

GEO WEEK & MINISTERIAL SUMMIT 2023

Workshop

#TheEarthTalks



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA



GEO WEEK
2023 MINISTERIAL
SUMMIT

GEO GROUP ON
EARTH OBSERVATIONS



**GEO
WEEK
2023**
MINISTERIAL
SUMMIT

#TheEarthTalks GEO WEEK & Ministerial Summit 2023

EO for EUDR

- The EU Forest Observatory on deforestation and forest degradation – EUFO
- A cocoa mapping use case

06/11/2023, 16:00 – 18:00, room: Daisy



Andreas Brink



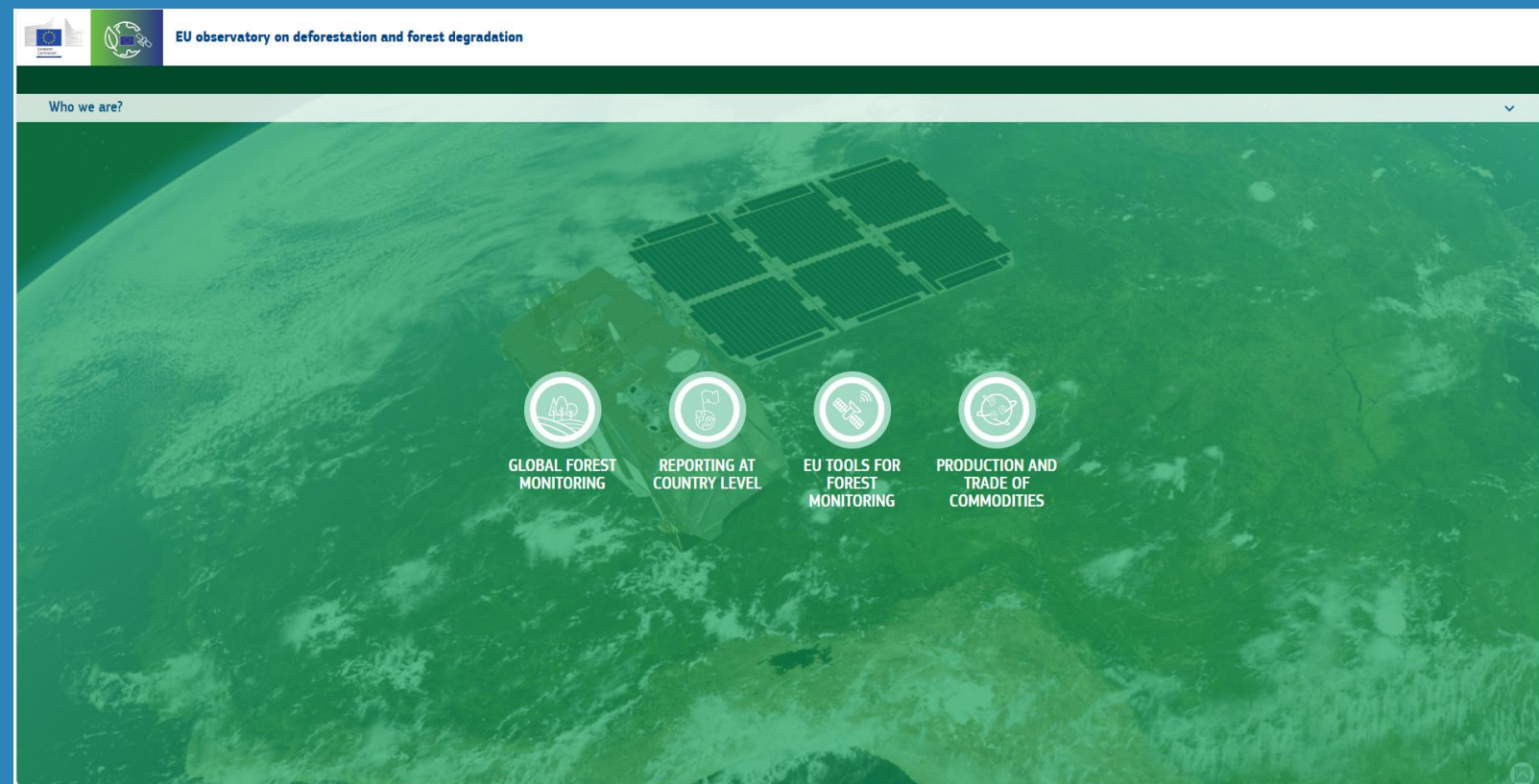
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EU Forest Observatory on deforestation and forest degradation - EUFO

Developed by the JRC



EUFO – “legal basis”

Introduced in COM(2019) 352 final “Stepping up EU Action to Protect and Restore the World’s Forest” as action by the Commission

- “The Commission will [...] establish an **EU Observatory on deforestation, forest degradation, changes in the world’s forest cover, and associated drivers**. The objective of this is to **facilitate access to information on supply chains** for public entities, consumers and businesses.”

Noted in Regulation (EU) 2023/1115 on Deforestation-free supply chains:

- “The EU Observatory should **facilitate access to information on supply chains** for public entities, consumers and business, **providing easy-to-understand data and information** linking deforestation, forest degradation and changes in the world’s forest cover to Union demand for, and trade in, commodities and products. The EU Observatory should thus **support the implementation of this Regulation by providing scientific evidence** with regard to global deforestation and forest degradation and related trade.”
- The EU Observatory should:
 - Provide for land cover maps, including with time series since the cut-off date
 - Provide for a range of classes allowing landscape composition
 - Participate in the development of an early warning system combining research and monitoring capacity.
 - Cooperate with the competent authorities, relevant international organisations and bodies, research institutes, non-governmental organisations, operators, traders, third countries and other relevant stakeholders
 - Be operational as soon as possible.

EUFO – “legal basis” (cont.)

Noted in EUDR FAQ Question 61: When will the EU Forest Observatory be operational?
How is this going to help companies implement the Regulation?

