

Assessing the use of AI and remote sensing for European Union Deforestation Regulation (EUDR) supply chain tracing



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March 8, 2026

This research was supported by the Jamie Cassels Undergraduate Research Award, University of Victoria. Supervised by Dr. Sophia Carodenuto and Noa Brown

Introduction

- Tropical deforestation is a major source of global emissions, with a substantial share associated with international commodity supply chains (Pendrill et al., 2019)
- In response, policymakers are turning to geospatial monitoring to regulate forest-commodity impacts. The European Union Deforestation Regulation (EUDR) requires proof that imports such as soy, palm oil, cocoa, and timber are deforestation-free before entering the European market (European Union, 2023).
- As a result, a growing number of private tracing firms have developed geospatial platforms that use satellite imagery, machine learning, and farm-level mapping to support due diligence and compliance.
- There remains limited research on how these tracing systems actually operate, what data they rely on, and what broader implications they may have for environmental sustainability and equity on the ground.
- This research aims to address that gap by asking: how do EUDR tracing companies gather and analyze supply chain data, and what implications does this have for environmental sustainability and equity in producer countries?

EUDR Status



Preliminary Results

Preliminary analysis of interviews reveals several emerging themes across three dimensions of EUDR supply chain tracing systems.

Function:

- Cost vs accuracy trade-off – Large-scale analysis relies on accessible, low-cost datasets, which can be less accurate.
- AI black box – AI models being used are opaque, limiting transparency and auditability of classifications.
- Varied detection accuracy – Detection accuracy varies across landscapes, crops, and infrastructure conditions.

Consent:

- Coerced consent – Consent from producers is coerced because market access requires sharing geolocation data.
- Lack of communication – Farmers experience data collection as extractive and poorly communicated.
- Difficult to confront – Meaningful consent is unclear and difficult to achieve at global scale.

Society:

- Reinforces global inequalities – Monitoring reinforces Global North power over data interpretation and governance.
- Risk of exclusion – Smallholders risk exclusion from compliant supply chains due to uncertainty.
- Lack of consultation – Surveillance expands without producer country consultation, echoing colonial patterns.

Discussion/ Conclusion

- Geospatial monitoring systems are central to enforcing supply chain regulations such as the EUDR.
- Uncertainty in tracing model outputs can shift risk and compliance costs down the supply chain, and smallholder producers may face exclusion when monitoring results are unclear.
- Larger firms are better positioned to absorb the costs of compliance, while smaller actors and producers may struggle to adopt the technologies and reporting requirements associated with EUDR monitoring.
- The expansion of traceability monitoring also concentrates power in tracing firms and EU regulators, who have greater influence over how environmental data is collected and interpreted, while tracing firms profit from producer-level data.
- Interviewees also expressed skepticism about the future implementation of the EUDR and highlighted repeated delays and uncertainty surrounding the regulation's final scope and enforcement.
- These findings are based on a preliminary interview sample, which is skewed toward academic experts. Future research will expand the dataset.

Methods

- This study uses semi-structured qualitative interviews with experts involved in EUDR supply-chain traceability and environmental monitoring.
- A total of seven interviews were conducted within this preliminary stage with participants from two stakeholder groups:
 - Academia (n = 5) – researchers studying environmental governance, remote sensing, and supply-chain monitoring.
 - Industry (n = 2) – professionals working in supply-chain tracing and geospatial monitoring firms.
- Interview questions were guided by the three-dimensional analytical framework developed by Fontes et al. (2022), which evaluates AI-enabled surveillance systems across three dimensions and was adapted for this study's supply-chain tracing context.
 - Function – how data is collected, processed, and analyzed using remote sensing and machine learning
 - Consent – whether farmers are informed about or able to consent to data collection
 - Societal impacts – broader implications for power, equity, and environmental governance
- Interview transcripts were then analyzed using deductive coding, where themes were categorized according to the three dimensions of the framework.

