
Toward deforestation free commodities:
Challenges and opportunities for convergence
Brian King
Head of Digital & Data Innovation Accelerator, CGIAR
midjourney

CGIAR: the world's largest agricultural innovation network

Africa Rice Center

International Food Policy Research Institute (IFPRI)

International Center for Agricultural Research in the Dry Areas (ICARDA)

International Livestock Research Institute (ILRI)

International Maize and Wheat Improvement Center (CIMMYT)

International Institute of Tropical Agriculture (IITA)

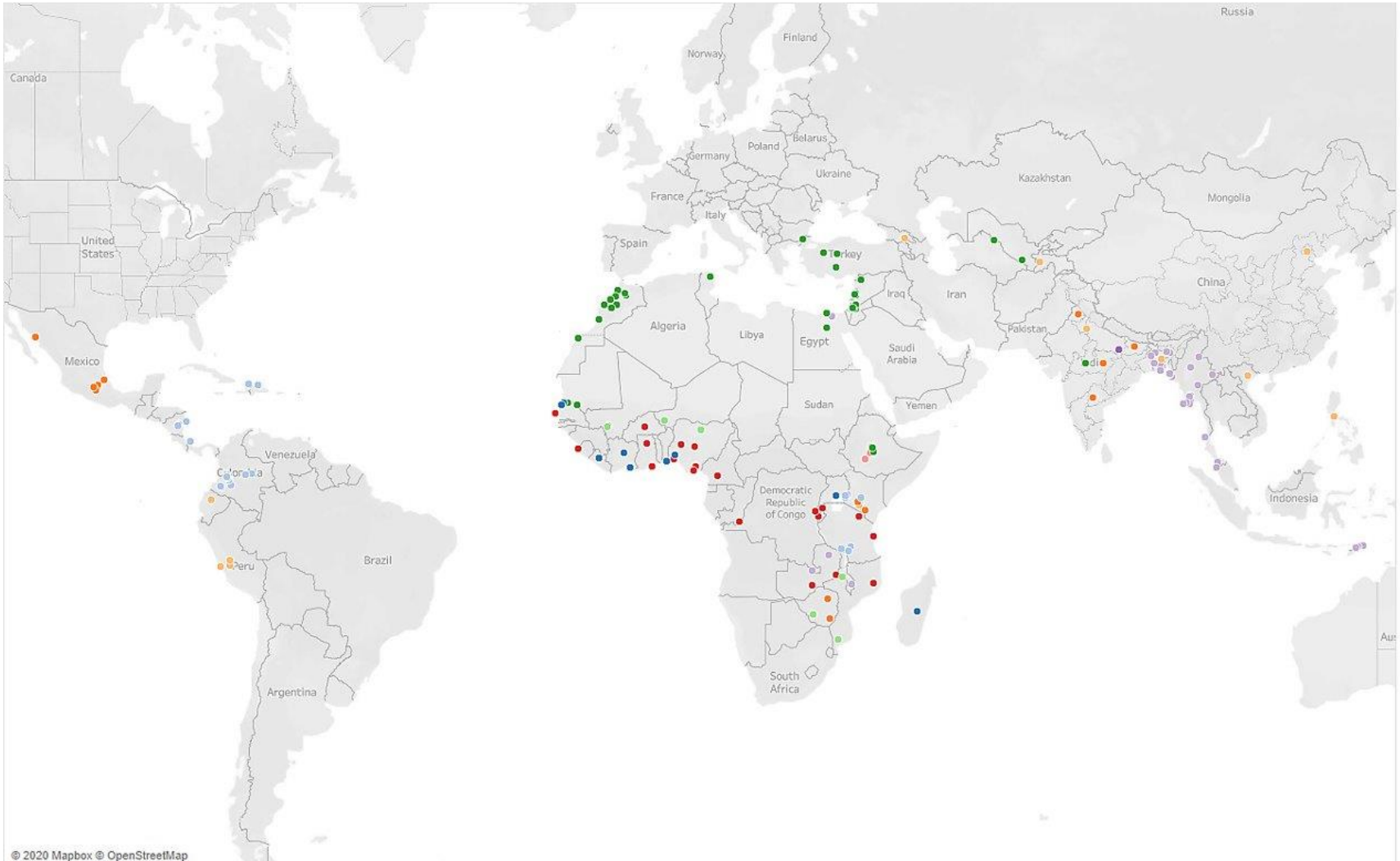
International Rice Research Institute (IRRI)

International Water Management Institute (IWMI)

International Potato Center (CIP)

The Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT)

WorldFish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Digitalizing, and fragmented, supply chains

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Recent years have seen multiple policies and regulations regarding **sustainability and responsibility in supply chains** (e.g. EUDR, German Supply Chain Due Diligence)

This has led to a **proliferation of traceability solutions** in the marketplace, and a lack of common digital standards that can facilitate the easy exchange of information.

Interoperability and inclusion

A lack of standards could contribute to **reinforcing the position of larger, incumbent firms** with the ability to invest in compliance all along their value/supply chains.

Interoperability thus becomes important for a multiple, smaller actors to participate–while also laying the foundations for other linking other systems and use-cases, such as for transparency, developing smallholder specific trade, and more.

