Data and Deforestation:

Considerations, challenges, and opportunities related to traceability and transparency in the palm sector

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WHAT WE'LL COVER TODAY

Deforestation and palm: What's happening and how did we get here?

How do traceability and transparency help to address forest loss?

Success factors and enabling conditions for traceability and transparency

Data Challenges, Initiatives and Opportunities

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Unites organizations, governments and private sector partners around **trusted, transparent geospatial data solutions** that enable credible monitoring, verification and disclosure of progress in reducing deforestation and restoring degraded lands.

FDAP FUNCTION & STRUCTURE

Data Challenges ▢ **Innovative solutions**

Engage partners and stakeholders

Align on foundational data gaps

Innovate demand-driven approaches
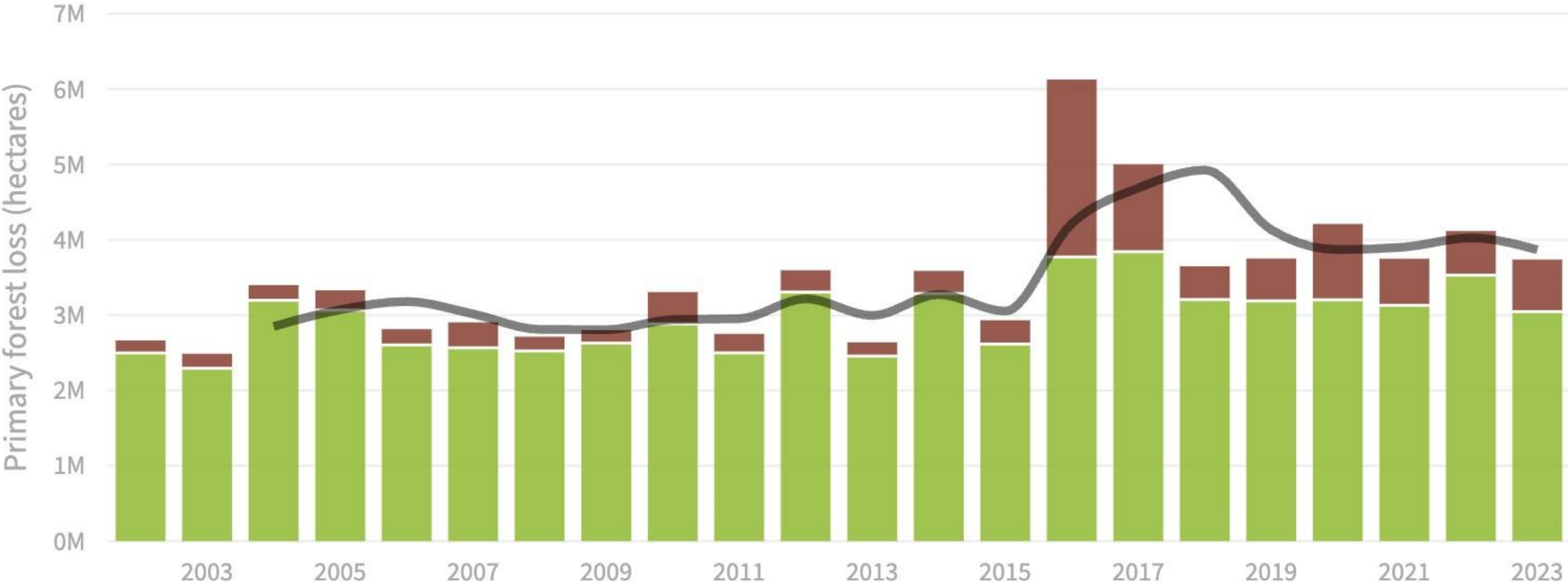
Deploy data delivery mechanisms

Assess impact

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DEFORESTATION: WHAT'S HAPPENING AND HOW DID WE GET HERE?

Tropical primary forest loss, 2002-2023

■ Non-fire related loss ■ Fire related loss ■ Moving average

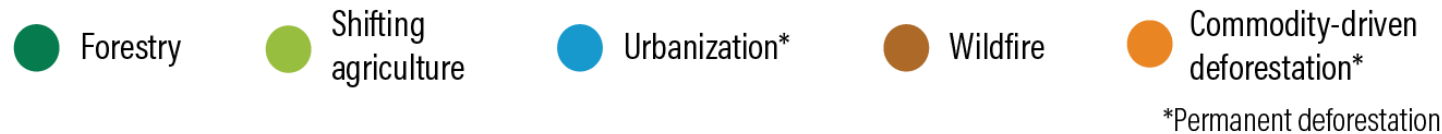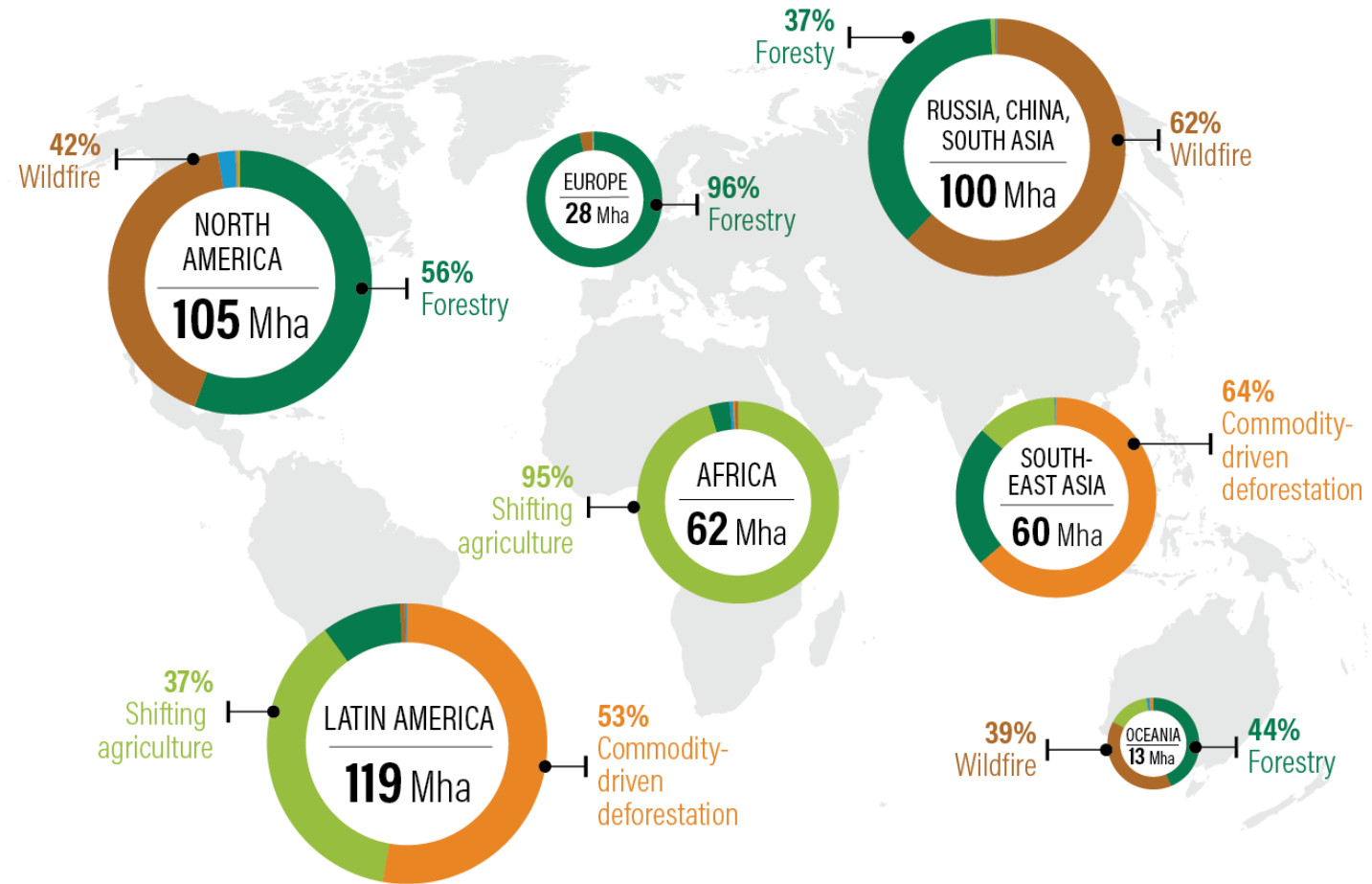Non-fire related loss can occur from mechanical clearing for agriculture and logging, as well as natural causes such as wind damage and river meandering. The three-year moving average may represent a more accurate picture of the data trends due to uncertainty in year-to-year comparisons. All figures calculated with a 30 percent minimum tree cover canopy density.

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Drivers of tree cover loss by region, 2001-2023

37% Foresty — RUSSIA, CHINA, SOUTH ASIA **100** Mha — **62% Wildfire**

42% Wildfire — NORTH AMERICA **105** Mha — **56% Forestry**

EUROPE **28** Mha — **96% Forestry**

95% Shifting agriculture — AFRICA **62** Mha

SOUTH-EAST ASIA **60** Mha — **64% Commodity-driven deforestation**

37% Shifting agriculture — LATIN AMERICA **119** Mha — **53% Commodity-driven deforestation**

39% Wildfire — OCEANIA **13** Mha — **44% Forestry**

Legend:
- Forestry
- Shifting agriculture
- Urbanization*
- Wildfire
- Commodity-driven deforestation*

*Permanent deforestation

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INDONESIA PRIMARY FOREST LOSS

Non-fire related loss ■ Fire related loss ■ Moving average

Primary forest loss (hectares)

