



CLIMATE AND RESILIENCE AND DISASTER MANAGEMENT SEMINAR -2026

Panel Discussion: Disaster Management in a Multi-Hazard World

Beyond Compliance: Building a Trusted Geospatial Intelligence Backbone for Deforestation-Free and Hazard-Resilient Supply Chains



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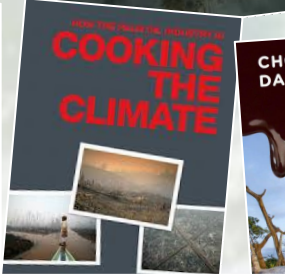
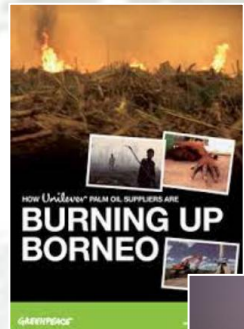
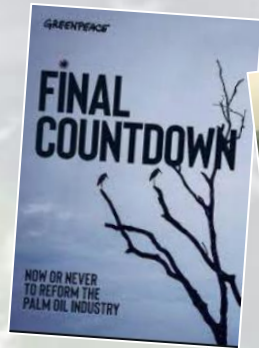


How it got started

Air pollution over Southeast Asia in October 1997



From Hazard to Action: How Deforestation-Free Commitments Began



Bloomberg TV: Who's Responsible for Singapore Forest Fires?

Nestlé No Deforestation Commitment

Background: In 2010, Nestlé committed to deforestation-free supply chains. Our Regulatory Sourcing Standard is the first of its kind to be implemented by a multinational corporation.

Deforestation-free deforestation:

- Not expanding or producing on:
 - Areas conserved within High Carbon Stock (HCS) forests and habitat such as peatlands, wetlands, savannas and other
 - High Carbon Stock (HCS) forests, as defined in the High Carbon Stock Approach (HCSA).
 - Plantations of any depth, unless where farmers have a correct permit.
 - HCSA protected areas category 1. For UNESCO World Heritage Sites and wetlands on the Ramsar List.
- Identifying, protecting and avoiding producing on High Carbon Stock (HCS) lands on and around the production facilities after 31st December 2015, as defined in the High Carbon Stock Approach (HCSA).
- Having a forest management plan in place in the case of agricultural production of pulp and paper.

Single Point of supply paper: pulp, paper and cardboard. Issue commitments account for 4 million tonnes overall annually by Nestlé.

As of March 2020, 90% of all purchased forest-risk commodities (palm oil, soy, beef and pork) were sourced from deforestation-free supply chains. This includes 85% of all palm oil, 95% of all soy, 95% of all beef and 95% of all pork.

85% Global No Deforestation Status 85%

85% of all palm oil, 95% of all soy, 95% of all beef and 95% of all pork.

PORTAL DA Moratória da Soja

CERTIFIED SUSTAINABLE PALM OIL™ RSPO

The Consumer Goods Forum

Forest Positive

wilmar

No Deforestation, No Peat, No Exploitation Policy

DECEMBER 8th, 2013

Purpose:

Wilmar International recognizes that while plantation development has contributed significantly to economic development, deforestation and other unsustainable practices have worked closely with other growers, traders, processors, NGOs, end-user companies, human and community rights, to advance this industry transformation, we hereby announce this company policy:

- No Deforestation**
 - No development of High Carbon Stock (HCS) Forests
 - No burning
 - Progressively reduce greenhouse gas (GHG) emissions on existing plantations
- No Development on Peat**
 - No development on peat regardless of depth.
 - Best Management Practices for existing plantations on peat
 - Where feasible, explore options for peat restoration with expert stakeholders and communities
- No Exploitation of People and Local Communities**
 - Respect and support the Universal Declaration of Human Rights and migrant workers
 - Facilitate the inclusion of smallholders into the supply chain
 - Respect the rights of indigenous and local communities to give or withhold their Free, Prior and Informed Consent (FPIC) to operations on lands to which they hold legal, communal or customary rights
 - Resolve all complaints and conflicts through an open, transparent and consultative process.

Care to our policy is a commitment to creating a transparent sourcing network with full transparency. We look forward to close consultation with communities, NGOs, our industry partners, and financial institutions to ensure effective implementation of these policies.