- The Observatory **will build on already existing monitoring tools, including Copernicus products** and other publicly or privately available sources, to support the implementation of this Regulation by providing scientific evidence, including land cover maps on the cut-off date, regarding global deforestation and forest degradation and related trade. **The use of these maps will not automatically ensure that the conditions of the Regulation are complied with**, but it will be a tool to help companies to ensure compliance with this Regulation, for example to assess the deforestation risk. Companies will still be obliged to carry out due diligence.
- The EU Forest Observatory will **cover all forests worldwide**, including European forests and will be developed in coherence with other ongoing EU policy developments such as the Forest Monitoring Law and upgrading and enhancement of the Forest Information System for Europe (FISE).
- There is not yet a **precise date for the full operationalization of the Observatory** (indicative date for the platform to be online is December 2023). The availability of the services provided in the future by the Observatory is however not a precondition to comply with the requirements set by this Regulation.

Noted in new EU Forest Strategy for 2030

- “The Commission’s EU Observatory on deforestation, forest degradation, changes in the world’s forest cover, and associated drivers will **develop Earth-Observation-based monitoring tools for forests** that may be operationalized by Copernicus and taken up by FISE as part of the integrated forest monitoring system.”

Implemented by the JRC

EUFO – components

Global forest monitoring

Forest attributes

Forest cover changes
and drivers

Tropical moist forest

Global forest cover
2020

Production and Trade of Commodities

Production from FAO

Trade flows

Tools for Forest Monitoring

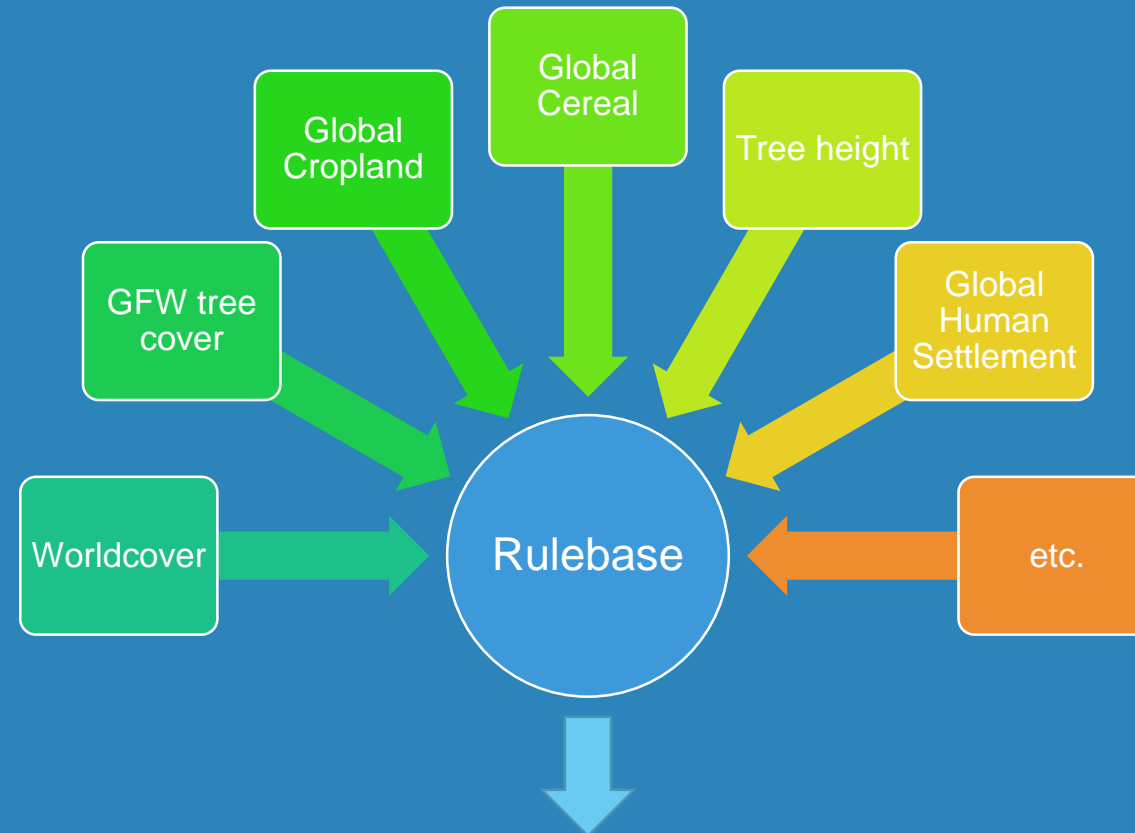
Near real time
disturbance analysis

Landscape patterns
analysis

EU forest tree species
distribution

Impact toolbox

Global forest cover map for 2020



Global forest cover map of standing trees at 10m resolution for year 2020

EUFO role in context of EUDR

Non
mandatory

- Legal text does not prescribe the use of this or any other map by operators/traders (or Competent Authorities) to inform their risk assessment