144 kha
(patches of primary forest loss over 2 ha and in Indonesia's forest land cover classes according to MoEF-WRI analysis)
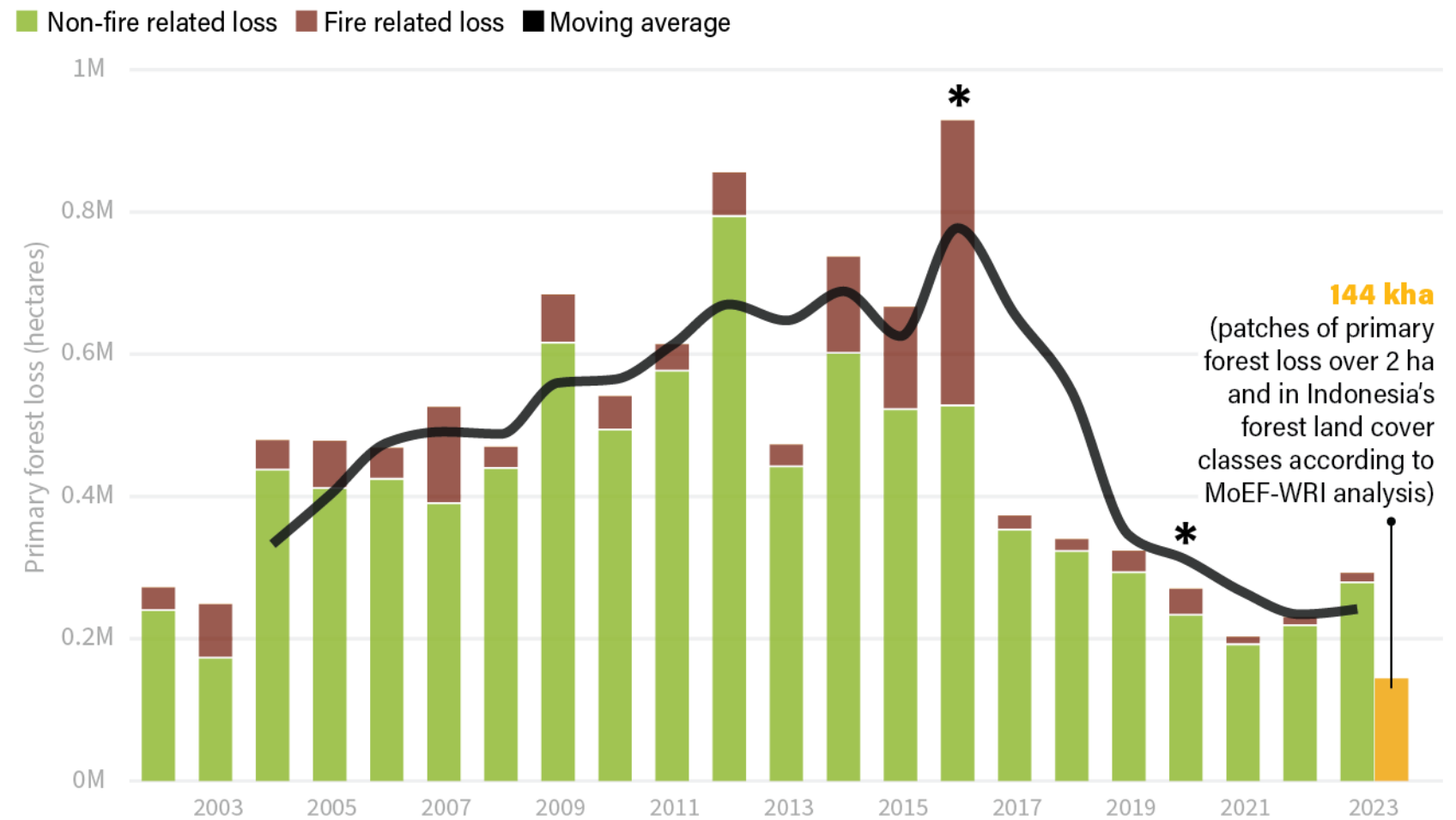
*Much of Indonesia's 2016 fire loss was actually due to burning in 2015. Burned lands were detected late because of insufficient clear Landsat images at year's end (the same is also true to a lesser extent for 2019 and 2020).

Much of the primary forest loss in Indonesia according to the GFW analysis is within areas that Indonesia classifies as secondary forest and other land cover (e.g., mixed dry land agriculture, estate crop, plantation forest, shrub and others). This is because the GFW primary forest definition is different than Indonesia's official primary forest definition and classification. GFW's statistics on loss of primary forests in Indonesia are therefore considerably higher than the official Indonesian statistics on deforestation in primary forest.

