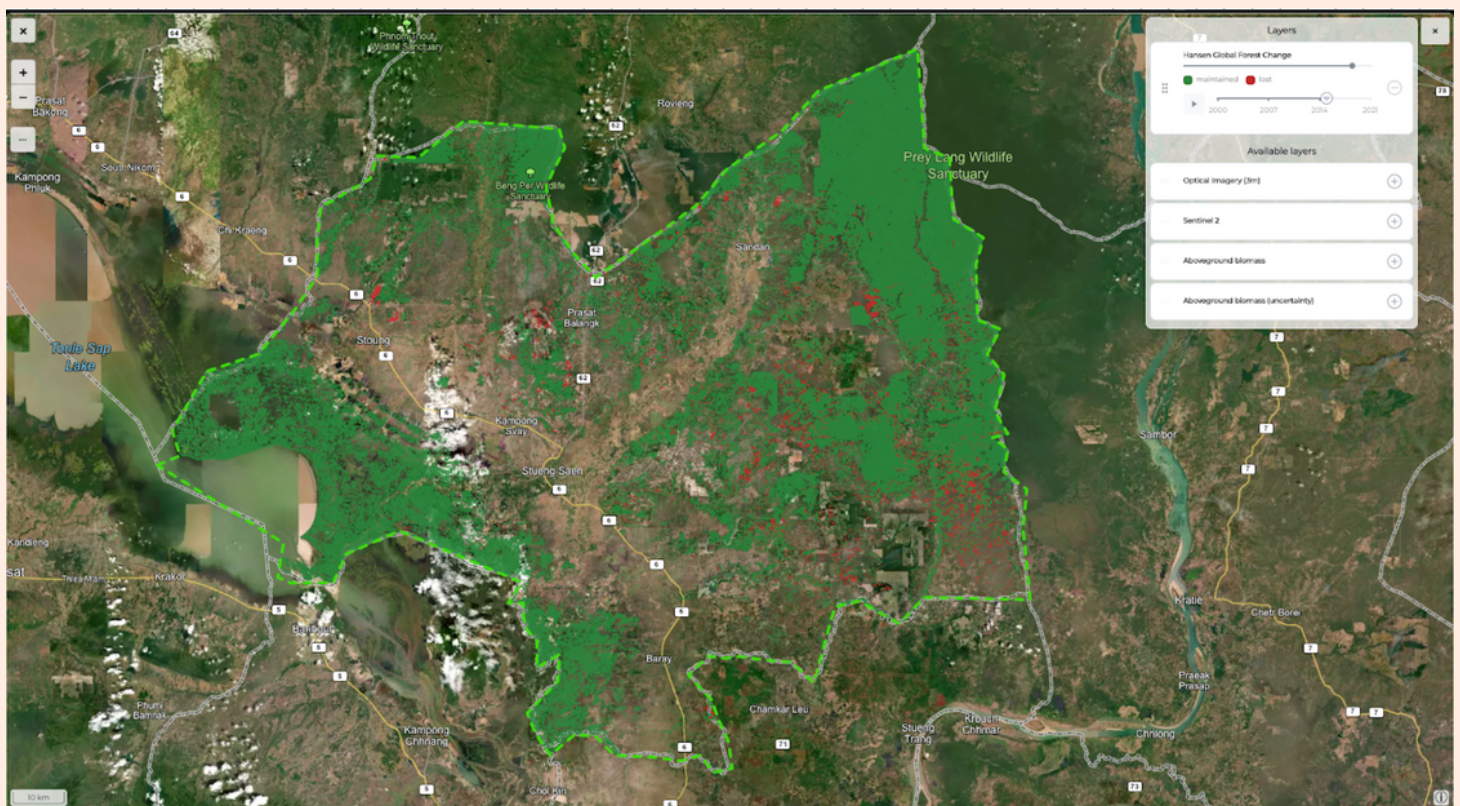
2. Kampong Thom Province, Deforestation in 2010 (red), and standing forest in green