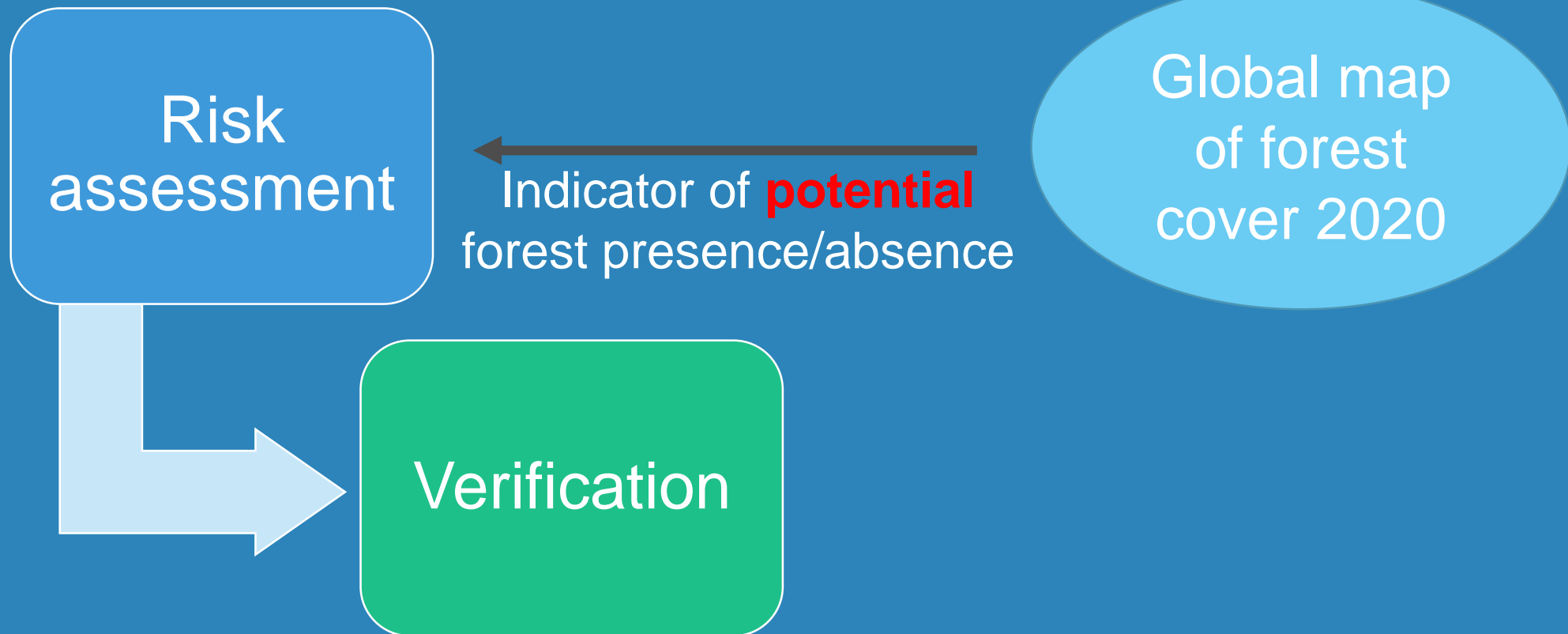
Non-
exclusive

- The EUFO – provided by the Commission free-of-charge – is one of many tools
- Other maps may have advantages compared to the information on the EUFO
- The regulation does not prescribe the modalities of and for map use

Legally non-
binding

- The map is one of many tools that may be used to inform the risk assessment
- The use of map does not guarantee compliance

How can the map be used?



Monitoring production and trade flows

Wall to wall statistics/indicators:

- Production, area harvested, and yield of commodities and products (FAOSTAT)
- Trade flows from producing country and EU-27 (FAOSTAT and UN COMTRADE)



Provide timely information to EUFO



Biotrade: A Python package to access and analyse the international trade of bio-based products

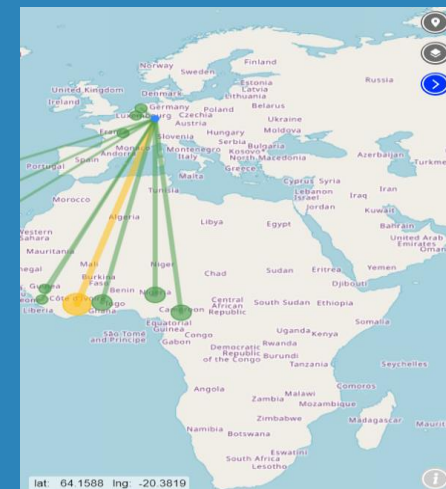
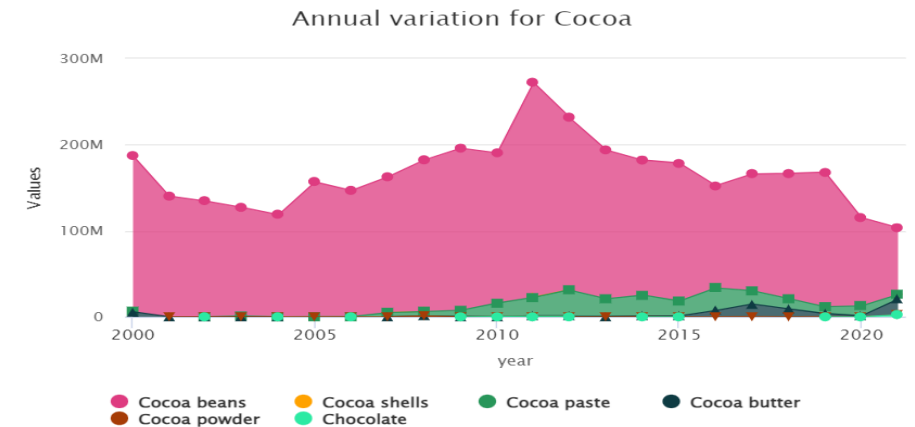
Paul Rougieux¹, Selene Patani², and Mirco Migliavacca¹

¹ European Commission, Joint Research Centre, Ispra, Italy ² JRC Consultant, ARCADIA SIT s.r.l., Vigevano (PV), Italy Corresponding author

DOI: 10.21105/joss.05550

EUROPEAN UNION | Cocoa beans imports from Côte D'Ivoire

in 2017-2021 the trade was 774,193,074.8 kg



Next steps: Land footprint of bio-based products

Question	How much pressure does the EU put on other countries by consuming products and commodities listed in the EUDR?
Definition	Land footprint is the area of land required to meet the EU imports and consumption of bio-based products
Scope	Implemented for six risk commodities in the EUDR. Under development for corn (subject to review) and rubber.
Approach	Relies on a physical model and uses technical coefficients and trade data from FAOSTAT and COMTRADE
Next steps	Include the calculation of deforestation attribution to trade

Detection of cocoa plantages in complex landscapes

What are the impacts of cocoa farming on biodiversity? A use case for Côte d'Ivoire and Ghana

- Where are cocoa farms?
- Which species/ecosystems/protected areas are exposed to cocoa farming and where?



The lifecycle of chocolate

Forest Biodiversity



Cocoa beans cultivation



- Pesticides
- Machinery
- Associated fuel consumption
- Biomass waste

Post harvest processes



- Shell removal
- fermentation
- drying
- cleaning
- roasting
- grinding
- refining...