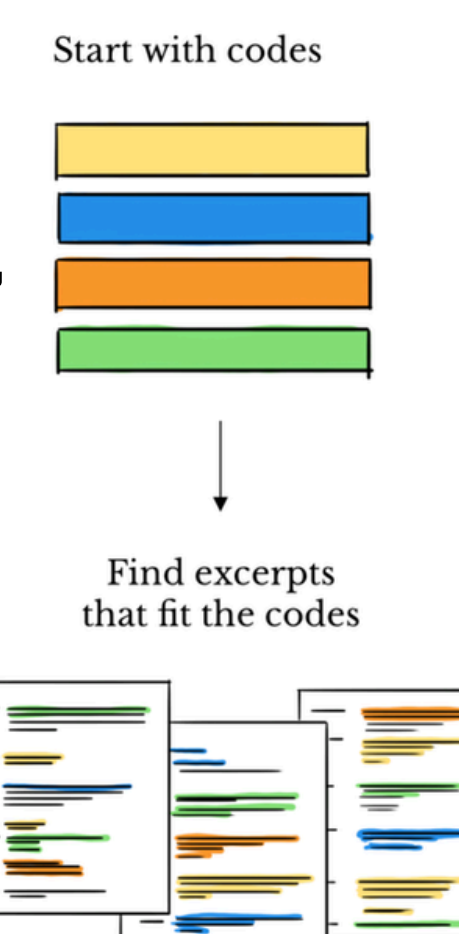


Image: Delve & Limpaecher (2024)

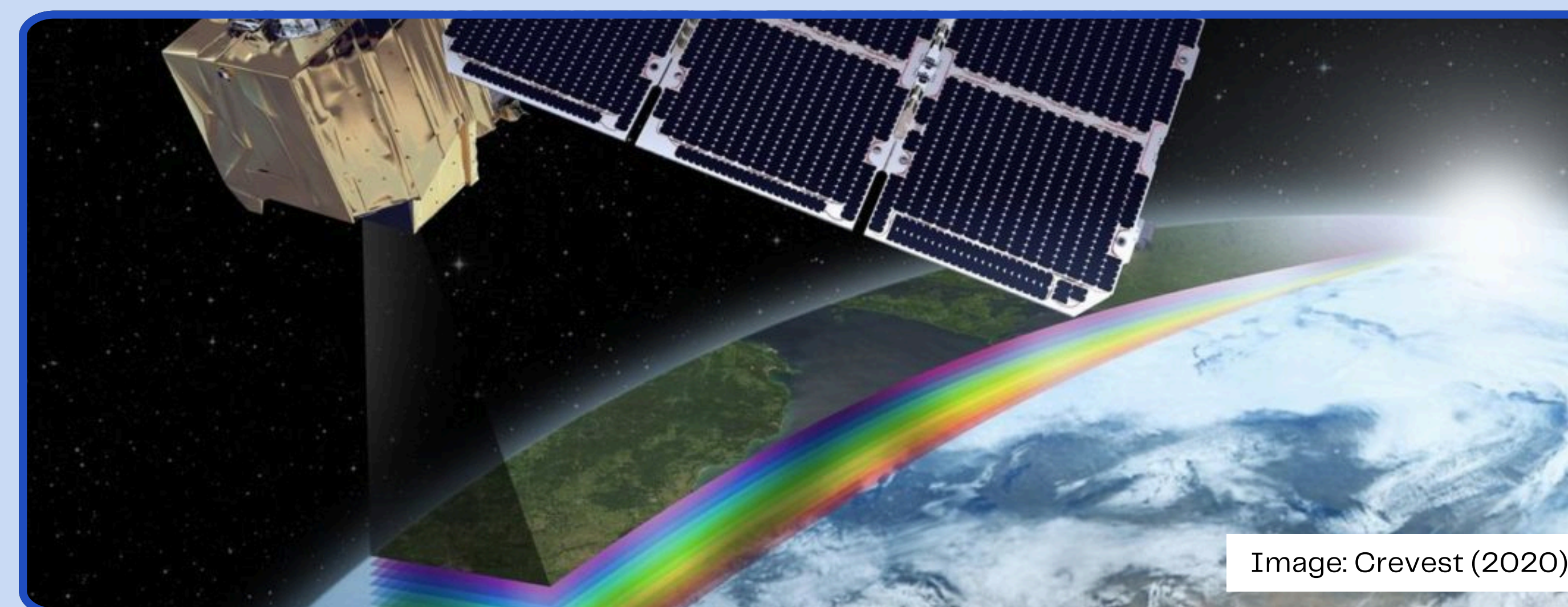


Image: Crevest (2020).