HCSA

HIGH CARBON STOCK APPROACH

TFA 2020

Amsterdam Declarations Partnership

Towards deforestation-free sustainable commodities

Cocoa & Forests Initiative

Accountability Framework initiative



REGULATION (EU) 2021/115 OF THE EUROPEAN PARLIAM AND OF THE COUNCIL of 31 May 2021 on the making available on the Union market and the report from the Union of certain commodities and products associated with deforestation and forest degradation and spreading.

REGULATION (EU) No 995/2010 (Text with EEA relevance)

THE EUROPEAN PARLIAM AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 19(2) thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee (1),

After consulting the Committee of the Regions,

Acting in accordance with the ordinary legislative procedure (2),

Whereas:

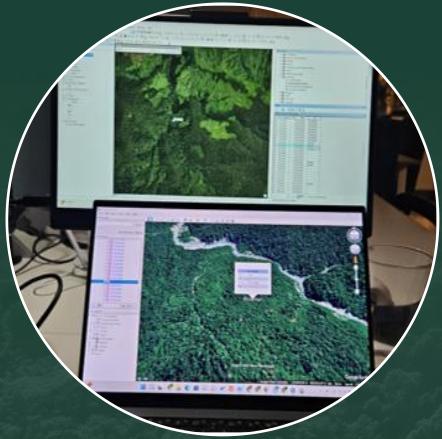
- Forests provide a broad variety of environmental, economic and social benefits, including timber and non-wood forest products and environmental services essential for humankind, as they harbour most of the Earth's terrestrial biodiversity. They maintain ecosystem functions, help protect the climate system, provide clean air and play a vital role for the purification of water and soils as well as for water retention and recharge. Large forest areas act as a moisture source and help prevent desertification of continental regions. In addition, forests provide subsistence and income to approximately one third of the world's population and the destruction of forests has serious consequences for the livelihoods of the most vulnerable people, including indigenous peoples and local communities who depend heavily on forest ecosystems. Furthermore, deforestation and forest degradation reduce essential carbon sinks. Deforestation and forest degradation also increase the likelihood of contact between wild animals, forest animals and humans, thereby increasing the risk of spreading new diseases and the risks of new epidemics and pandemics.
- Deforestation and forest degradation are taking place at an alarming rate. The Food and Agriculture Organization of the United Nations (FAO) estimates that 420 million hectares of forest – about 10% of the world's remaining forests, equating an area larger than the European Union – have been lost worldwide between 1990 and 2020. Deforestation and forest degradation are, in turn, important drivers of global warming and biodiversity loss – the two most urgent environmental challenges of our time. Yet, every year the world continues to lose 10 million hectares of forest. Forests are also heavily impacted by climate change and many challenges will need to be addressed to ensure the adaptability and resilience of forests in the coming decades.
- Deforestation and forest degradation contribute to the global climate crisis in multiple ways. Most importantly, they increase greenhouse gas emissions through associated forest fires, permanently removing carbon sink capacities, decreasing the climate change resilience of the affected area and substantially reducing its biodiversity and resilience to diseases and pests. Deforestation alone accounts for 11% of greenhouse gas emissions as stated in the Intergovernmental Panel on Climate Change (IPCC) special report on climate change and land of 2018.
- Climate breakdown induces the loss of biodiversity globally and biodiversity loss aggravates climate change, they are thus intrinsically linked, as recent studies have confirmed. Biodiversity and healthy ecosystems are fundamental to climate-resilient development. Insects, birds and mammals act as pollinators and seed dispersers and can help store carbon more efficiently, directly or indirectly. Forests also ensure the continuous replenishment of water resources and the prevention of droughts and their deleterious effects on local communities, including indigenous peoples. Directly reducing deforestation and forest degradation and eventually restoring forests and other ecosystems is the single largest nature-based opportunity for climate mitigation.

(1) OJ L 27, 14.2.2022, p. 88.

(2) Treaty of the European Parliament of 18 April 2002 (not yet published in the Official Journal) and decision of the Council of 16 May 2002.

From crisis → voluntary standards → corporate commitments → global frameworks → binding regulation

Key Geospatial role for Deforestation-Free Compliance Support



- Forest cover baseline
- Deforestation and degradation analysis



Geolocation of assets



- Legal ownership of landuse
- Indigenous and community rights



Supply chain & traceability

Why Geospatial Alone Is Not Enough for Deforestation-Free Compliance

- **Forest cover baseline:**

Existing forestcover maps use inconsistent definitions and thresholds, creating unreliable baselines.