Transport (fuel)



- From place of production to...
- storage place
- port or airport
- factory
- retail store
- home

Production process



- Including all other ingredients (milk, sugar, vanilla...)

Packaging

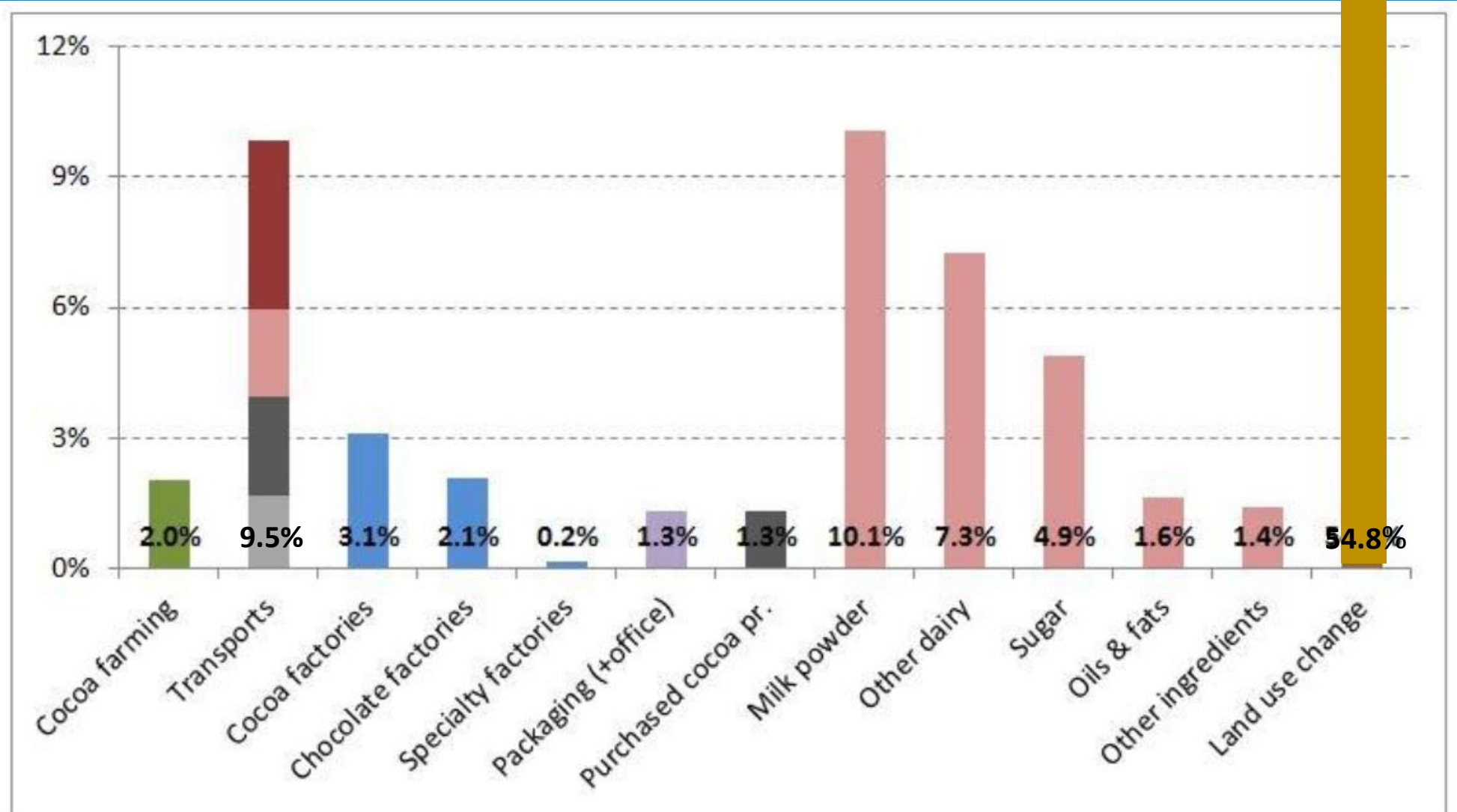


- Materials
- Energy

Waste

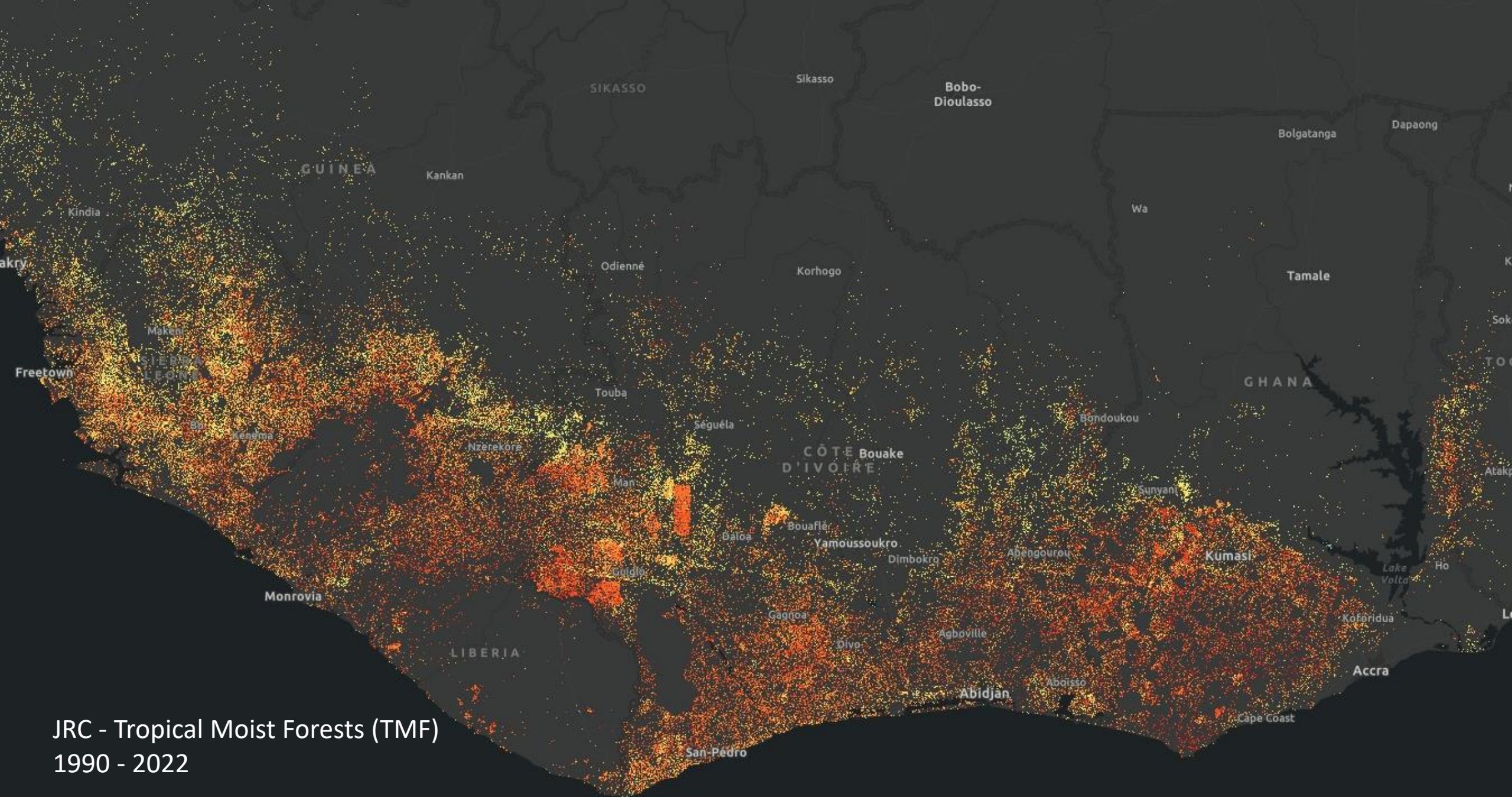


- Transport and treatment of the lost or thrown away portion
- Waste treatment of packaging



Organizational carbon footprint for 2016/17 = 8.23 mill tonnes CO2e

Source: Barry Callebaut