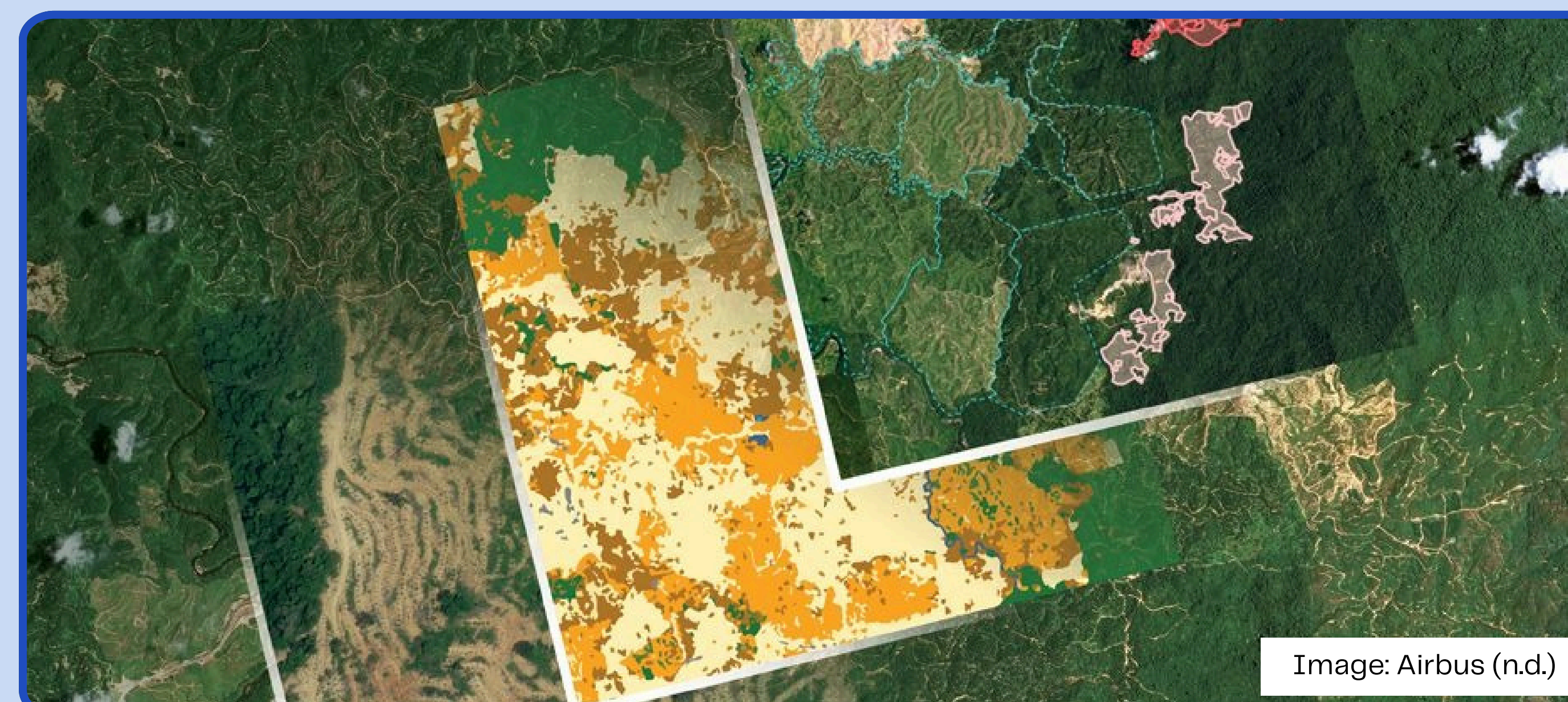


Image: Airbus (n.d.)

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Acknowledgements

I would like to extend my gratitude to Noa Brown for their supervision throughout this research. This project is just a small piece of much larger research they are conducting. I would also like to thank Dr. Sophia Carodenuto for their incredible supervision and the Environmental Governance Group for their support.