PROJECT REPORT

Global Forest Watch Dataset

3. Kampong Thom Province, Deforestation in 2015 (red), and standing forest in green

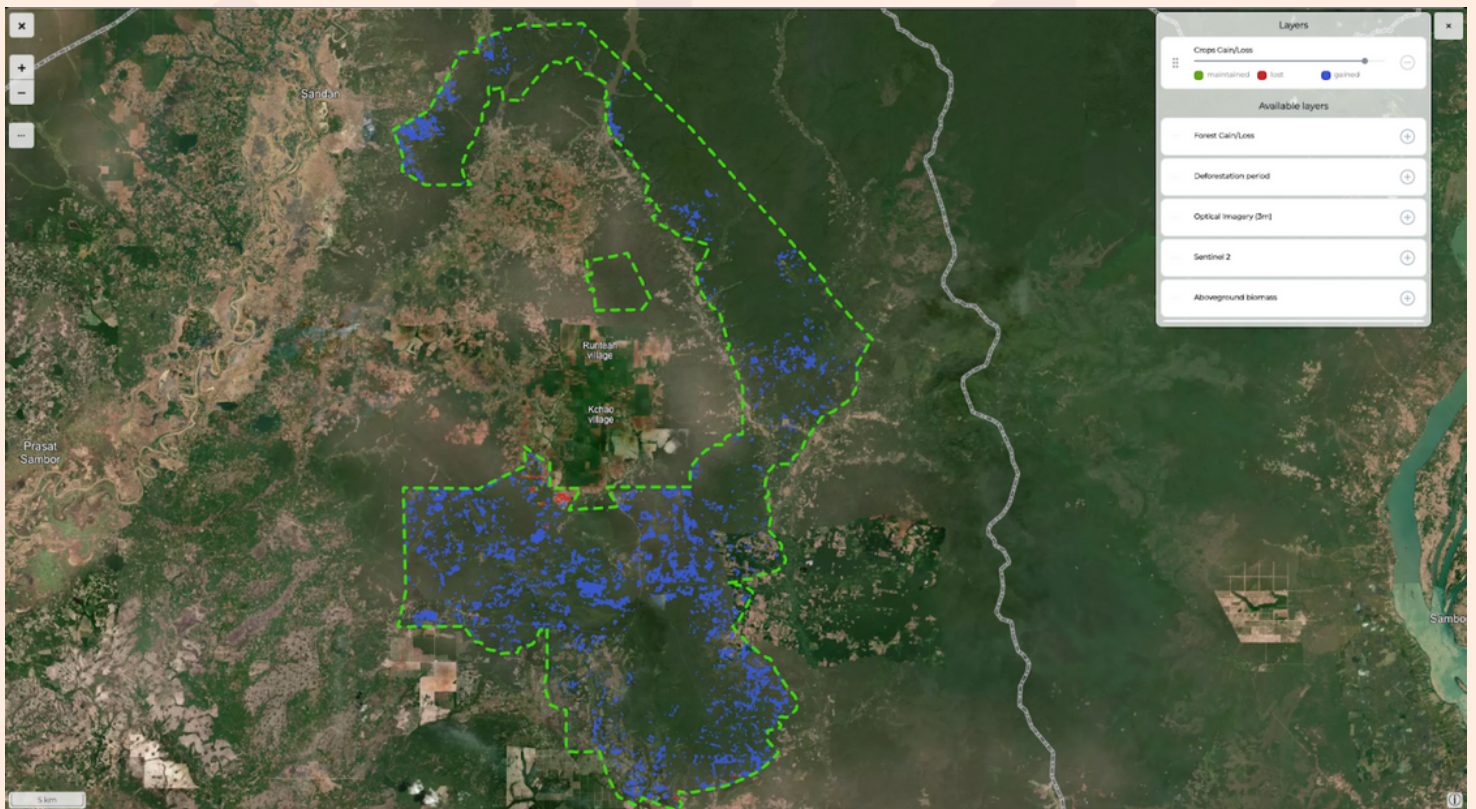


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Land use changes

The TRC project aims at mitigation of deforestation and land use change due to the population pressure from local communities. Therefore monitoring the expansion of subsistence farming is one of the key issues.

Following map illustrates expansion of agriculture land between 2015- 2023 (in blue)



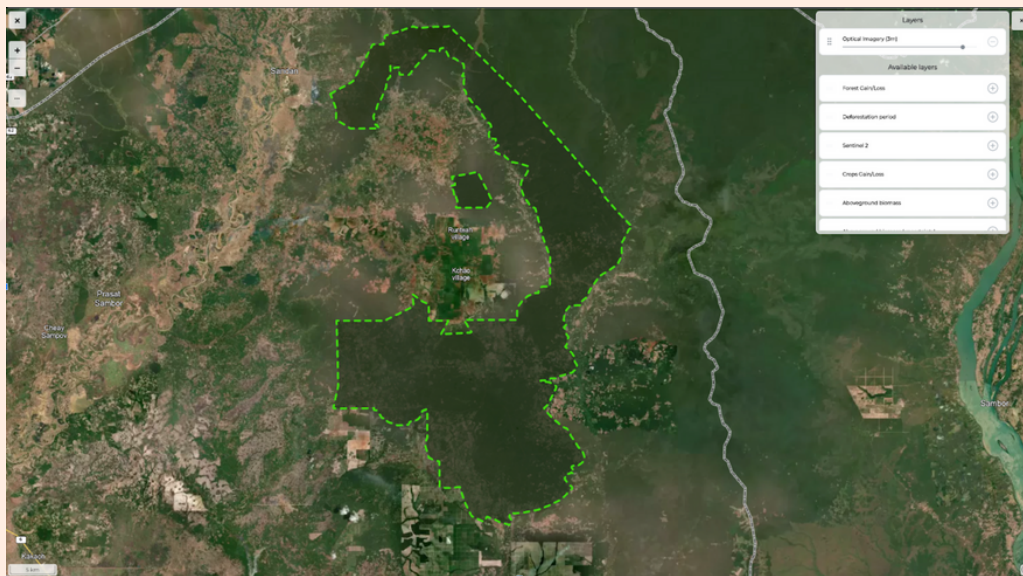
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3m resolution - Optical Imagery