JRC - Tropical Moist Forests (TMF)
1990 - 2022

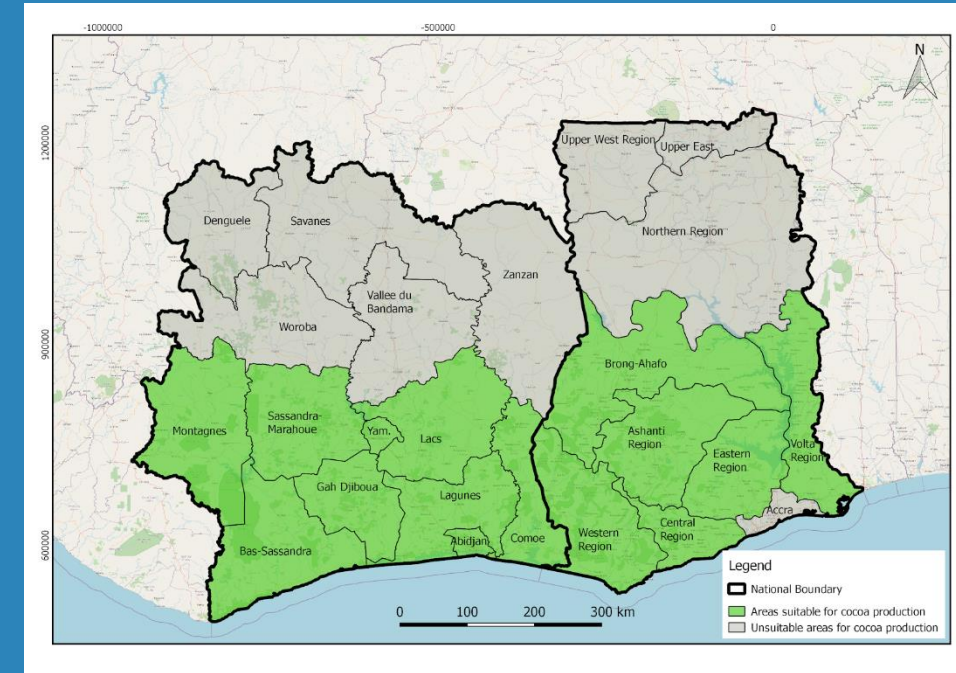
Where is cocoa

Open cocoa plantations

- Older, cocoa is visible from space
- Still, very hard to distinguish -> training data is crucial

Under canopy cocoa plantations

- Can not be detected with free and open data
- Forest degradation monitoring could help to predict new cocoa plantations



Method

Satellite imagery

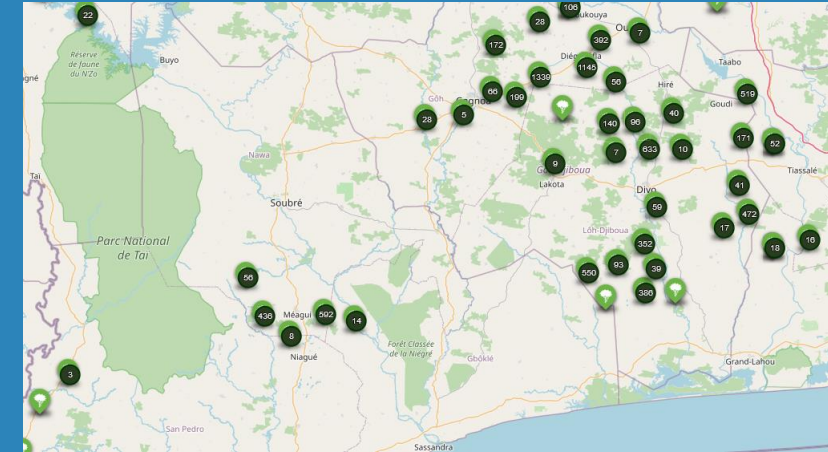
- Free and open with high spatial and temporal coverage
- Optical and radar data (S1 and S2)