- **Deforestation and degradation analysis:**

Satellite based change detection is often misaligned with local landuse contexts and cutoff dates.

- **Geolocation of assets:**

Many smallholder plots and facilities lack accurate, consistent, or updated spatial boundaries.

- **Legal ownership of landuse map:**

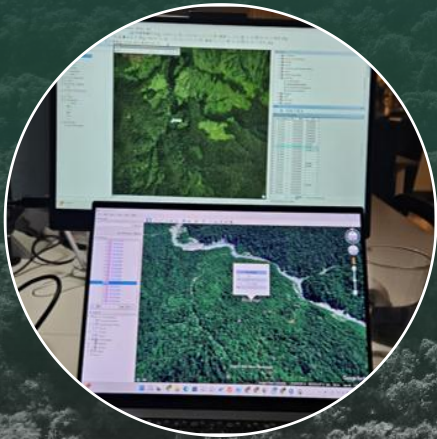
Legal landuse rights are often not mapped, not georeferenced, or not shared,

- **Indigenous and community rights**

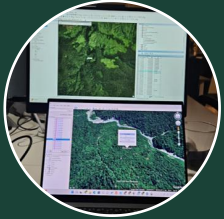
are mostly missing from official geospatial records.

- **Supply chain & traceability**

(customer → plot production): Spatial traceability rarely reaches from consumer down to individual production plots.



Geospatial Builds the Backbone, Real Transformation Happens on the Ground



Forest cover baseline:

Harmonized, multisource EO-based baselines with standardized definitions can serve as a unified, policy-ready forest-cover reference layer.

Deforestation and degradation analysis:

Machine-learning models trained on historical satellite time-series can detect deforestation and degradation at scale, with automated change alerts aligned to cut-off dates.



Geolocation of assets (plots & facilities):

High-resolution satellite imagery + AI-based parcel mapping can automatically detect and digitize smallholder and facility boundaries, closing the "missing plots" gap.



Legal ownership of land use map:

Geospatial platforms that integrate cadastral, concession, and permit data into a single GIS layer can align legal rights with physical land units, improving comparability with deforestation alerts.

Community rights & Indigenous peoples' areas:

Community led mapping with participatory GIS, drones, and AI-assisted interpretation of satellite imagery can formalize and spatialize customary and Indigenous land rights.



Supply chain & traceability (customer → plot):

Digital traceability platforms (blockchain style databases linked to geo-coordinates and satellite monitoring) can connect each product batch to its exact plot, enabling end-to-end spatial traceability.



Ground verification for accurate mapping and evidence support

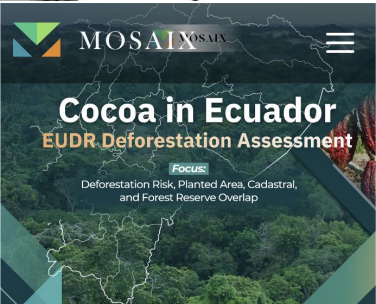


Stakeholder engagement in every level of supply chain actors



Support community land tenure registration and legalization

Study cases



Ecuador's Cocoa Sector and the EUDR: Key Findings, Risks, and What Comes Next



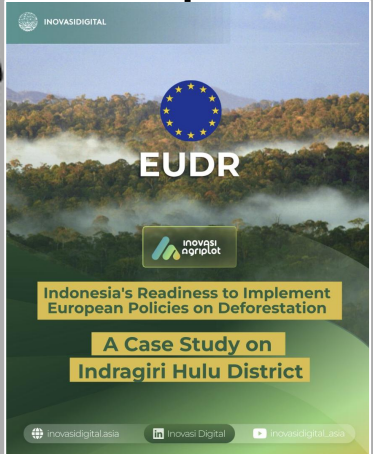
Kopi Fabriek and MosaIX: Strengthening Indonesia's Coffee in the EUDR Era

