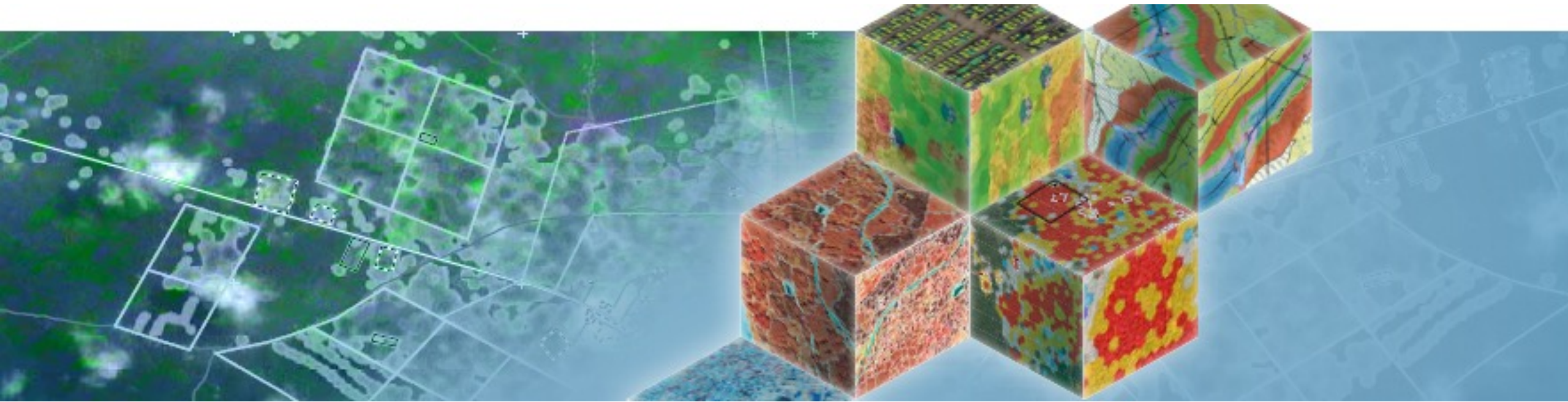# GWF

GEOSPATIAL WORLD FORUM

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Environmental Compliance Information from Space

Thomas Blaschke

University of Salzburg, Department of Geoinformatics – Z_GIS

Search News...

The Conversation: How to Use Free Satellite Data to Monitor Natural Disasters and Environmental Changes
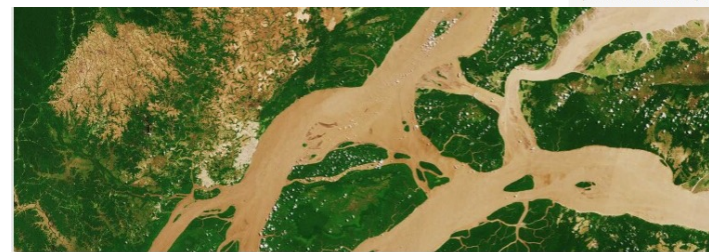
MARCH 14, 2023

Photo by NASA.

Monthly Archives

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Popular Posts

UT Named One of America's Top Colleges by Forbes
posted on October 3, 2023

UT Welcomes Fans for the South Carolina Game
posted on September 27, 2023

UT Welcomes Fans for the Texas A&M Game
posted on October 11, 2023

A satellite view of Northern Brazil, where the Amazon River meets the Atlantic Ocean, provides information about deforestation that can be [...] activities.
Source: ESA

July 27, 2018, 2:34 PM GMT+2

Satellites Reshaping Environmental Monitoring

Andre Tartar Bloomberg News	**Jeff Kearns** Bloomberg News	**Jeremy Kahn** Bloomberg News
Shannon Simms Bloomberg News	**Karlis Salna** Bloomberg News	**Aaron Clark** Bloomberg News

- Satellites being used to monitor climate effects, pollution, and natural disasters
- Also used to counteract deforestation, illegal fishing

WIRED | ROLEX Perpetual Planet Initiative

Explorer Steve Boyes is advancing our understanding of Africa's great rivers

Learn more

JONATHAN O'CALLAGHAN   SCIENCE   30.08.2022 12:00 PM

Swarms of Satellites Are Tracking Illegal Fishing and Logging

In some of the world's most inaccessible places, tiny satellites are watching—and listening—for signs of destruction.
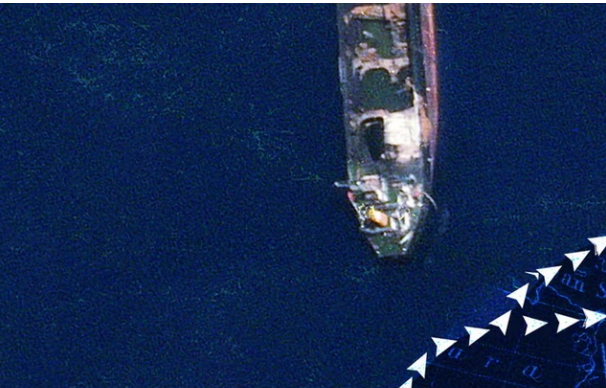
How a burnt out, abandoned ship reveals the secrets of a shadow tanker network