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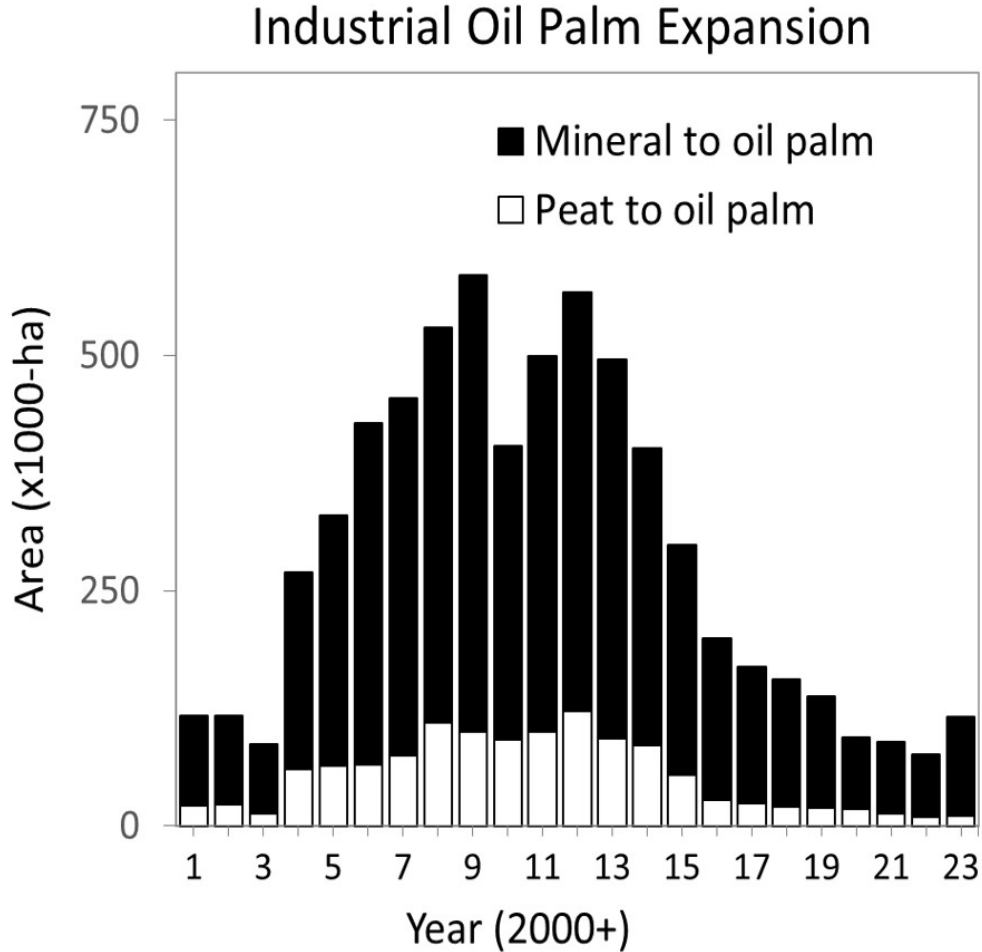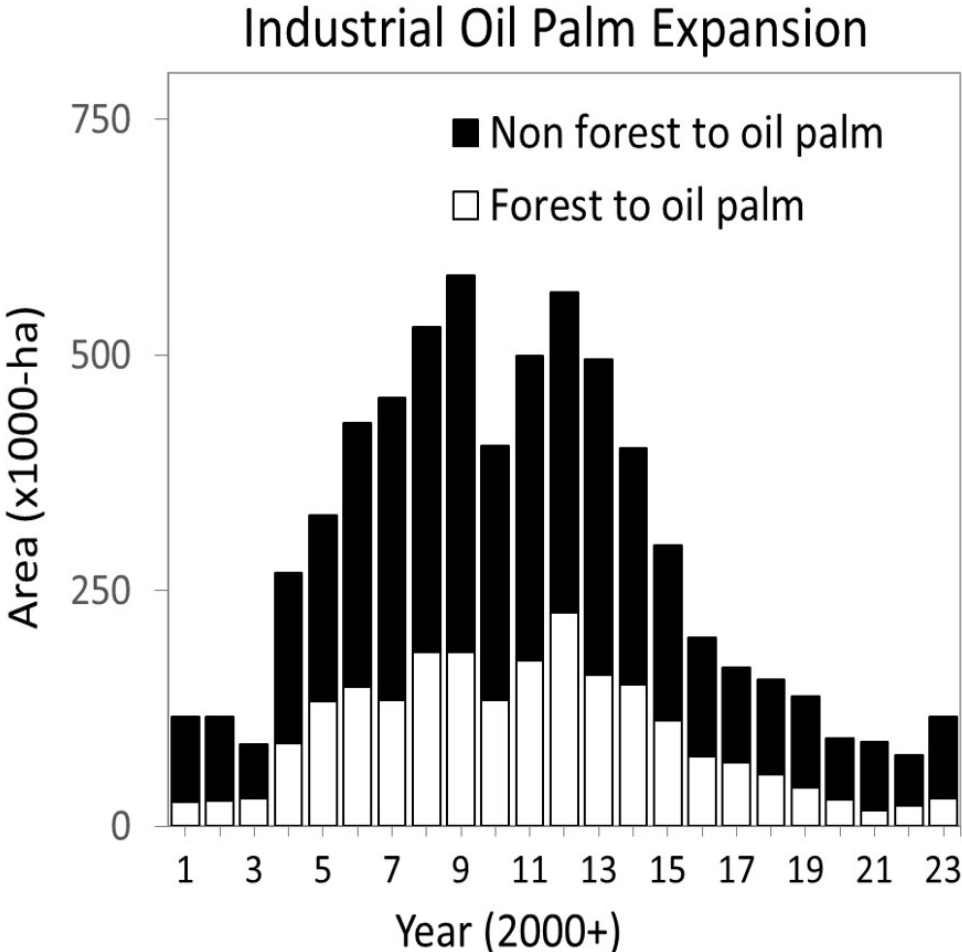
COMMODITY DRIVEN DEFORESTATION IN INDONESIA
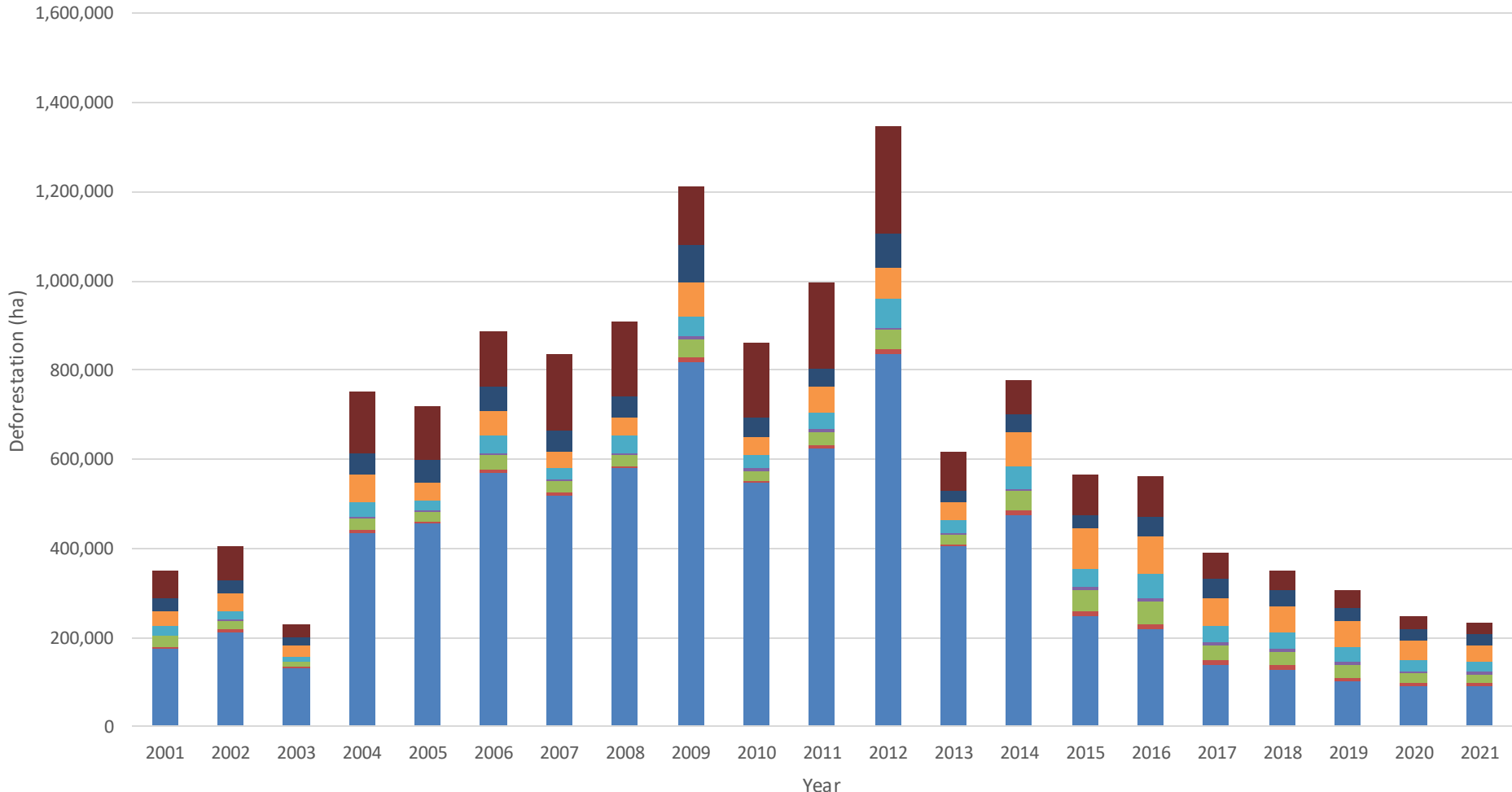
*2019-2021 preliminary results given lag time of assessment;
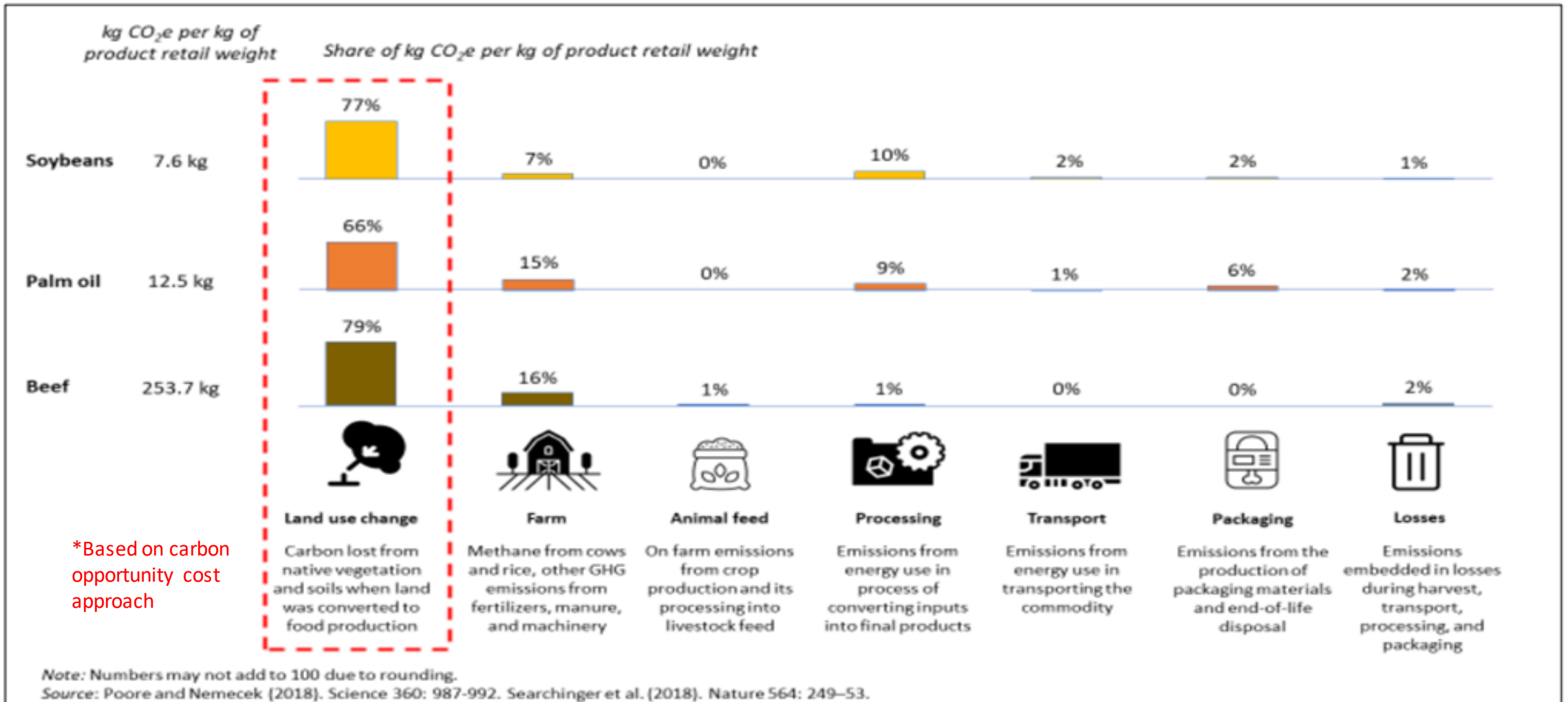Source: Goldman et al 2020

Legend: oil palm, soy, pasture, arabica coffee, robusta coffee, cocoa, rubber, timber/woodfiber

INDUSTRIAL OIL PALM EXPANSION IN INDONESIA

Source: TheTreeMap 2024

THE MOST GREENHOUSE GAS EMISSIONS OCCUR AT THE START OF SOFT COMMODITY VALUE CHAINS

kg CO_2e per kg of product retail weight

Share of kg CO_2e per kg of product retail weight

	kg CO_2e per kg	Land use change	Farm	Animal feed	Processing	Transport	Packaging	Losses
Soybeans	7.6 kg	77%	7%	0%	10%	2%	2%	1%
Palm oil	12.5 kg	66%	15%	0%	9%	1%	6%	2%
Beef	253.7 kg	79%	16%	1%	1%	0%	0%	2%

Land use change — Carbon lost from native vegetation and soils when land was converted to food production

Farm — Methane from cows and rice, other GHG emissions from fertilizers, manure, and machinery

Animal feed — On farm emissions from crop production and its processing into livestock feed

Processing — Emissions from energy use in process of converting inputs into final products

Transport — Emissions from energy use in transporting the commodity

Packaging — Emissions from the production of packaging materials and end-of-life disposal

Losses — Emissions embedded in losses during harvest, transport, processing, and packaging

*Based on carbon opportunity cost approach

Note: Numbers may not add to 100 due to rounding.