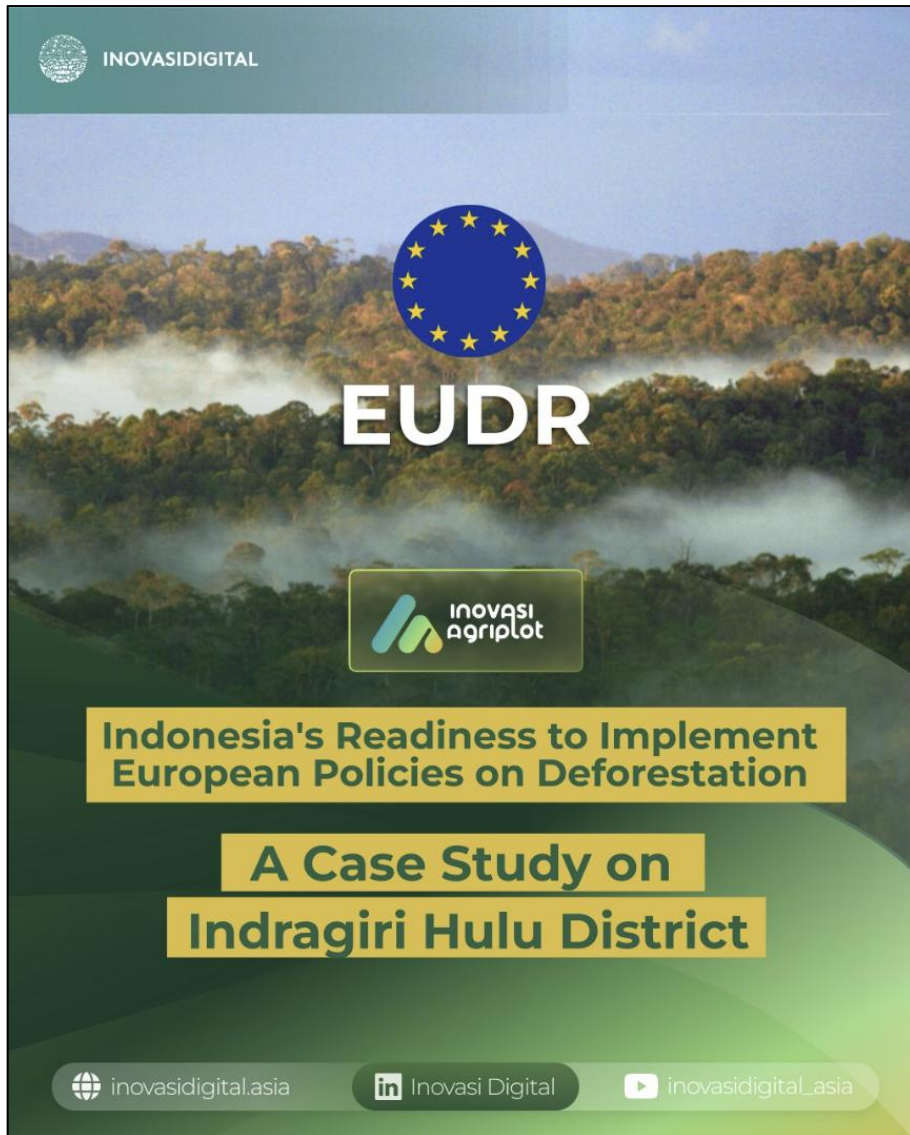


Gran Chaco Soy Traceability: Challenges, Assessment, and the Role of Technology in Ensuring EUDR Compliance



Implementing EUDR in the Soy Supply Chain: The Case of Mato Grosso





Key Summary

- About 49% of oil palm plantation areas in Indragiri Hulu are not compliant with EUDR requirements, mainly because they overlap with government-designated forest areas.
- This non-compliance creates serious risks across the supply chain, including:
 - Ineligibility to export to the EU market
 - Potential legal sanctions in Indonesia
 - Loss of trust from buyers and partners
 - Rejection of shipments at EU borders
 - Loss of international trade contracts
 - Financial losses, especially affecting smallholders