The number of vessels transporting sanctioned oil is booming and the consequences can be felt across the world - from Iran, to China, to Ukraine

by Jonathan Yerushalmy and Haylena Krishnamoorthy

APPLICATIONS

Trio of Sentinel satellites map methane super-emitters

Delhi: 'Use satellite images to check how many trees felled in Ridge'

School And Colleges

Maharashtra Elections

Abhinav Garg / TNN / Updated: Oct 14, 2022, 11:27 IST

Citizen Reporter

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You're Reading

Delhi high court decided on Thursday to take stock of the capital's green cover, particularly from 2018, when it began monitoring the condition of the city's trees.

Delhi: 'Use satellite images to check how many trees felled in Ridge'

Blood clots in veins: Unmasking this silent threat on World...

The high court also directed Delhi government to ascertain the present status of forest cover in the central and southern Ridge areas

Delhi: How gang duped targets in credit card, 5G

ESG / Finance / Insurance

Environment

Satellite technologies to monitor the essential climate variables, support in ocean conservation and restoration of land and forests, to assist companies in monitoring their environmental footprint & ESG compliance.

Finance

Satellite data for investment evaluation, risk assessment, event impact assessment, real-time asset/portfolio monitoring, carbon offsets auditing, etc.

The earth observation market is developing rapidly

Credit: Aravind Ravichandran
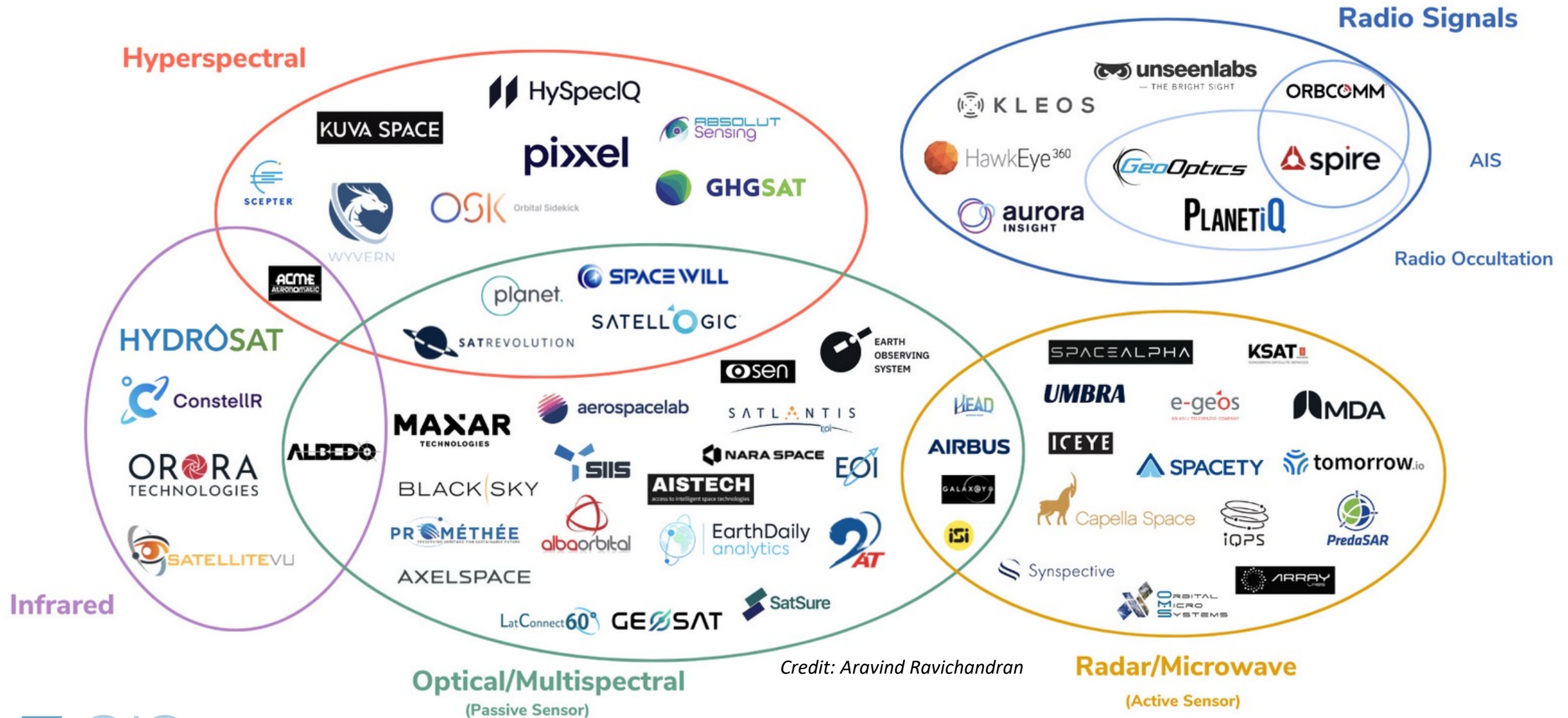
Industry claims that …..