Training/Validation data

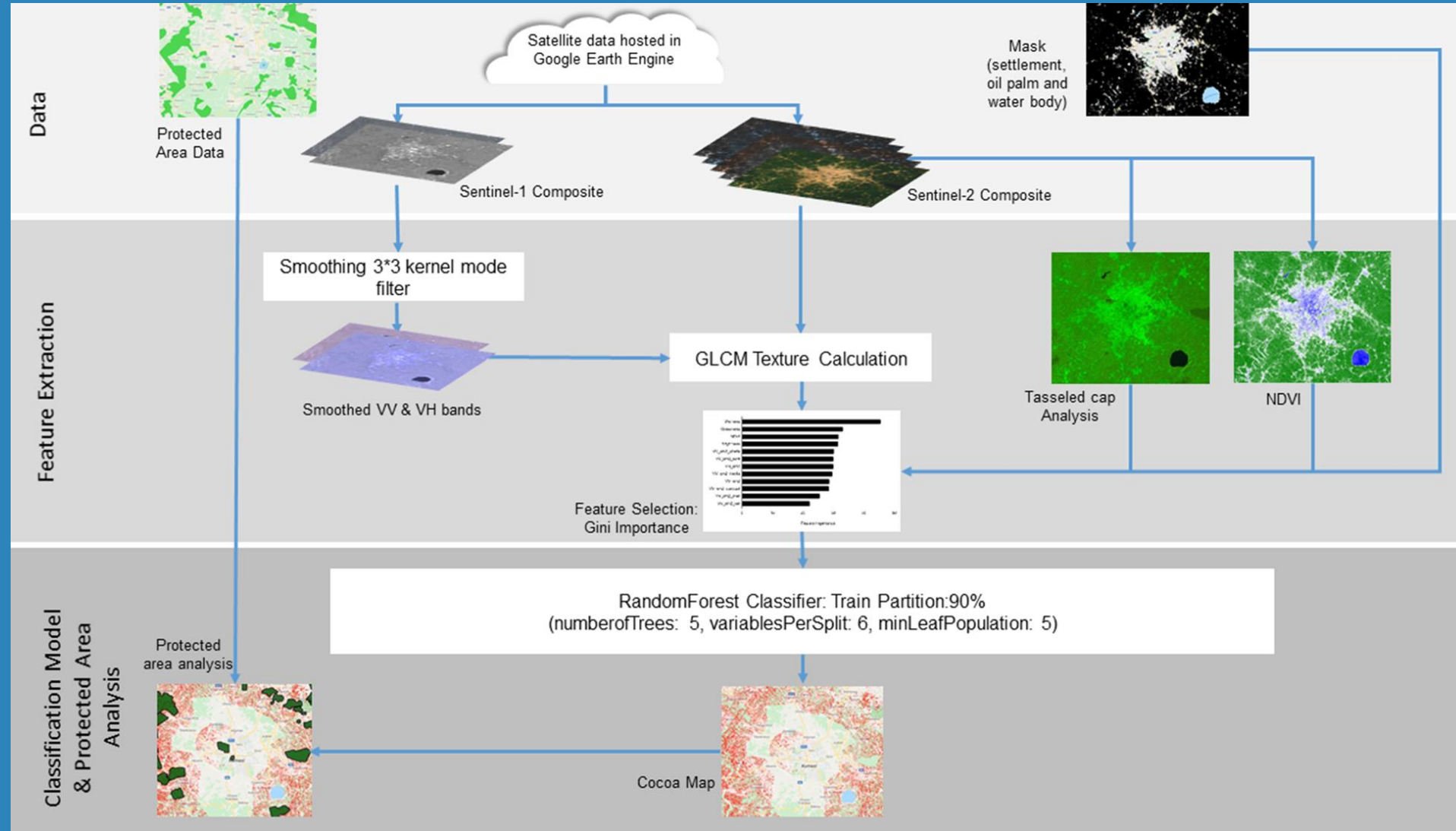
- Need of accurate ground collected data to teach our model to find cocoa [everywhere]
- 15,000 cocoa points from Cocoa life (Interactive Farm Map, Mondelez International)
- Other companies have such data, but data access is not easy