Comparison of optical imagery with 3 m resolution of the project area. At the approximate project start (2015), and the current state as of May 2023.

Note that the actual data is presented inside the polygon boundaries where outside the static background is presented.

Despite the slight difference in the time of the year when the image was taken, we can see that the larger forest hand shrinks as well as smaller woody features had disappeared completely. This aligns with the findings from our platform. At the beginning of the project, the area covered 41,196 hectares. However, our analysis shows that the stable forest in that region has decreased to approximately 34,501 hectares today, indicating a loss of around 7,000 hectares over the course of the project. This change is also evident in the high-resolution images provided below.



2015 - Project start



2023 - Current state

PROJECT REPORT

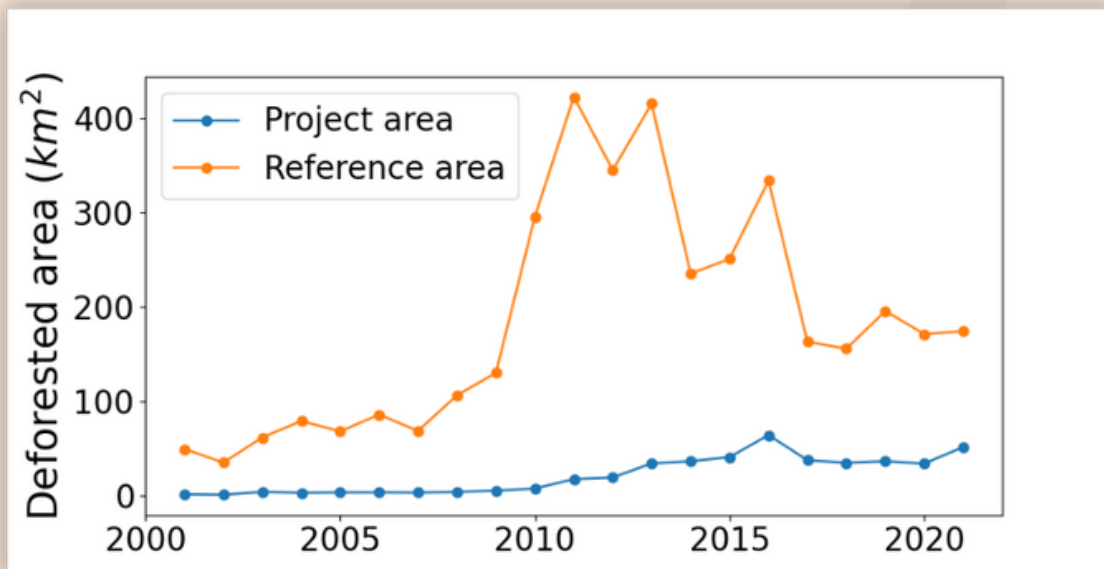
Wrap-up

In this report, we have presented some of the remote sensing products that can help with evaluating and monitoring the NBS projects.

We used the land use classification to track the land use change and expansion of subsistence farming. And encroachment on the project boundaries. The estimates of the above ground biomass as the rate of deforestation on the reference area are a key element for carbon stocks assessment as well as identification of most vulnerable and valuable ecosystems.

During the analysis, optical imagery was used to assess the difference in the project state after the initial eight years.

Lastly, we utilized past deforestation data for establishing the baseline deforestation rate in the juridical region encompassing the TUMRING REDD+ PROJECT.



WANT TO GET YOUR OWN REPORT?

Thank you for downloading the NbS sample report executed on Orbify Geospatial Data Platform (GDP).

If you're ready to take the next step and see how Orbify can help your projects, please book a customized demo with us.

Our team of experts is standing by to answer any questions you may have and create a personalized demo for you.

[Schedule your personalized demo here!](#)

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