Reporting needs can be solved with ‚press the bottom' solutions

But there are methodological and legal aspects to be included

# But, initially, images are merely many pixels (... or measurements)

initially one only gets large arrays (rasters) of pixels – only our eyes/brain recognize objects such as lakes or rivers etc. !

classic approach:

- How to interpret and utilize different colours (spectral reflectance values in various bands of an image

- How to analyse and classify individual pixels, groups of pixels, or e.g., 3*3 - pixel neighbourhoods

Object Based Image Analysis

*Machine learning & AI approaches*
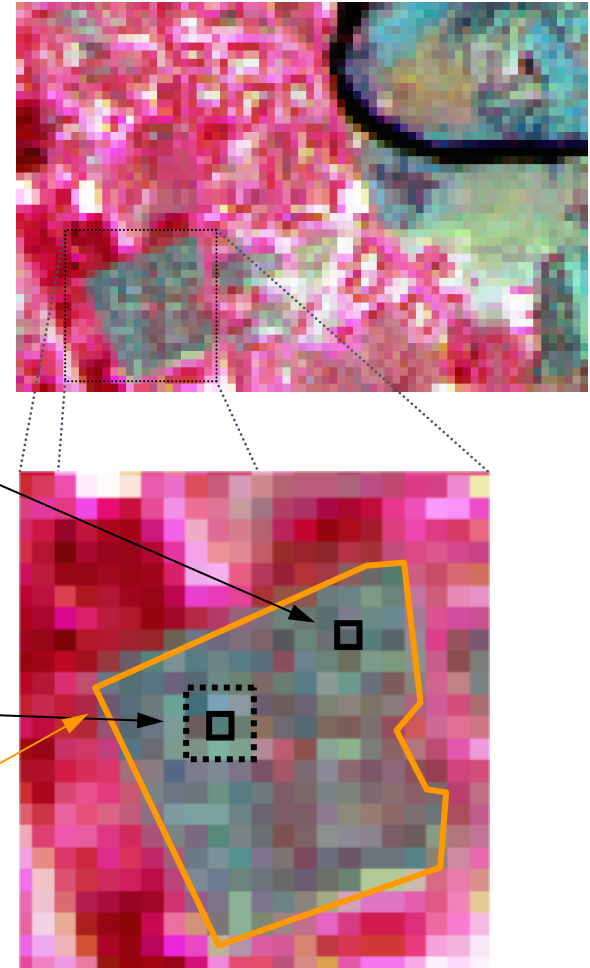
In most cases, information important for the understanding of an image is not represented in single pixels but in meaningful image objects and their mutual relations (Blaschke, 2003)

International regulations as a trigger to develop automated geospatial workflows

SDGs

ESG

CSRD & ESRS

CSDDD, GRI, SASB, ...

Earth observation in lucrative markets, i.e., business, finance, ESG, decarbonization

Corporate Social Responsibility Directive (EU)
European Sustainability Reporting Standards
Directive on corporate sustainability due diligence (EU)
Global Reporting Initiative
Sustainability Accounting Standards Board
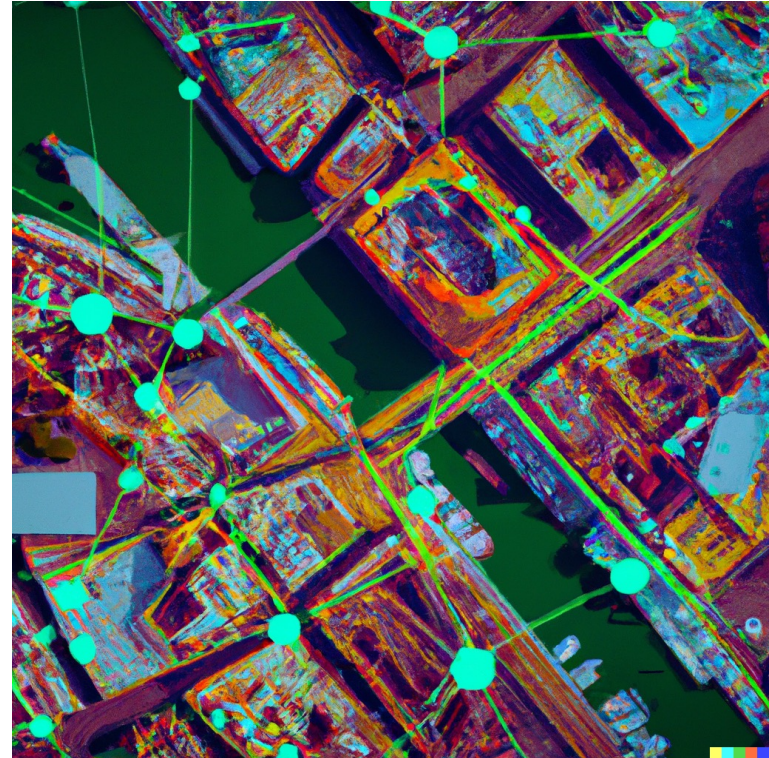
EU legislation and policies currently in place