Source: Poore and Nemecek (2018). Science 360: 987-992. Searchinger et al. (2018). Nature 564: 249–53.
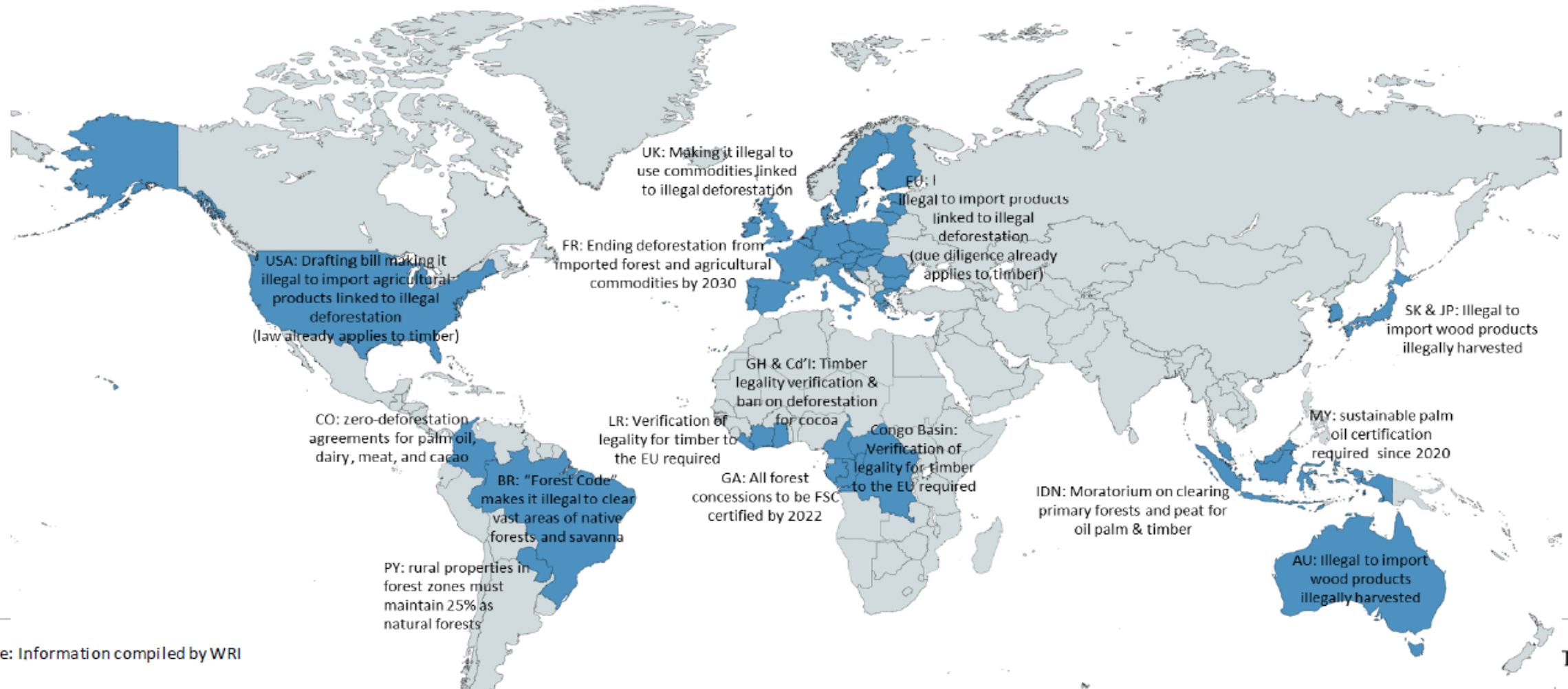
AN EVOLVING AND INCREASINGLY BUSY SPACE OF INITIATIVES ADDRESSING DEFORESTATION AND RELATED ISSUES
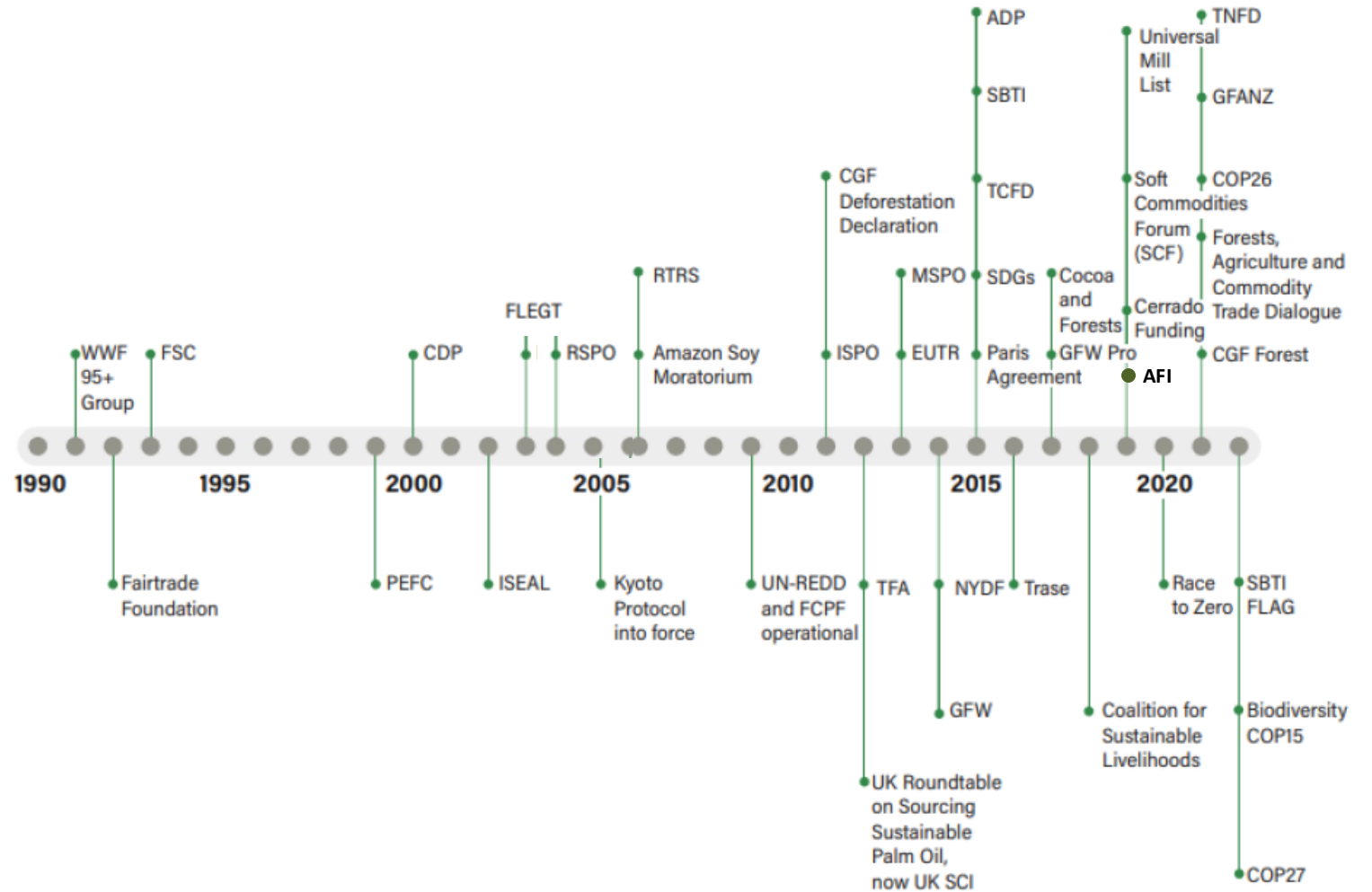
EMERGING NORMS FOR LEGALITY, SUSTAINABILITY AND TRACEABILITY

A growing number of countries have policies in place to support green soft commodity value chains

UK: Making it illegal to use commodities linked to illegal deforestation

EU: Illegal to import products linked to illegal deforestation (due diligence already applies to timber)

FR: Ending deforestation from imported forest and agricultural commodities by 2030

USA: Drafting bill making it illegal to import agricultural products linked to illegal deforestation (law already applies to timber)

SK & JP: Illegal to import wood products illegally harvested

GH & Cd'I: Timber legality verification & ban on deforestation for cocoa

CO: zero-deforestation agreements for palm oil, dairy, meat, and cacao

LR: Verification of legality for timber to the EU required

Congo Basin: Verification of legality for timber to the EU required

MY: sustainable palm oil certification required since 2020

BR: "Forest Code" makes it illegal to clear vast areas of native forests and savanna

GA: All forest concessions to be FSC certified by 2022

IDN: Moratorium on clearing primary forests and peat for oil palm & timber

PY: rural properties in forest zones must maintain 25% as natural forests

AU: Illegal to import wood products illegally harvested

Source: Information compiled by WRI

HOW DO TRACEABILITY AND TRANSPARENCY HELP ADDRESS FOREST LOSS?

WHAT DO TRACEABILITY AND TRANSPARENCY MEAN TO YOU?

Traceability and transparency are not solutions in themselves but are necessary to support decisions by supply chain actors that affect forest cover.

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FRAMEWORKS FOR ACHIEVING COMMITMENTS AND MEETING STANDARDS/REQUIREMENTS
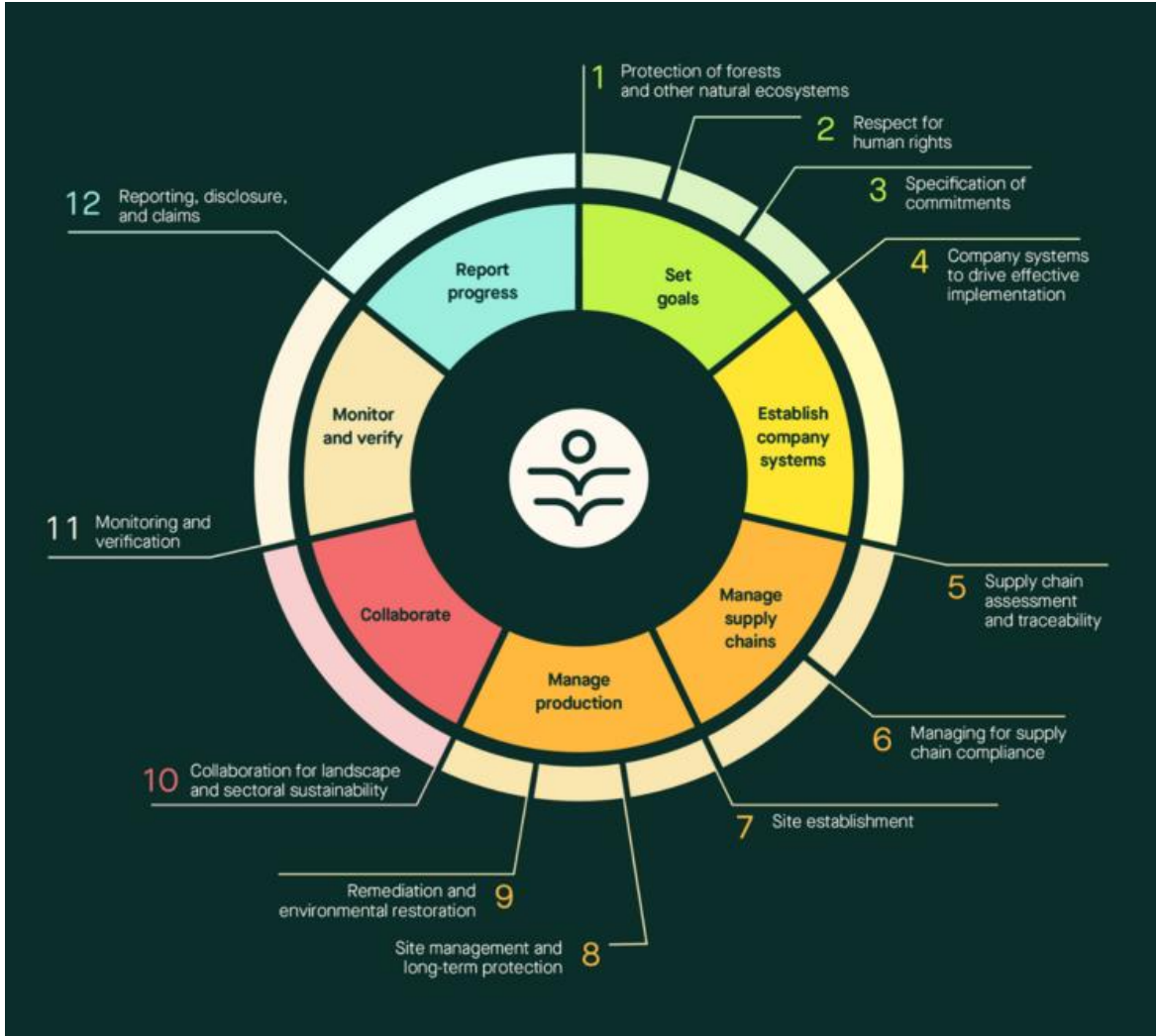
FIGURE B1-1 | OECD-FAO five-step framework for risk-based due diligence

A FIVE-STEP FRAMEWORK

1. Establish strong company management systems
2. Identify, assess, and prioritize risk in the supply chain
3. Design and implement a strategy to respond to identified risks
4. Verify supply chain due diligence
5. Report on supply chain due diligence

Note: OECD = Organisation for Economic Co-operation and Development; FAO = Food and Agriculture Organization of the United Nations.