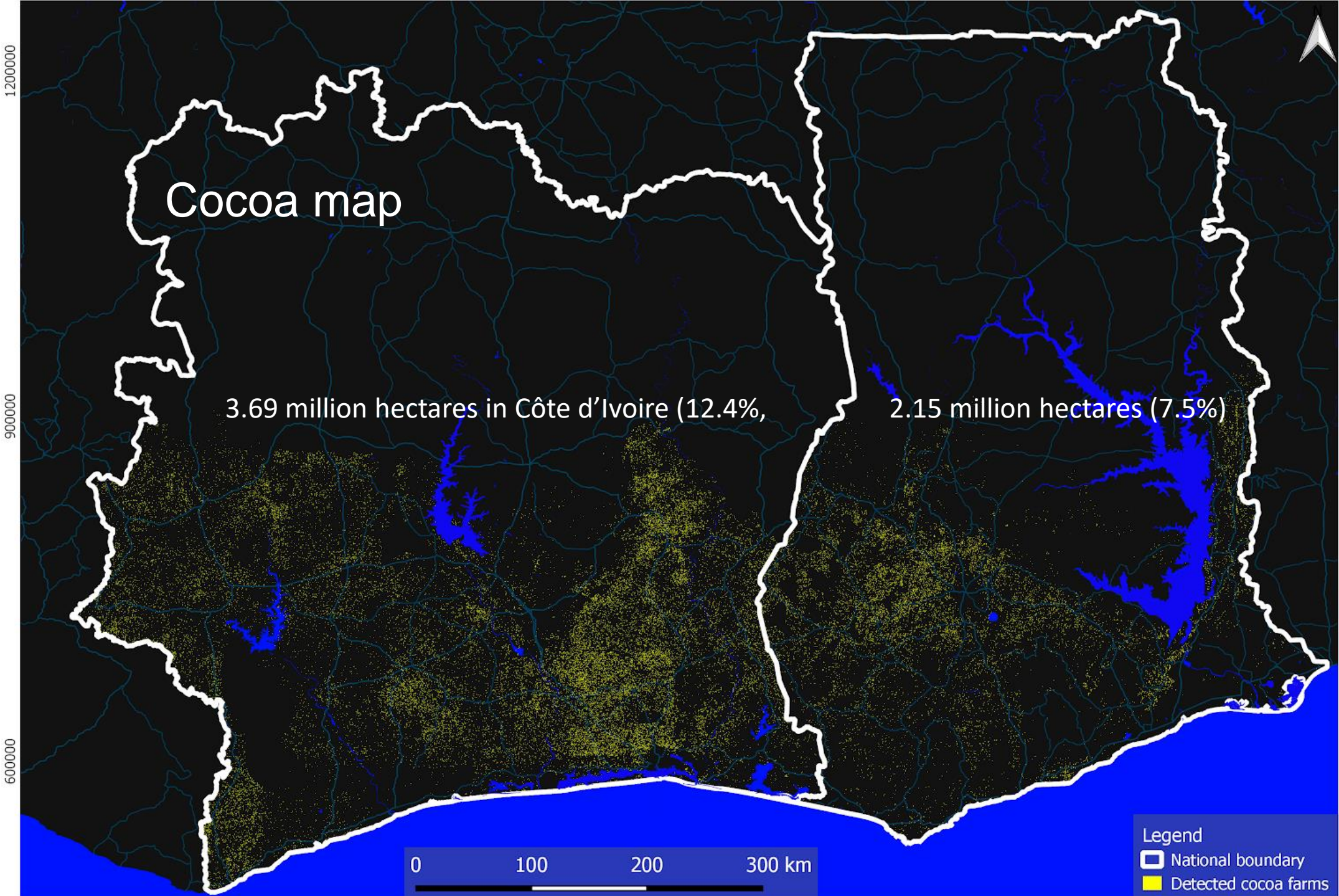
Detection of cocoa

- Remote sensing classification model(s) – RandomForest, Artificial Neural Networks

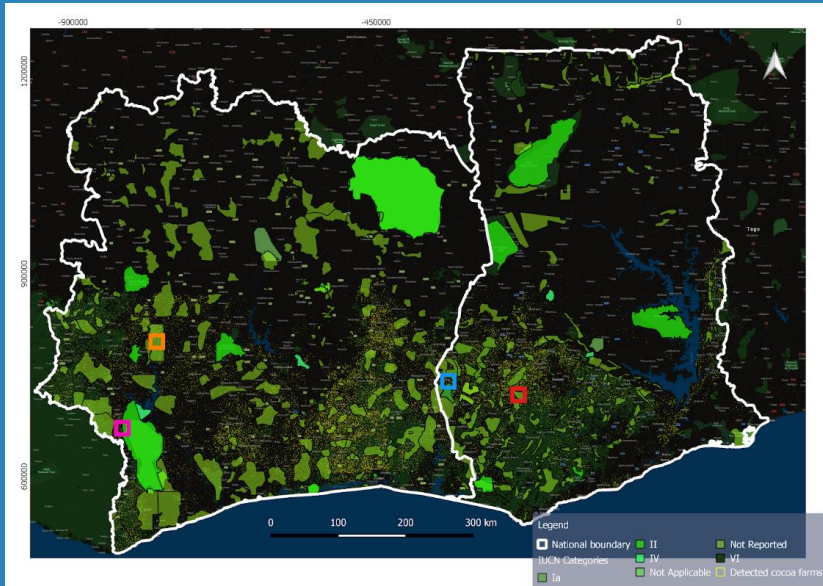


Workflow

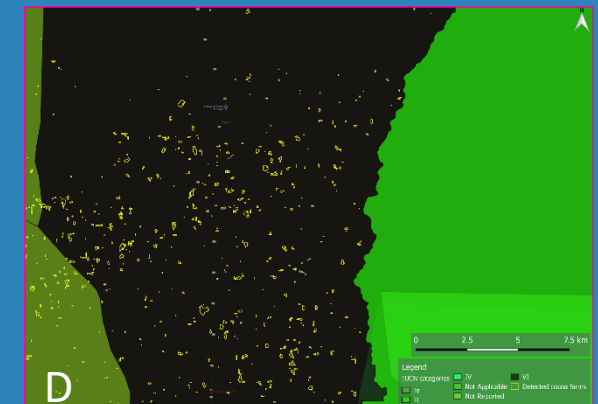
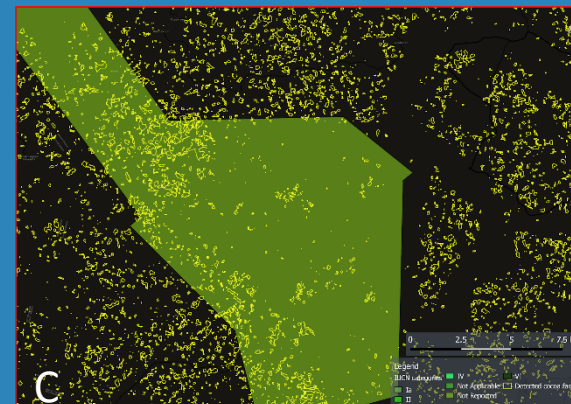
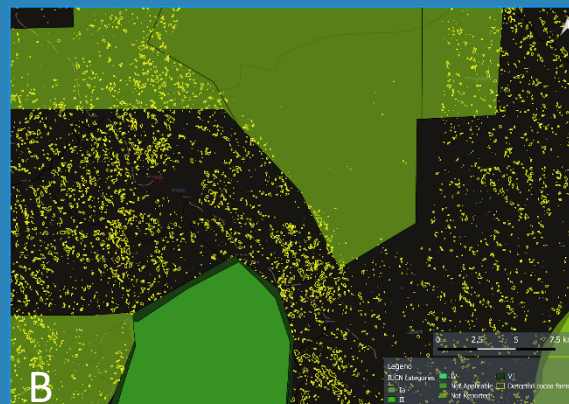
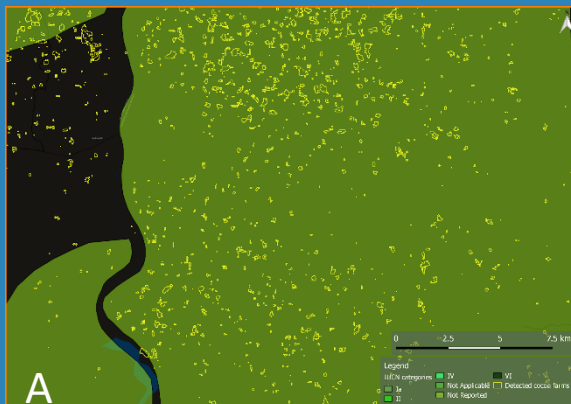