The Forest Law Enforcement Governance and Trade (FLEGT) Action Plan

- The EU Timber Regulation

- The Forest Law Enforcement Governance and Trade (FLEGT) Regulation

The recast Renewable Energy Directive

EU LULUCF regulation

The Communication on "Stepping up EU Action to Protect and Restore the World's Forests"

The European Green Deal

- 2030 EU Biodiversity Strategy

- Farm to Fork Initiative

EU Taxonomy Regulation for sustainable activities

The Non-financial reporting Directive (NFRD)

European Union Deforestation and Forest Degradation Regulation (EUDR)

Z_GIS

EUDR: a gamechanger?

**REGULATION (EU) 2023/1115 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 31 May 2023
on the making available on the Union market and the export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing Regulation (EU) No 995/2010**

https://pxhere.com/de/photo/964480

Coffee · Palm Oil · Cocoa · Soy · Leather & Beef · Sugar Cane · Rubber · Pulp & Paper · Coconut · Forrest

To be taken into account: (not exhaustive)

Governance Factors:

a. **Land Ownership and Land Rights**: Mapping land ownership and land rights can provide insights into potential conflicts and adherence to property rights, a key governance factor.

b. **Regulatory Compliance**: Monitoring land use against zoning and environmental regulations can assess a company's compliance with governance standards.

c. **Supply Chain Transparency**: Geospatial data can help trace the supply chain, identifying the sources of raw materials and potential risks associated with suppliers.

d. **Infrastructure Investment**: Assessing infrastructure development in regions where a company operates can indicate its commitment to long-term growth and governance.

a. **Community Impact**: Geospatial data can help evaluate the proximity of a company's operations to communities, potentially highlighting issues related to noise, pollution, or other disturbances.

b. **Access to Services**: Assessing the accessibility of education, healthcare, and other essential services in the regions where a company operates can shed light on its social responsibility.

c. **Labor Force Analysis**: Mapping the distribution of labor force and their conditions (e.g., income, housing) around company facilities can indicate labor-related risks and opportunities.

d. **Cultural Heritage and Indigenous Rights**: Identifying culturally significant or indigenous areas near a company's operations can help assess its impact on cultural heritage and indigenous rights.

End of voluntariness - enforcement through sanction-proven regulation by EUDR

only deforestation-free products may be placed on the market in the EU. December 31, 2020 applies retroactively as the deadline. If deforestation occurs after that date, the EUDR applies without restriction (except for transitional provisions for SMEs).