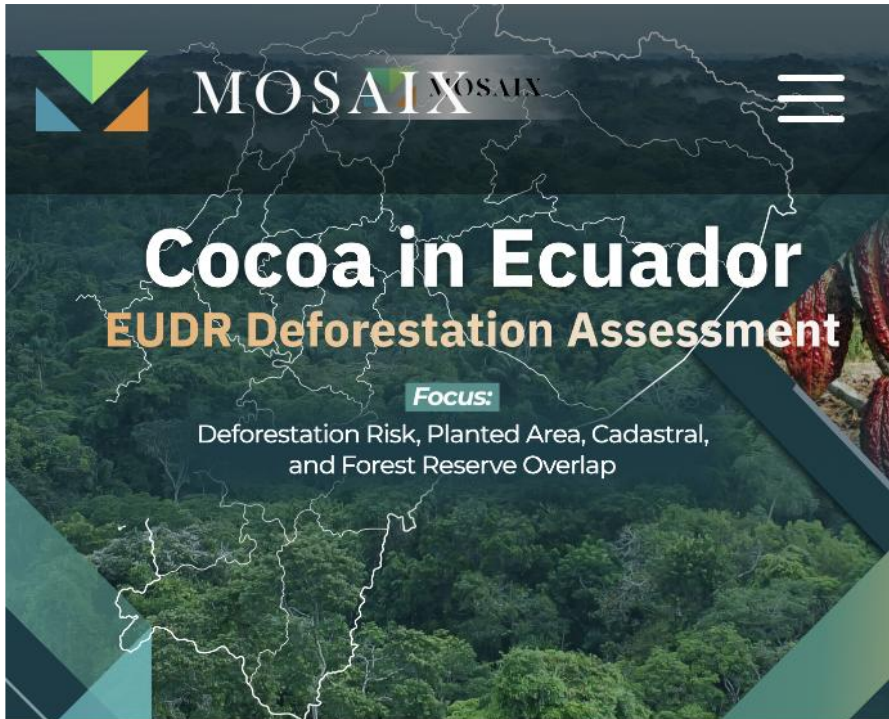
Core Insight

- Even though a significant portion of land is already compliant, nearly half of the supply base is at risk, not necessarily due to deforestation alone, but largely due to legal and spatial land status issues.
- EUDR readiness is less about detecting deforestation, and more about resolving land legality, tenure clarity, and spatial alignment at scale.



Key Summary

- 1. Trust first
 - Initial farmer resistance → gradual acceptance
 - ☞ Adoption is trust-driven
- 2. Identity unlocks compliance
 - Farmer cards (land, geo, legality)
 - ☞ Compliance starts with formal identity
- 3. Group-based traceability
 - Cooperatives structure data & supply chains
 - ☞ Traceability is collective, not individual
- 4. Tech as enabler
 - Mapping, verification, reporting (e.g. Agriplot)
 - ☞ Tech connects fragmented systems
- 5. From risk → opportunity
 - Market access, competitiveness, partnerships
 - ☞ EUDR drives sector upgrade
- Core Insight
 - Compliance = inclusion + identity + structure + technology
 - EUDR in coffee is about formalizing smallholders into a verifiable system, without excluding them.



Ecuador's Cocoa Sector and the EUDR: Key Findings, Risks, and What Comes Next

Key Summary

- 1. Systemic risk
 - Many plots unregistered + overlap with forest areas
 - ☞ Non-compliance is widespread
- 2. Land legality gap
 - Weak tenure, smallholder-driven system
 - ☞ Main bottleneck = land legality
- 3. Fragmented traceability
 - Informal, intermediated supply chains
 - ☞ Hard to prove origin consistently
- 4. Beyond deforestation
 - Requires geo + legal + due diligence
 - ☞ Data & legality matter as much as forest
- 5. Smallholder risk
 - Potential exclusion from EU markets
 - ☞ Market favors organized supply chains
- Core Takeaway
 - EUDR readiness is limited by legality, traceability, and system fragmentation
 - EUDR in cocoa is a shift from informal systems to verifiable, data-driven supply chains





Implementing EUDR in the Soy Supply Chain: The Case of Mato Grosso

Key Summary

- 1. Mostly compliant, still risky
 - 96% compliant, ~4% non-compliant
 - ☞ Small gaps can block entire supply chains
- 2. Traceability gap
 - Missing geo-data, fragmented info
 - ☞ Key issue = proving origin
- 3. Complex monitoring
 - Multi-country, multi-dataset verification
 - ☞ Compliance is data-intensive
- 4. Data system gaps
 - Integration & reporting still weak
 - ☞ Manual processes = high risk
- 5. Tech as enabler
 - Mapping, traceability, automated checks
 - ☞ Systems unlock scalability

Core Takeaway

- Main barrier is traceability and data integration, not deforestation
- EUDR in soy is a data and traceability challenge at scales



Key Capabilities for Supply Chain and Landscapes Transformation



Global Commodity Baseline Mapping and Supply Chain Traceability Verification

Developing and maintaining spatially explicit commodity baselines to support traceability, risk screening, and verification across global supply chains.