Cocoa and Protected Areas



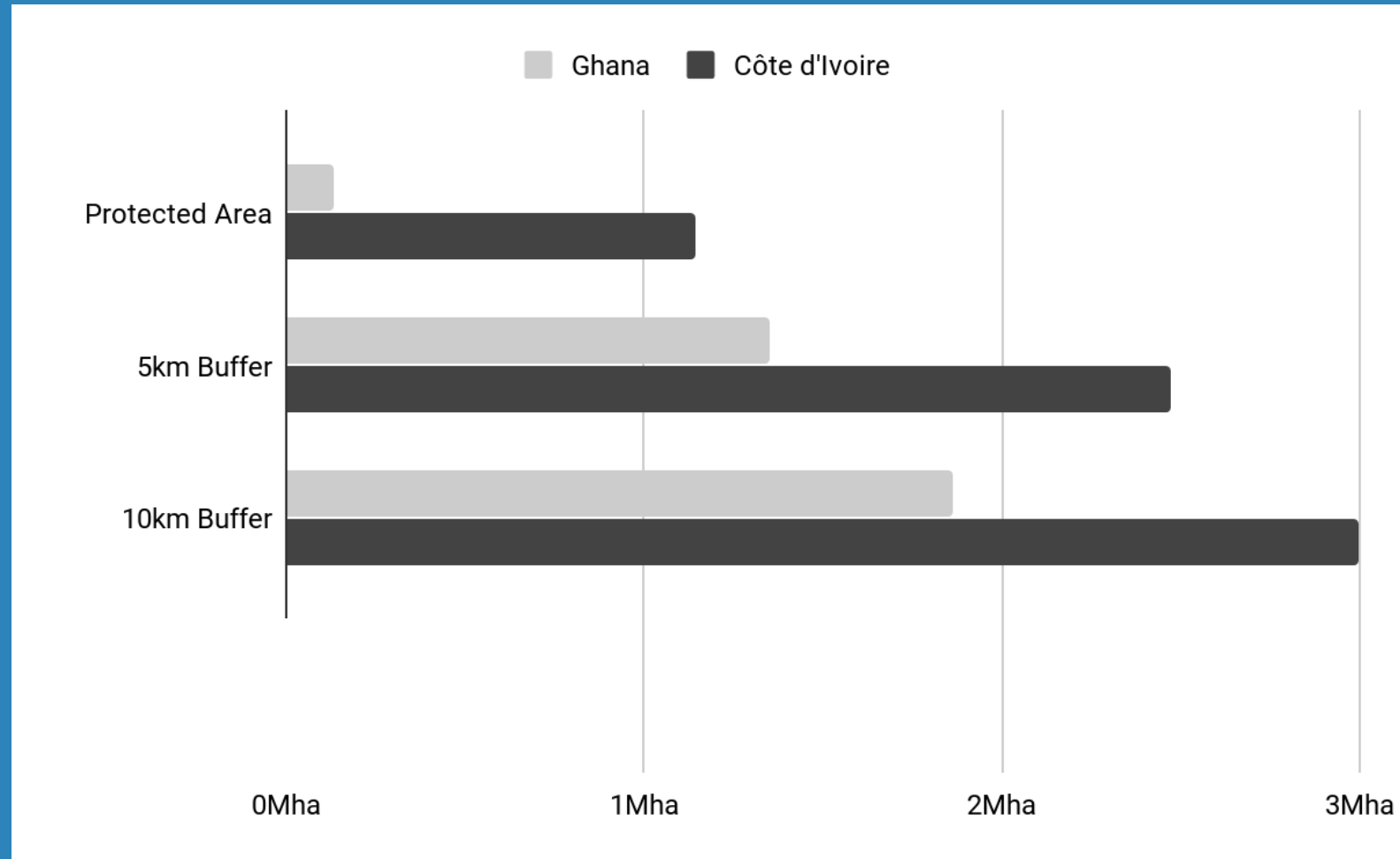
- A** - Haut Sassandra Forest Reserve (undes. IUCN cat.)
- orange box
- B** - Sukusuki (undes. IUCN category)
- blue box
- B** - Bia Forest Reserve (IUCN category II)
- blue box, dark green
- C** - Anhwiaso East Forest Reserve (undes. IUCN category)
- red box
- D** - Tai National Park (IUCN category II)
- purple box, dark green



Protected areas and their vicinity

Almost 70% of the protected areas in Ghana and Côte d'Ivoire include cocoa plantations

Percentages range from 5% or less up to between 34% and 54%



Partners and Affiliations

EUFO - Frédéric Achard & Rene Colditz, Forests and Bioeconomy Unit JRC

Cocoa mapping – I.-O. Abu, Z. Szantoi, A. Brink, M. Robuchon, M. Thiel, Detecting cocoa plantations in Côte d'Ivoire and Ghana and their implications on protected areas, Ecological Indicators, Volume 129, 2021, 107863, ISSN 1470-160X, <https://doi.org/10.1016/j.ecolind.2021.107863>.

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6-10 NOVEMBER

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