The term "deforestation-free" covers deforestation and forest degradation. According to the EUDR, this can be determined on the basis of quantitative, objective and internationally recognized data!
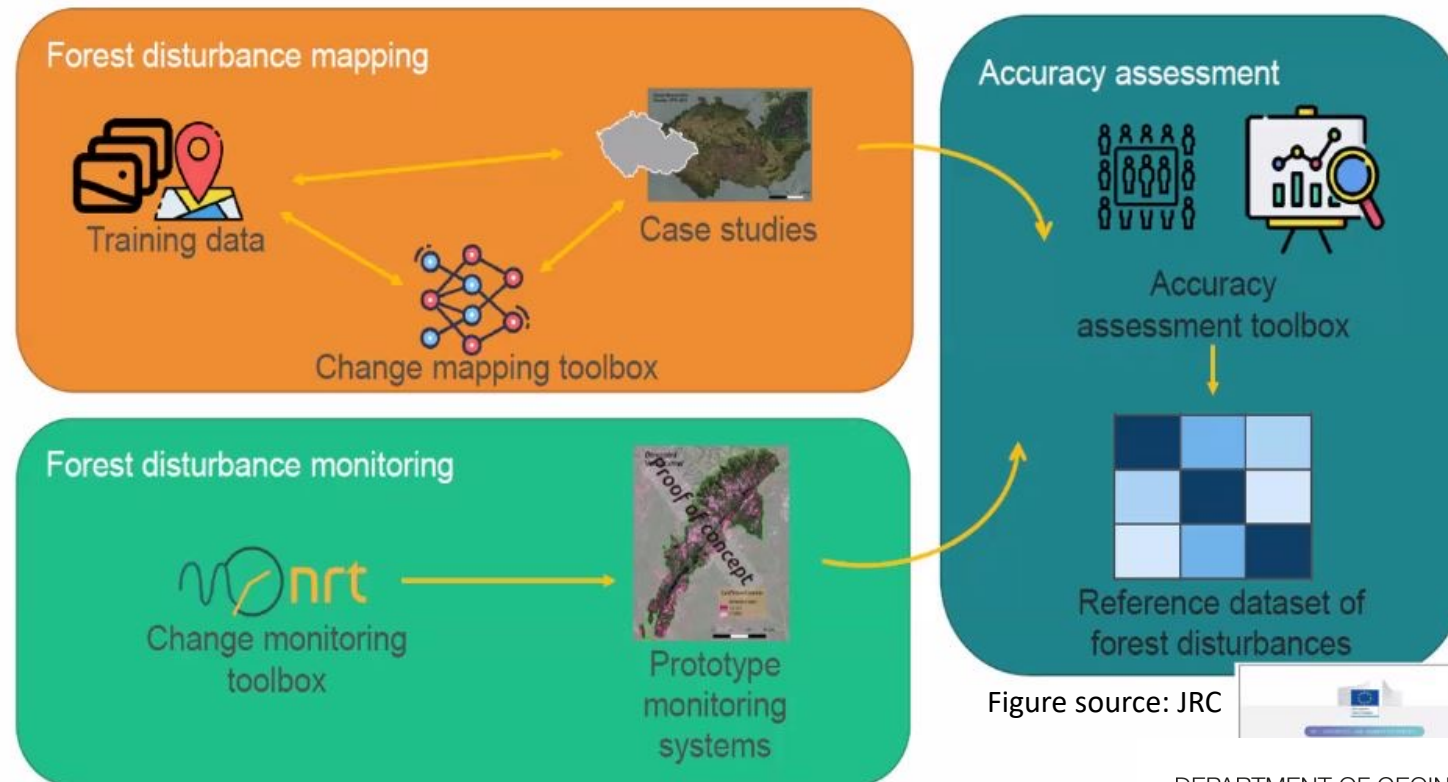
(subjective acceptance or "reliance" on it is not enough)

Products that contain the following raw materials or products must be deforestation-free: **cattle, cocoa, coffee, oil palm, rubber, soy** and **wood** (fed with these or produced using them).

29 June 23	30 December 24	30 June 2025
Entry into force	**Entry into application**	**Applicable to MSEs operators as well**
(established the legal existence of the Regulation)	(the Regulation is aplicable to ALL except MSE operators)	

EUDR

- Investigate changes to forested areas overtime: has deforestation or forest degradation occurred since Dec 2020?

- NDVI, multi or hyperspectral imagery, AI recognition, a combination?

Figure source: JRC

BUT …….
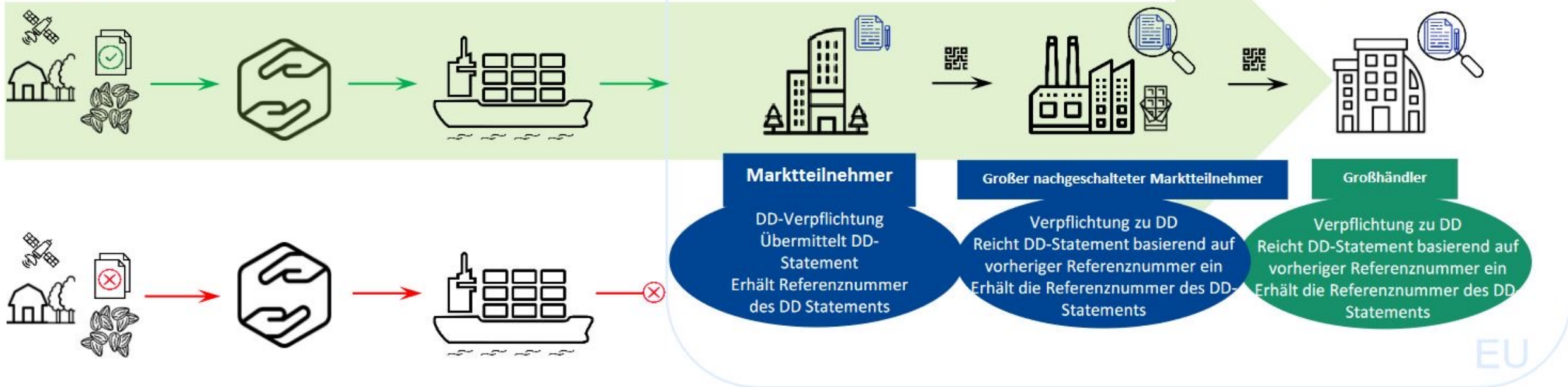
Special attention: smallholders

- coffee, cocoa and soya makeup 19.5% of Africa's GDP.