Sources: a. FAO 2022b, Box 3.2, 59; b. OECD and FAO 2016; c. OECD and FAO Forthcoming.

There are a lot of necessary data points…

What metrics to report on?

Where are the areas that need to be protected?

What is my baseline?

What is my remaining deforestation footprint?

What is a reasonable timeline for implementation?

How much of my supply is DCF?

What constitutes non compliance?

Which alerts are actually non compliances?

How to monitor for compliance?

Where is my own supply coming from?

What impact are these efforts having on landscapes?

How to assess risks associated with my supply?

Which areas to prioritize for collaboration?

How much is non compliant? Non traceable? Engaged?

How to assess progress?

How to use data to prioritize engagement?

How much area needs to be remediated

THE "BEST" DATA, INDICATORS, & SYSTEMS MAY DIFFER DEPENDING ON THE USE CASE

Monitoring and responding to alerts and/or grievances in near real time

Assessing Risk (procurement or investment) and prioritizing interventions

Evaluating and reporting progress for DCF and GHG commitments

Regulatory compliance and Due Diligence

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WHEN YOU ARE LOOKING AT AN INDIVIDUAL SITE LEVEL, THINGS ARE "RELATIVELY" STRAIGHT FORWARD…

Detected by a single alert system
High confidence: detected more than once by a single alert system
Highest confidence: detected by multiple alert systems

BUT WHEN LOOKING AT INDICATIVE SUPPLY BASES FOR A LARGE INDIRECT SUPPLY CHAIN, THINGS GET MUCH MORE COMPLICATED
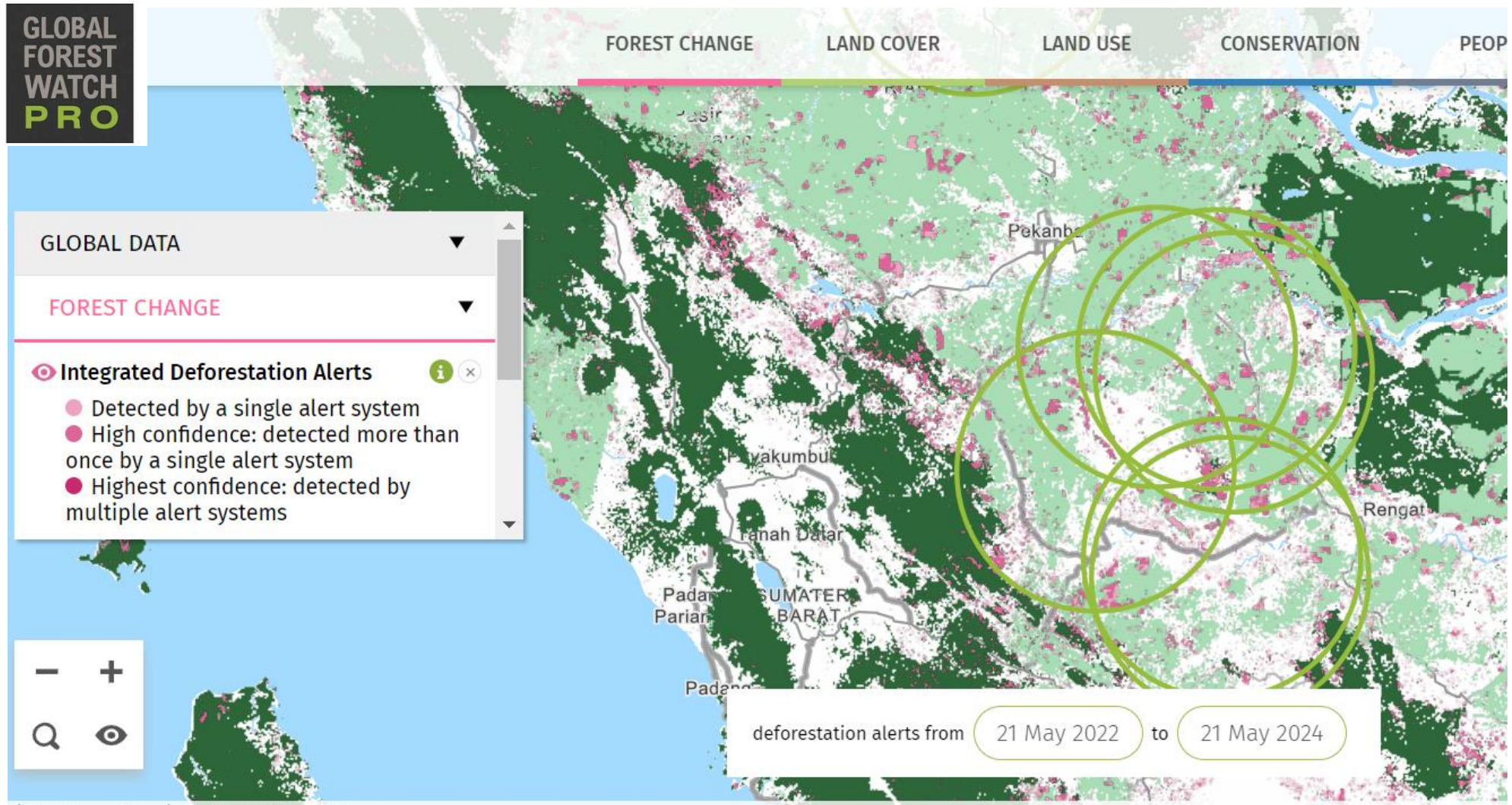
DATA AVAILABILITY EXAMPLES

A great deal of data is available in the public domain and serves as the basis for more bespoke analyses in private platforms. A few examples:

- **Forest:** SBTN Natural Lands (and Forest Base Map) + JRC 2020 base map
- **Palm extent:** Global 2021 oil palm extent including age estimates (Descales et al 2024)
- **Change:** Annual TCL + Integrated GLAD, GLAD S2, RADD alerts
- **Carbon:** Global carbon flux and biomass (Harris et al)
- **Assets:** Universal Mill List and RSPO member concessions (updated regularly)
- **Imagery:** Planet <5M monthly images
- **Supply chains:** Trase supply chain trade flows

FIGURE 5 | Availability of crop data for monitoring supply chains

Source: Goldman 2022.

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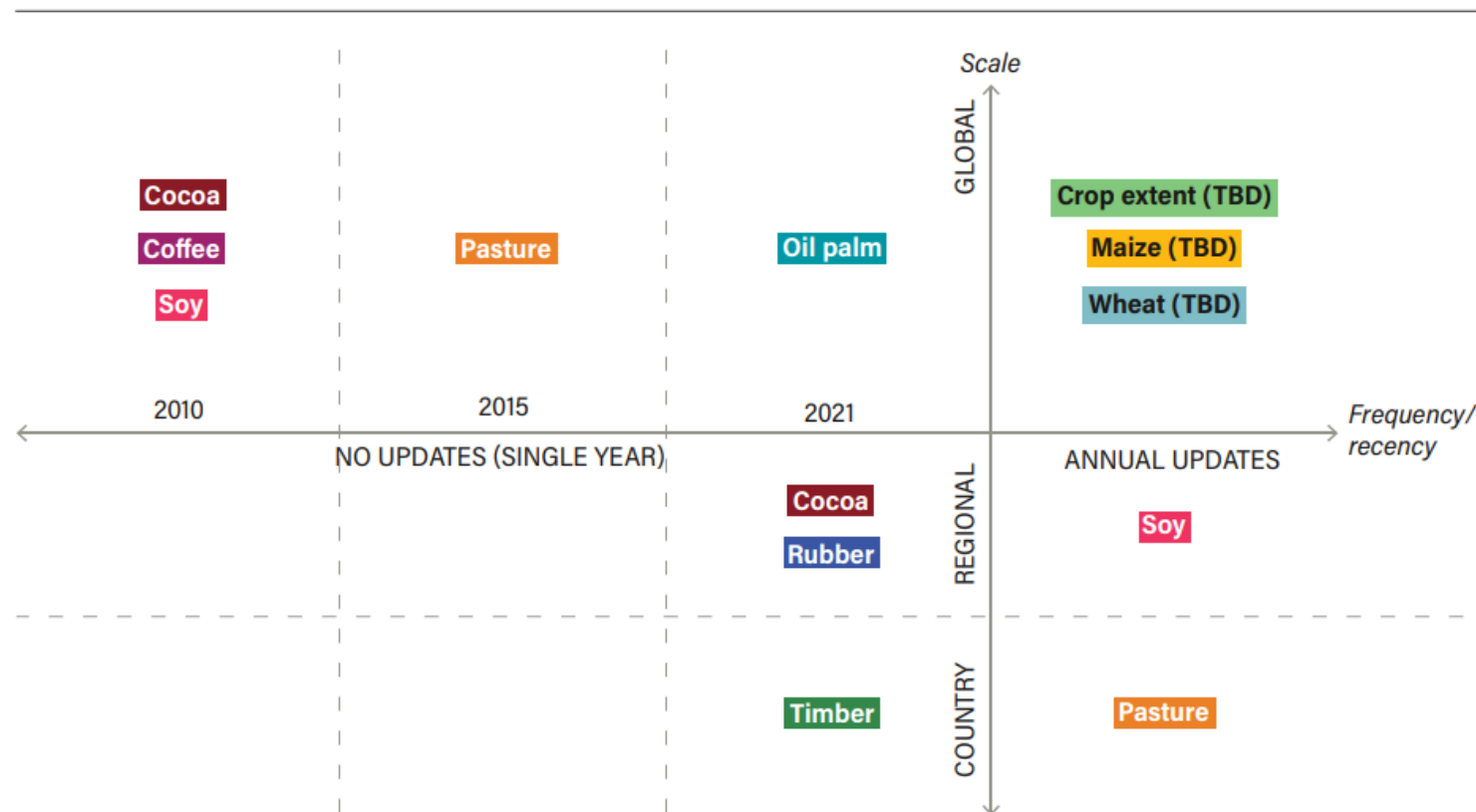
REPORTING METRICS ARE JUST AS IMPORTANT AS THE UNDERLYING DATA …