Compliance Monitoring, Reporting, and Verification

Delivering evidence-based monitoring and assurance systems to support sustainability commitments and regulatory requirements through consistent reporting and verification.



Supply Chain Transformation through Engagement and Capacity Building

Supporting suppliers, smallholders, and partners through structured engagement and capacity-building programs that enable measurable improvements and long-term compliance.



Tailored Digital Platforms for Sustainability Implementation

Designing and deploying customized digital tools that translate sustainability requirements into actionable workflows for monitoring, reporting, and decision-making.



Landscape-Level Sustainability and Forest Recovery

Designing and implementing place-based interventions that support ecosystem recovery, forest conservation, and sustainable land use across commodity-driven landscapes.



Inclusive Community and Smallholder Engagement

Strengthening the role of independent smallholders and local communities through inclusive livelihood support, recognition of land tenure, and equitable participation in landscape governance.



Multi-Stakeholder Partnership and Systemic Change

Facilitating collaboration among communities, governments, civil society, and private-sector actors to translate sustainability commitments into coordinated, long-term landscape transformation.

Our Organization



Earthqualizer Foundation is a non-profit driving sustainable, equitable landscapes by tackling commodity-driven deforestation. Through ecosystem recovery, forest conservation, and support for smallholders and community land rights, it delivers place-based solutions that align environmental protection with inclusive development.

www.earthqualizer.org | Indonesia



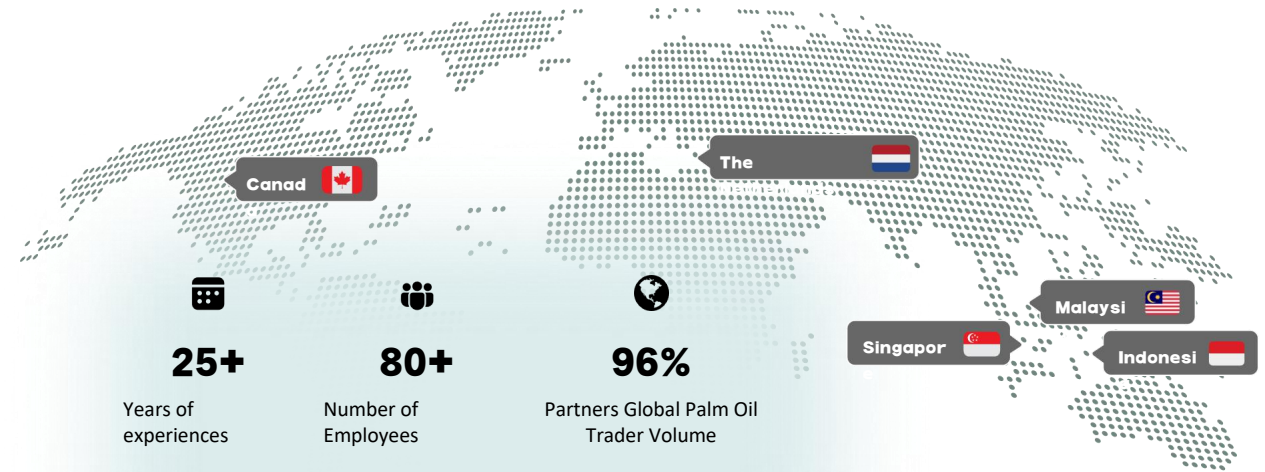
Inovasi Digital is the private-sector arm of Earthqualizer, turning field insights into practical, data-driven solutions for sustainability. It develops tools for supply chain transparency, supports NDPE and EUDR compliance, strengthens supplier engagement, and delivers tailored digital platforms for effective, on-the-ground implementation.

www.inovasidigital.asia | Indonesia | Malaysia



Mosaix is the European-based subsidiary of Inovasi Digital, bringing its innovations to wider markets and regulatory contexts. It bridges policy and field realities through strategic guidance and digital tools for due diligence, EUDR compliance, and responsible sourcing—connecting companies, traders, and investors to practical, high-impact solutions.

www.mosaix.earth | The Netherlands



Focus Commodities



Our Partners





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