- 75% of deforestation in Africa is related to agriculture expansion, and these 3 commodities are a main contributor.

- 80% of the commodities are sourced from smallholder farmers

- Majority of smallholders across the continent (and world) are unaware of the EUDR and what it entails.

- Smallholders make up 60% of farmers on the continent and don't have the ability to trace deforestation.

Z_GIS

Phtot credit: Shawn Harquail

Case study - coffee Columbia

coffee finca locations from a field study in 2014 (yellow dots), simply stored with a BING image

then JRC Forest/Non-Forest Layer above (state of affairs for the EU currently what can be seen as forest with a deadline of 2020)

one can see: the entire area was classified as forest, even though there are settlements there that were already there in 2014 (also long before that)

The zoom in to the farm "El Mango" shows the structure of the coffee plantation very well on the Bing/google image (even grid)

Hansen et al. 2023 considered:
forest from 0-100%,

The coffee areas are shown to be around 40-50% forest, which is probably why they there were two deforestation alerts at the El Mango farm, once in 2006 and again in 2012.

→ Deforestation alert!

Coordinates from Coffee farms in Cauca/Colombia. I collected them during my PHD questionnaires in 2014. All farms are small size (size less than 4ha)

Bing image

Using the JRC Global Forest Cover map of 2020 in version 1, most of them would trigger a Deforestation Risk

Non-forest

Forest

Deforested after 2020

Deforested before 2020

Lt. Hansen, 2023

Sample Farm, El Mango:

Lt Hansen most of the area before 2000, 2 new detections in 2006 & 2012

Z_GIS
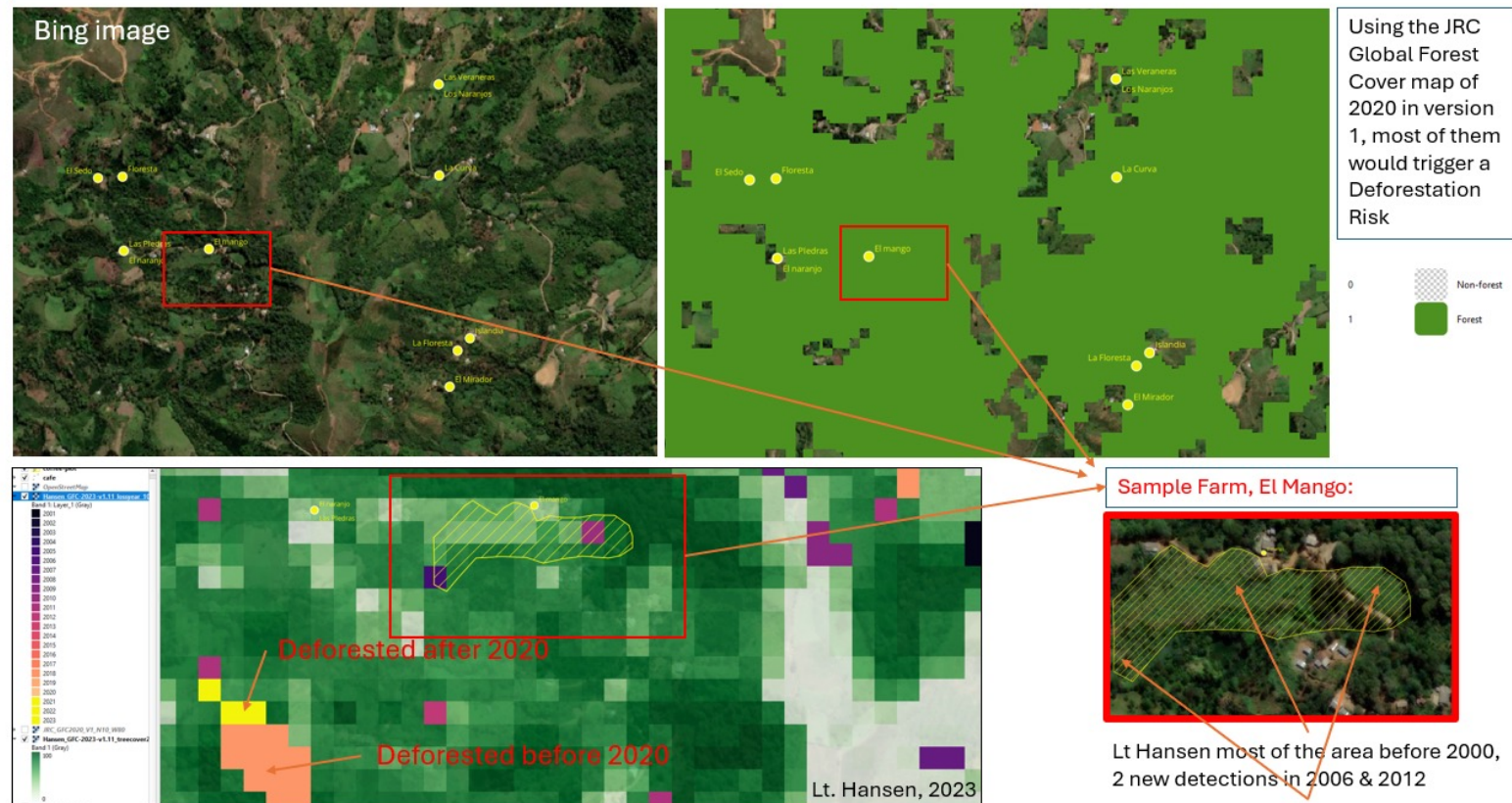
Case study - coffee Columbia
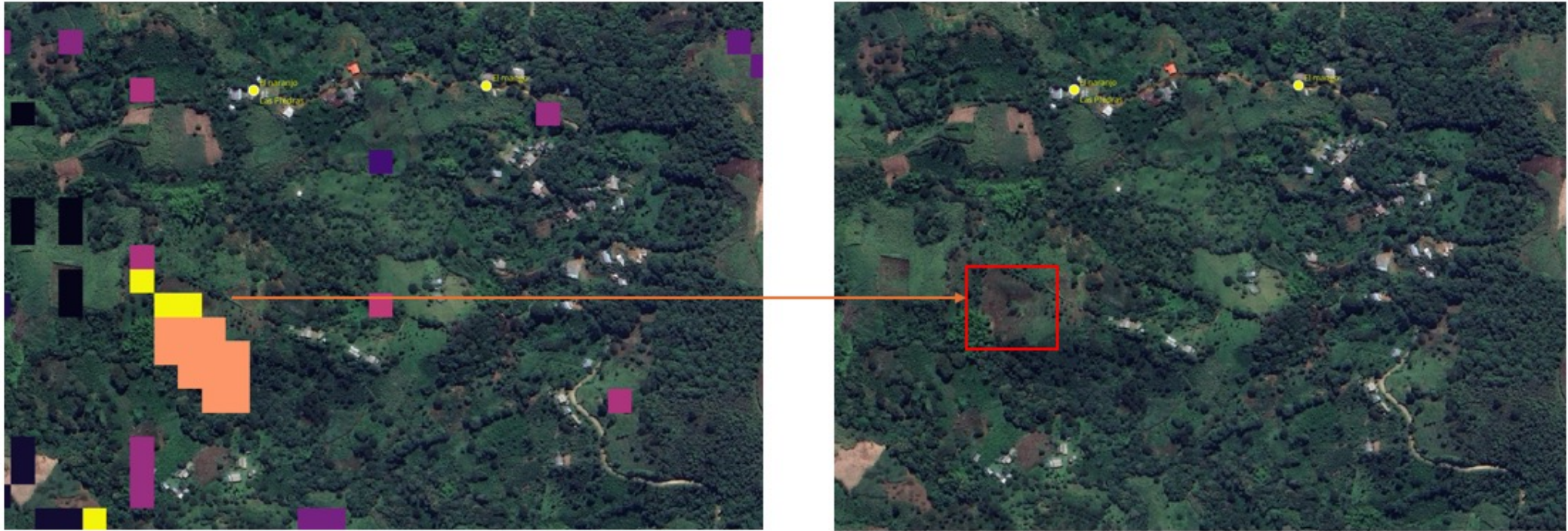
- Coffee from this area will be difficult to import into the EU and would disadvantage smallholders.

- A comprehensible solution is therefore needed as to how such situations can be evaluated.