For Non DCF areas - calculate "deforestation footprint" as hectares of natural forest loss for both production units and sourcing areas

See which sourcing areas have no forest loss or negligible deforestation risk

See which production units have no natural forest loss + negligible risk since cutoff date

Then add near real time alerts, contextual data, and high res imagery for ongoing monitoring and response and risk mitigation

DCF sourcing area (A1)

Unknown origin (B1)

Non-DCF origin (B2)

Farm level monitoring (A2)

Certification (A3)

NDPE IRF

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RISK ASSESSMENT AND RISK BASED APPROACHES

- Identify "riskier" areas in a supply base for more engagement where:

  – Non-compliant deforestation may have occurred

  – There is a higher possibility of it occurring in the future

- Benchmark relative overall relative risk for countries or subnational jurisdictions

- Identify areas of "negligible risk" that could be considered for streamlined deforestation free claims (with safeguards in place)
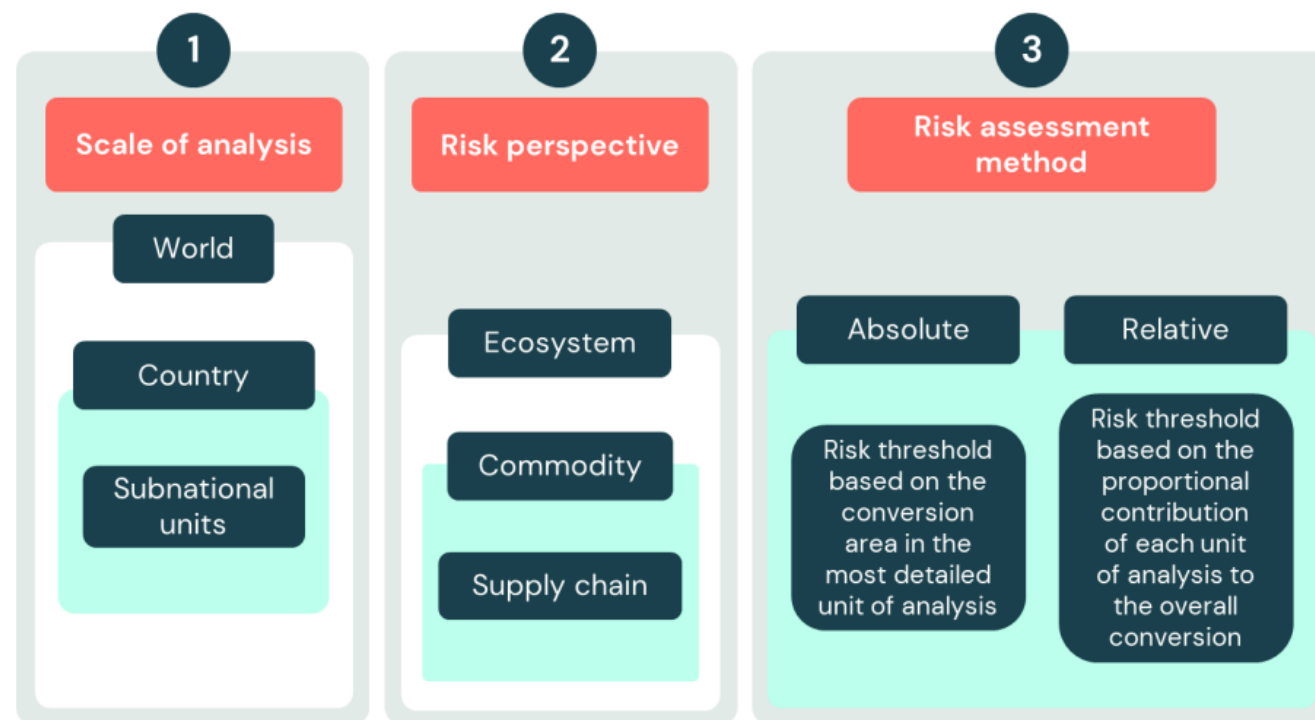

Figure 1: Key concepts and methodological choices for national and subnational risk categorisation of commodities' origins

Source: Trase. (2023).

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POCG
Palm Oil Collaboration Group

GOAL: Risk-based approach for Palm Independent Smallholders to demonstrate, and support a just transition to, DCF

Principles for a just ISH transition to D-free

1. **Direct limited resources to farmers & communities to support livelihoods and address root causes of deforestation**, not only to supply chain segregation infrastructure & traceability systems
2. **Collective investment, governance & multi-stakeholder action** to support local government in high priority areas
3. **Risk-based traceability to include smallholders in supply chains** during step-wise traceability data collection

Negligible risk: Green lane for smallholders

Traceable to defined area with **negligible D risk**
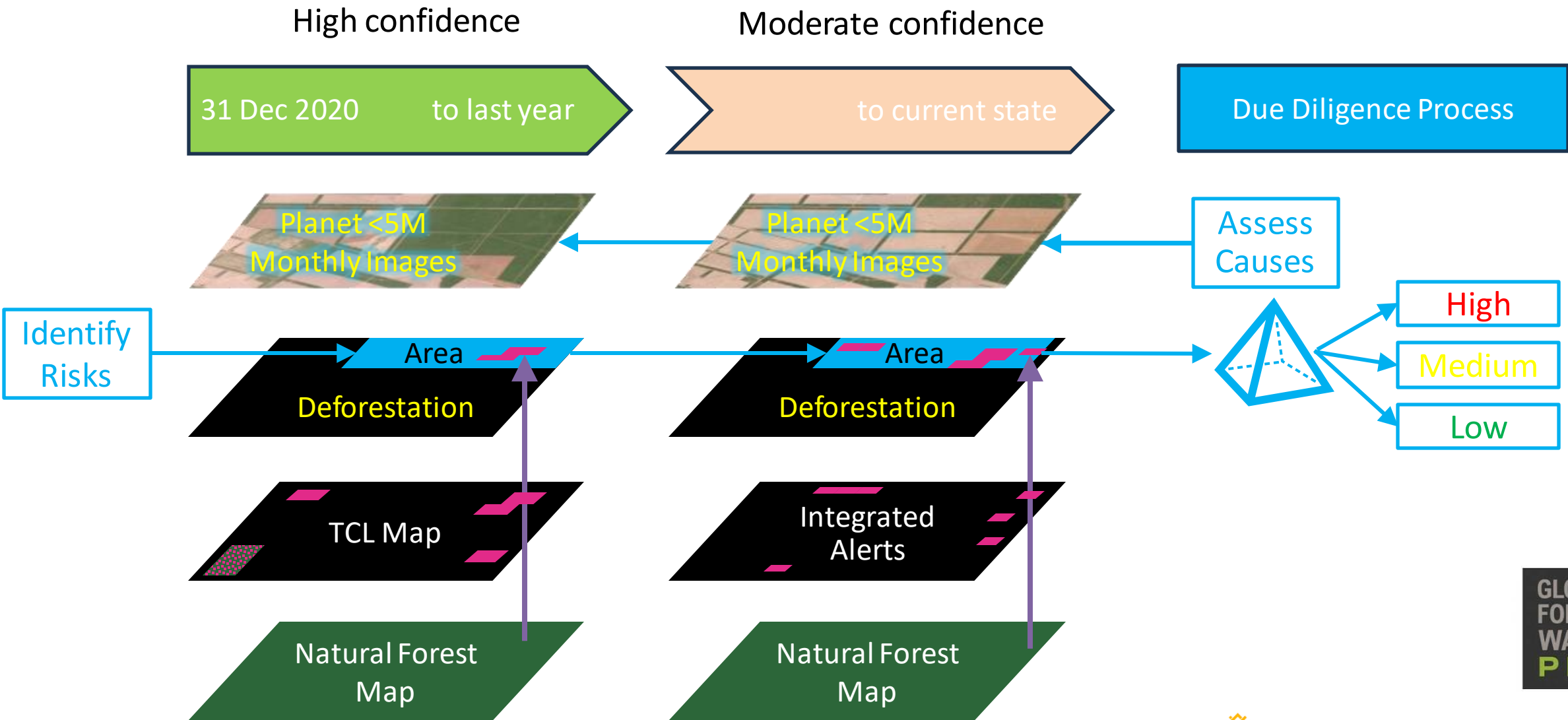
Traceable to ISH plot