Case study - Côte d'Ivoire:

every year 110,000 hectares of tropical moist forest cut down
for cocoa plantations the EU is most exposed to deforestation

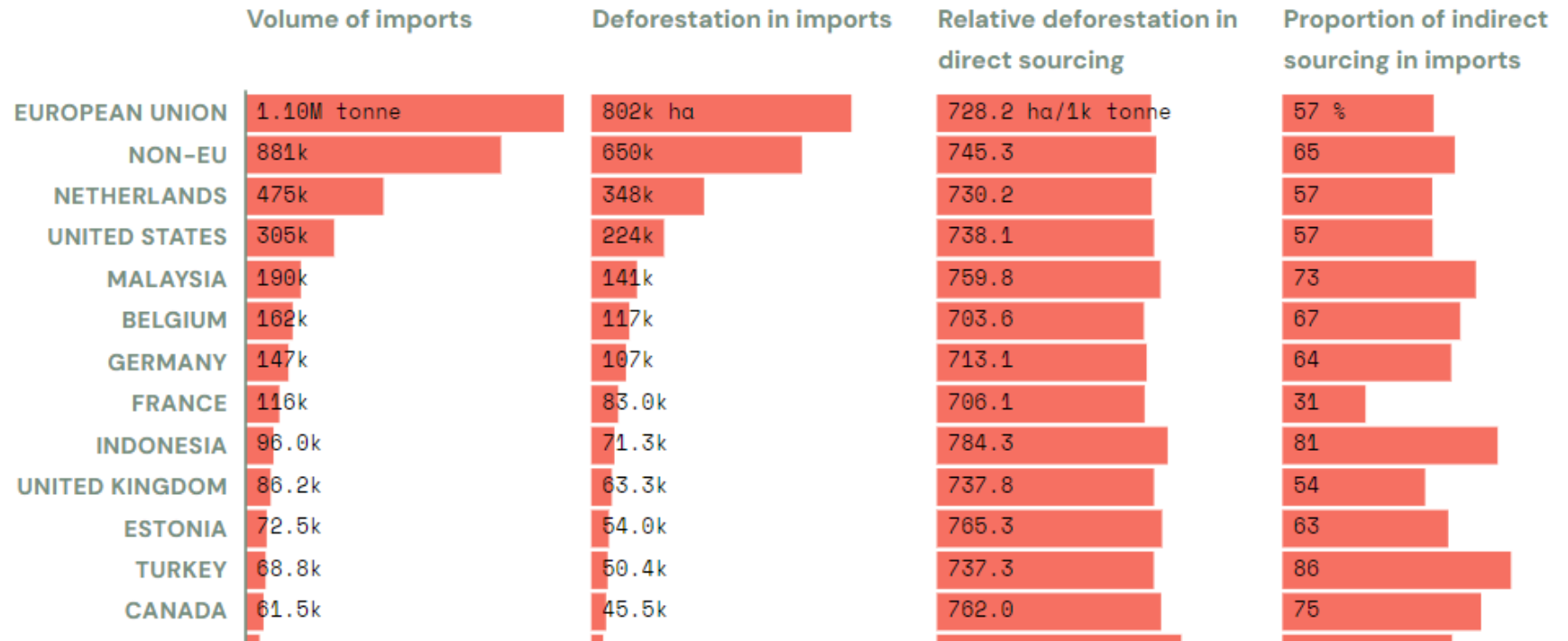|	Volume of imports	Deforestation in imports	Relative deforestation in direct sourcing	Proportion of indirect sourcing in imports
EUROPEAN UNION	1.10M tonne	802k ha	728.2 ha/1k tonne	57 %
NON-EU	881k	650k	745.3	65
NETHERLANDS	475k	348k	730.2	57
UNITED STATES	305k	224k	738.1	57
MALAYSIA	190k	141k	759.8	73
BELGIUM	162k	117k	703.6	67
GERMANY	147k	107k	713.1	64
FRANCE	116k	83.0k	706.1	31
INDONESIA	96.0k	71.3k	784.3	81
UNITED KINGDOM	86.2k	63.3k	737.8	54
ESTONIA	72.5k	54.0k	765.3	63
TURKEY	68.8k	50.4k	737.3	86
CANADA	61.5k	45.5k	762.0	75

BEETLE FORTECH

Z_GIS

SMART
& EASY
LAND
MAPPING

UNIQUE PLOT ID
→ CROP TYPE ?
→ EXPANSION ?
→ LOGGING ?

BEETLE FORTECH

Rapport sommaire
sur la parcelle appartenant à ████████

Propriétaire du champ	████████
Culture	Anacardier (Cashew)
Point central de la parcelle	Latitude: ████████
	Longitude: ████████
Taille du polygone	2,71 hectares
Périmètre du polygone	939,77 mètres
Date d'enregistrement GNSS	24 février 2024

GEOLOCATION PRODUCTION REPORT (ESSENTIAL FOR EUDR COMPLIANCE)

KEY COMMODITIES: COCOA, COFFEE, TIMBER

Huge markets, new players: automated reporting through geospatial workflows

- ESRS and CSRD

- Earth Observation combined with geospatial data

- Report on required metrics

- New market opportunities

Google Earth image March 2022

Figure source: JRC

refinq

BEETLE FORTECH

ESG CHAIN

VEO
Verify | Evaluate | Orientate

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www.zgis.at

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Department of Geoinformatics – Z_GIS

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https://master-cde.eu/