Purchase from intermediary

Non-negligible risk areas

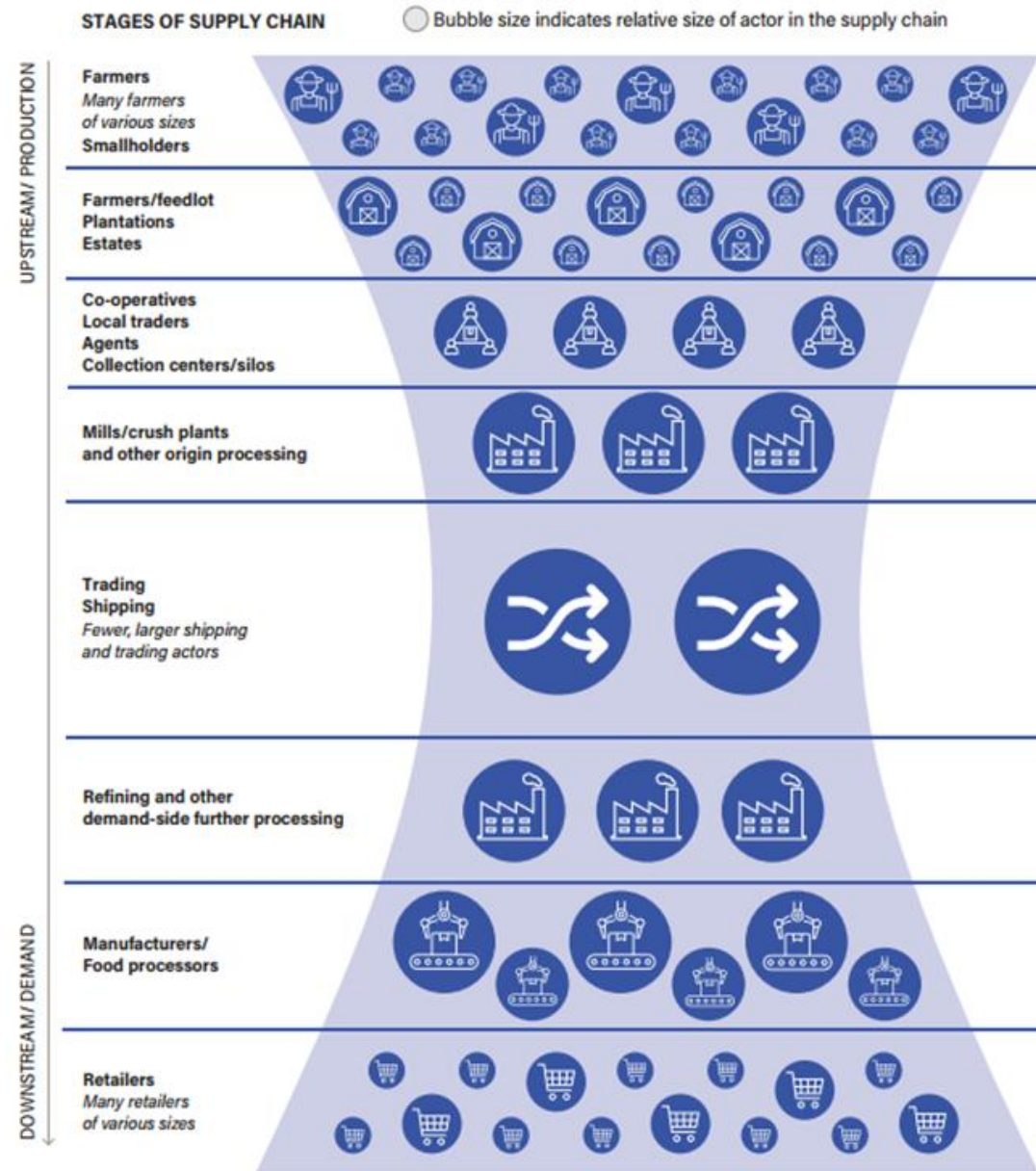Traceable to defined area with **D risk mitigation**

- **Collective action to support smallholders & mitigate deforestation risk**
- **Landscape level & supporting government smallholder programmes & social forestry etc**
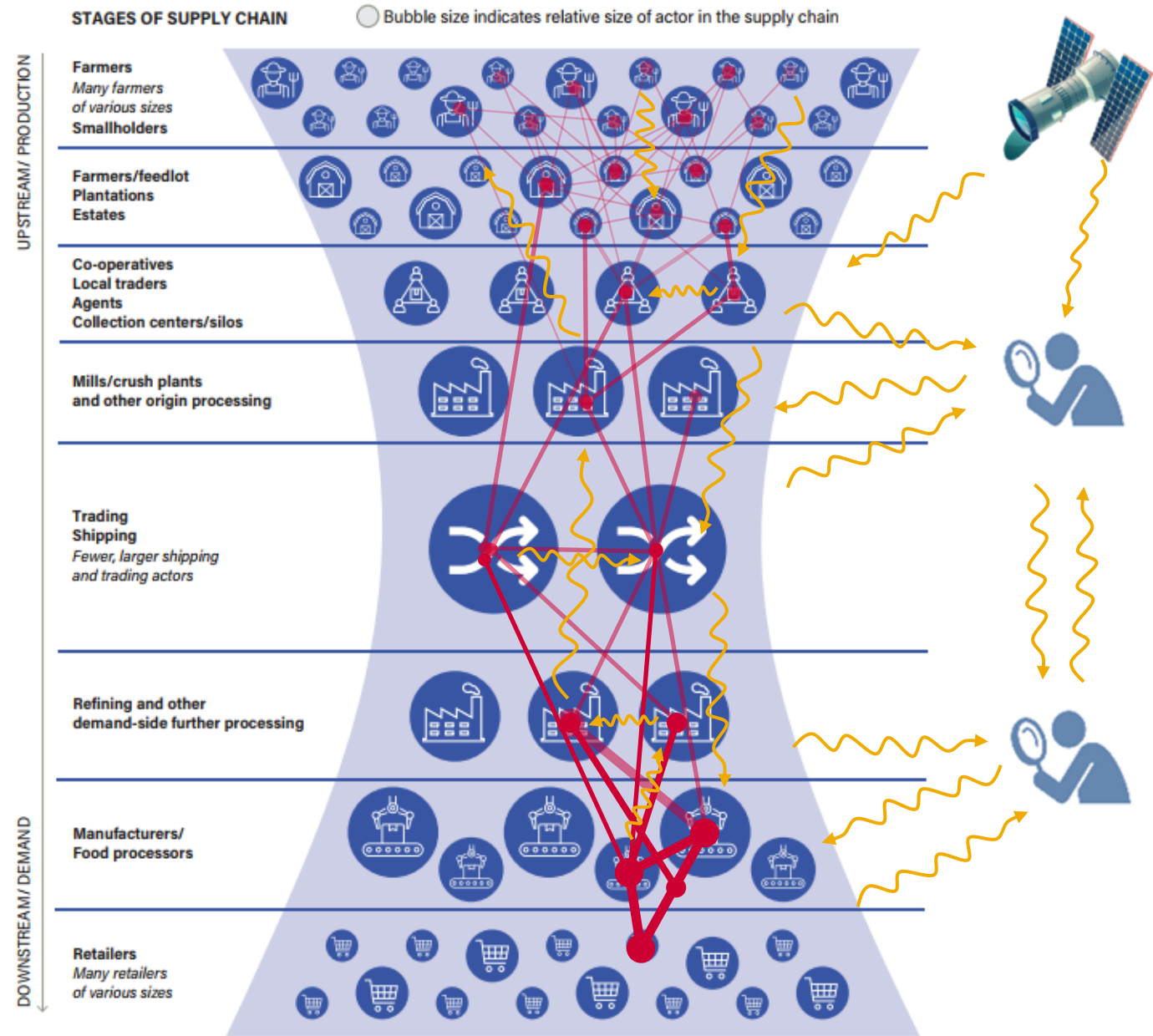
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AND THEN THERE IS EUDR DD...

SUPPLY CHAINS ARE COMPLEX...

STAGES OF SUPPLY CHAIN — Bubble size indicates relative size of actor in the supply chain

UPSTREAM/ PRODUCTION

Farmers
Many farmers of various sizes
Smallholders

Farmers/feedlot
Plantations
Estates

Co-operatives
Local traders
Agents
Collection centers/silos

Mills/crush plants
and other origin processing

Trading
Shipping
Fewer, larger shipping and trading actors

DOWNSTREAM/ DEMAND

Refining and other
demand-side further processing

Manufacturers/
Food processors

Retailers
Many retailers of various sizes

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STAGES OF SUPPLY CHAIN ⬤ Bubble size indicates relative size of actor in the supply chain

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Many retailers of various sizes

● — ● Commodity flow

〜→ Information flow

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WHAT DO YOU THINK?

Where is there the most confusion or room for improvement with regard to how data is applied to different use cases?

How can we maximize the impacts we are having by utilizing traceability and transparency data and systems without getting lost in the weeds?

# SUCCESS FACTORS AND CONSIDERATIONS FOR TRACEABILITY AND TRANSPARENCY

LOOKING AT SUCCESS FACTORS AND ENABLING CONDITIONS RELATED TO TRACEABILITY AND TRANSPARENCY ....

- Provides an updated evidence base on traceability and transparency in commodity value chains

- Assesses lessons for different stakeholders and direction of travel

- Scope: Cattle, palm oil, soy, cocoa, rubber, coffee and wood

TOOLS AND INITIATIVES

Figure source: Analysis by authors
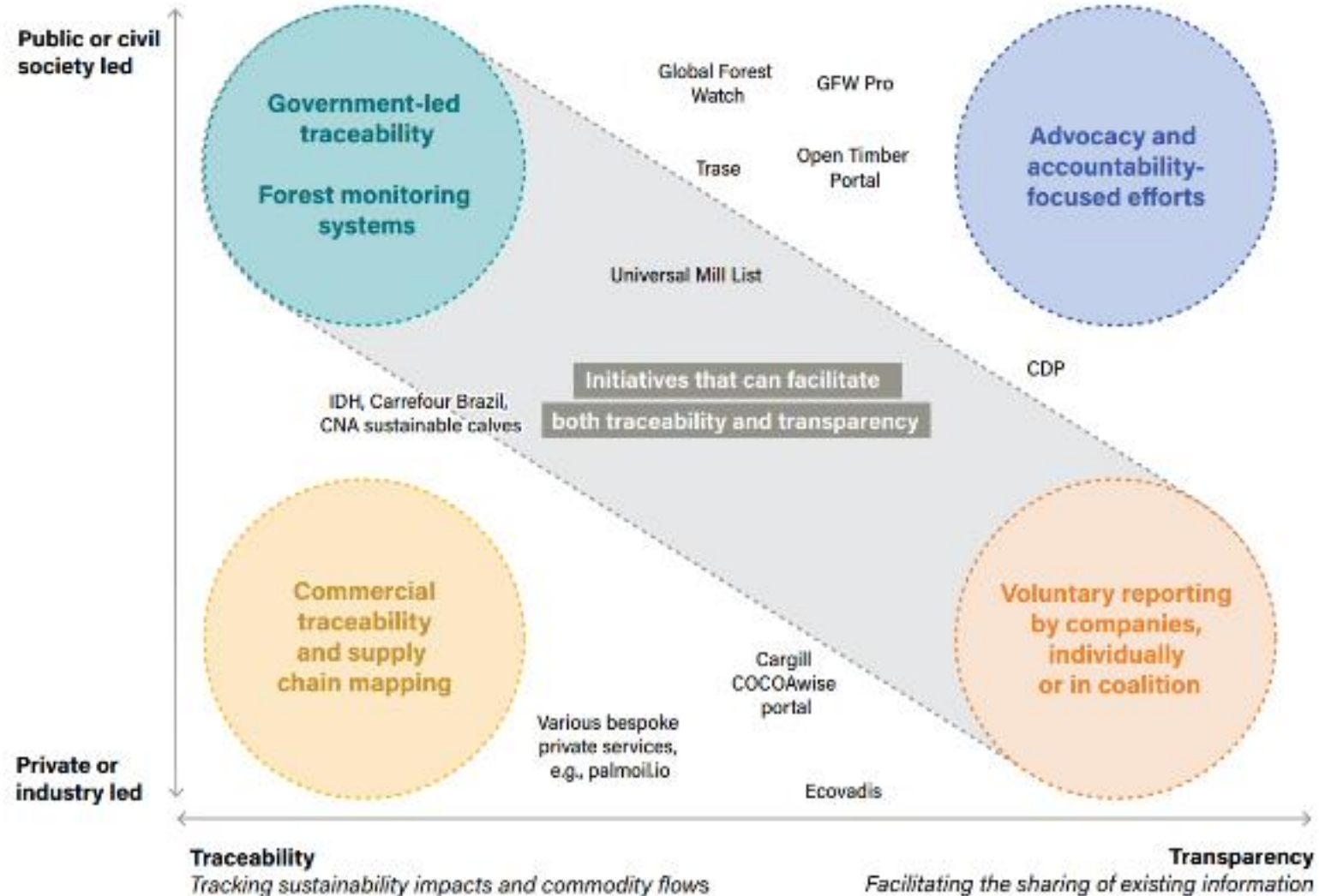
SUCCESS FACTORS

✓ Public funding and civil society involvement in design and management

✓ Beneficial regulatory environment

✓ Shared goals and trust

✓ Equitable cost sharing

✓ Data is accessible, metrics are comparable

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PUBLIC VS PRIVATE DATA

- **Open data** builds wider trust and accountability – third parties can check and build on published data to develop more tools and analyses, which in turn supports a more "open data ecosystem" which

  - ✓ Supports greater alignment,

  - ✓ Decreases duplicative efforts

  - ✓ Enables harmonized use and impact of data at scale

- **A market of competing service providers** drives innovation that can deliver more helpful insights and thus better information to decision-makers

  - However, if safeguards are not put in place, commercialization of data gathering, processing, and analysis **can exacerbate existing inequalities in supply chains and exclude smallholders from accessing or owning data related to their own operations**

# LESSONS LEARNED ON DATA DISCLOSURE

- ✓ Data disclosure must respect the need to protect individuals.

- ✓ Data disclosure must also respect commercial and privacy concerns.

- ✓ Not all data need to be made public to make progress.

- ✓ Data disclosure can build the credibility of traceability and transparency initiatives by enabling external verification.

- ✓ Data disclosure decisions need to consider the trade-offs between safeguards and benefits

WHAT DO YOU THINK?

- How do you see the roles and tradeoffs of private vs public data and platforms?

- How can we better prioritize investment in solutions that build collaboration, consistency, credibility and more equitable access to information while still driving innovation?

DATA CHALLENGES, INITIATIVES AND OPPORTUNITIES

TWO BASIC "BUCKETS" OF DATA CHALLENGES

Geolocations and Traceability

Forest and Land Monitoring

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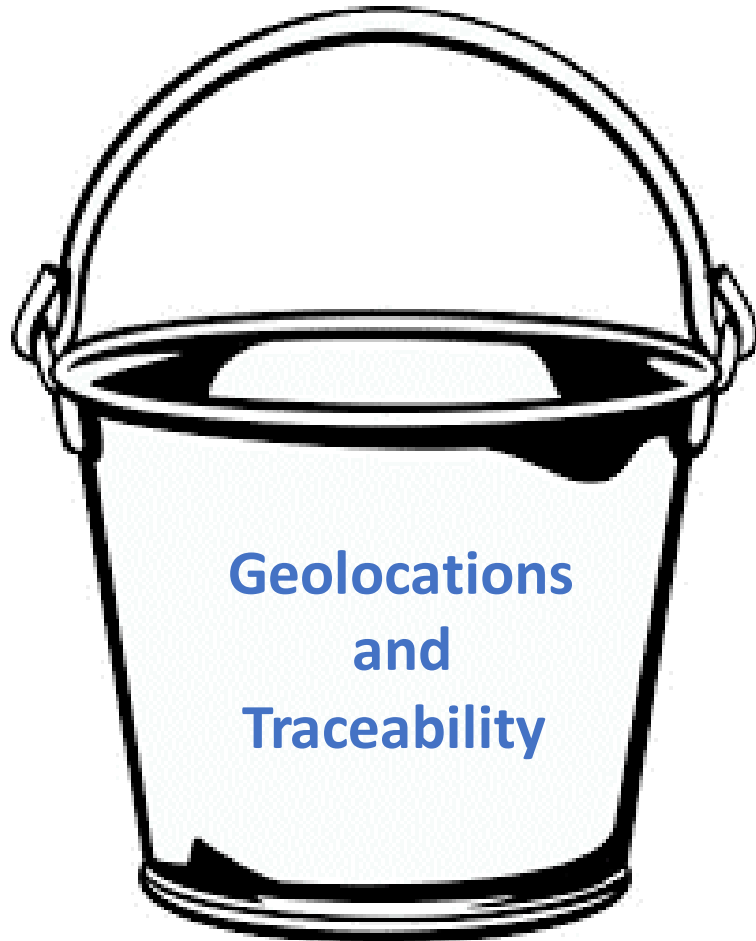
GEOLOCATIONS AND TRACEABILITY

- **Data Interoperability and standardization of data**
- **Data sharing**
- **Geolocation data gap**

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DATA INTEROPERABILITY AND STANDARDIZATION

Challenges:

- Standardizing geometries
  - Standardizing attributes (ID systems, naming)
- Data quality and validation

Examples of Initiatives Underway:

- DIASCA
- Preferred by Nature Geolocation Data Sharing Protocol
- IDs and Attributes:
  - UML (efforts underway on on universal refineries and crushers lists); RSPO PRISMA and digitization; AgStack, Open Supply Hub; other sector-specific efforts; Indonesian gov efforts
- Verification/QC: UML approach for mills, Meridia Verify

→ *Opportunities: Cross sectoral (and?) sector specific standardization formatting, attributes, validation protocols, ID systems*

Preferred by Nature

Geospatial Data Sharing Protocol
For deforestation-free commodity value chains

The GDS Protocol   September 2023

DATA SHARING

Technical Considerations:
- Platform Incompatibility
- Data Formatting
- Data Volume
- Data Storage and processing infrastructure constraints

Legal Data Restrictions and Commercial Sensitivities:
- Lack of clarity of legal permissions for data sharing (e.g. data privacy laws)
- Lack of clarity or misalignment between producer countries and buyer expectations
- Supplier willingness to share data
- Political challenges of data transparency

Ethical Considerations:
- FPIC for mapping and sharing of data
- Potential livelihood, land rights and legal prosecution implications
- Lack of clarity on data ownership and rights
- Equitable cost (and profit) sharing for data solutions and investments

→ *Opportunity – prioritizing solutions built on open source, shareable APIs -- digital public infrastructure*

→ *Opportunity – cross sectoral examples and lessons on data sharing agreements, NDAs; improving standardization on data sharing requests*

→ *Opportunity –Developing and building consensus best practice principles and guidance around data sharing*

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GEOLOCATION DATA GAP/LACK OF CENTRALIZED DATA COLLECTION AND MANAGEMENT

Challenges:

- Proliferation of individual collection efforts and systems – inefficient use of time and resources

- Unclear division of labor/roles and responsibilities (between gov registration systems, certification systems, individual companies up and downstream, support orgs -who does what on resourcing, data collection and management)

- Smallholder and SME tech capacity and incentives to create and share boundary data

GEOLOCATION DATA GAP/LACK OF CENTRALIZED DATA COLLECTION AND MANAGEMENT

Initiatives Underway:

- Centralized data collection and processing – RSPO PRISMA; UML partners on universal refineries and crushers lists; National registration and traceability systems; other sector specific efforts (e.g. cocoa, rubber); ISEAL on cross-sectoral; TRASE;

- Tech/AI automated boundary detection

- First mile traceability and mapping apps enabled for smallholders (e.g. Koltiva; PemPem, Meridia, Geotraceability, Hamurni, Ground, etc); individual company efforts, private platforms (e.g. EQ)

- Traceability system pipelines with government: IDH and Solidaridad

→ *Opportunity: Scaling of coordinated data collection and aggregation; creating pipelines to connect individual databases with government systems and a universal registry system*

FOREST MONITORING

- **Definitions and Metrics**
- **Land Cover/Land Use Mapping (Extent and Change)**

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DEFINITIONS AND METRICS

Challenges:

– Conflicting definitions between producer country regulations, buyer country regulations and voluntary commitments

– Inconsistent, subjective, unformatted narrative text description used to build land cover and use classes

– Lack of clarity and consistency on how definitions translate into compliance metrics/measurements

Initiatives Underway:

– Accountability Framework Initiative, SBTN, SBTI – definitions, targets, KPIs
– POCG PPBC Negligible risk, IRF
– RSPO P&C Review and EUDR Gap Assessment

LAND COVER/LAND USE MAPPING

Challenges:

- Narrative definitions in regulations aren't easily mappable using remote sensing

- There is no definitive land cover/use map reference

- Multiple and often contradicting overlapping land cover datasets

- Missing data

- Need to incorporate local/regional context and validation data

Alignment initiatives:

- FDaP Community Machine Learning model (palm probability layer building on many existing layers); WHISP

→ *Opportunity: Building momentum around towards convergence of proof rather than reliability on single layers*

HOW TO GET INVOLVED?

- WE NEED YOU! We are looking for active participation!

- To co-develop, build momentum around, test and deploy:

  – Standardized approaches for on data formats, attributes and validation processes;

  – Universal Asset Registries for palm (building on the UML) and supporting methodologies, protocols and pipelines;

  – Best practice guidelines on data ethics and data sharing;

  – Further development of the community learning model, palm probability and WHISP – feedback, method alignment, training data input

- Helping us to identify other challenges and opportunities, initiatives we can align with and support

WHAT DO YOU THINK?

- Which of these are the main data challenges for you?

- Do you think these are some solutions worth working together on?

- Are we missing initiatives that are already working on some of these?