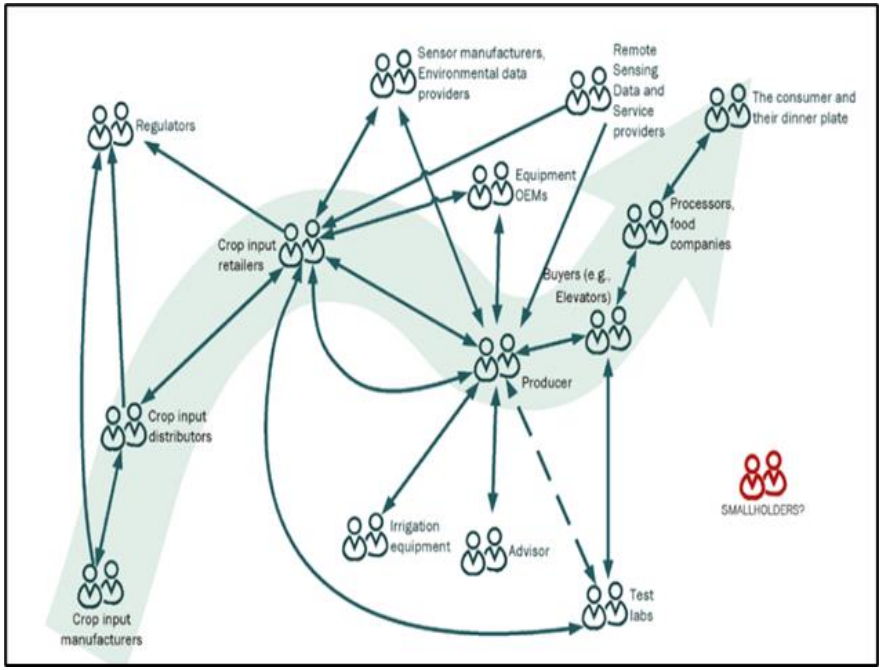
https://www.nachhaltige-agrarlieferketten.org/en/in-practice/diasca-interoperability-between-traceability-solutions

The DIASCA group funded by GIZ seeks to advance integration of supply chains with three working groups:

- **Livelihoods**
- **Forest monitoring**
- **Traceability solutions interoperability.**

POLL RESULTS FROM DIASCA meeting– Top 3 Concerns with EUDR.

Codesign along supply/value chains



ISO Strategic Advisory Group on Smart Farming
Final Report – February 2023

- **Identify digital capabilities at a system level**
- **Identify important capabilities for supply chain actors**
- **Examine technologies that may support the capabilities**

Codesign along supply/value chains

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- **Key digital capabilities for traceability of “deforestation free” commodities:**
  - **Enable geolocation farms and fields with points and polygons,**
  - **Minting of unique identifiers.**
  - **Monitor deforestation at scale**
  - **Support chain of custody.**

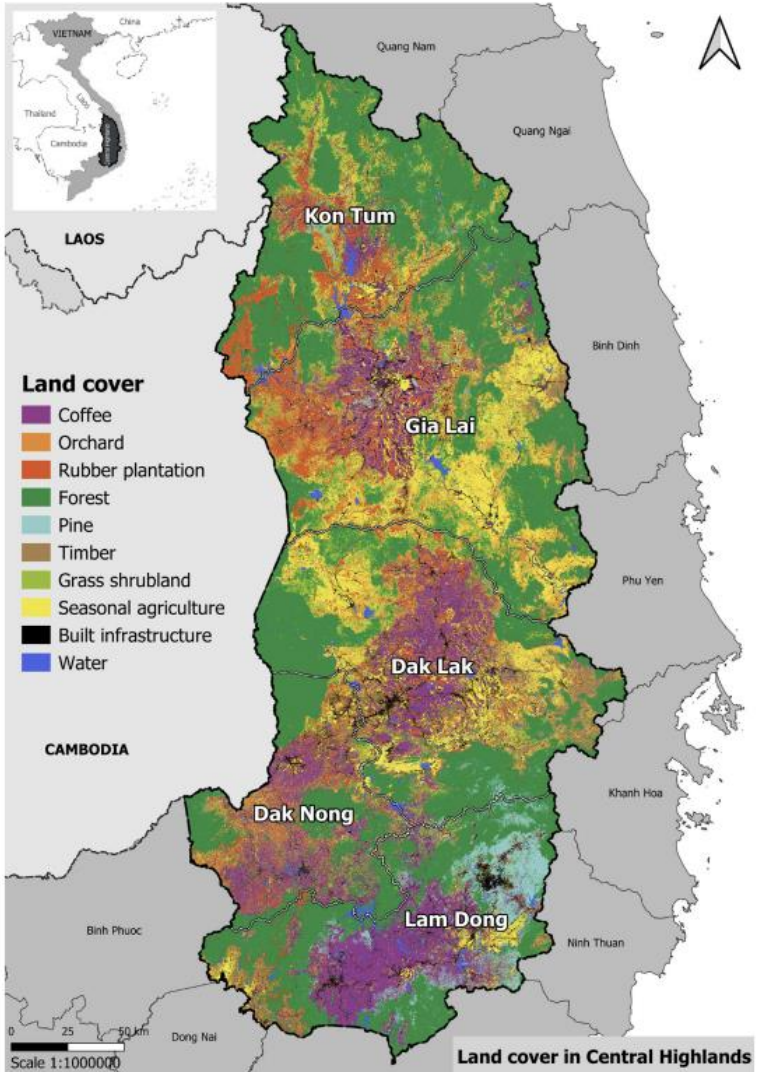
Codesign along supply/value chains

Joann de Zegher, Instituto de Tecnología de Massachusetts, (https://www.jfdezegher.com/)

- Open source (or at least open standard) solutions for traceability that leverage and/or generate points, polygons, and unique IDs – anchored in human-centered design.

Applying open science

- Open data, methods, models, and tools.
- Establish credible proxy measurements that can be used at scale.
- Understand the impacts (desired or not) of transparency regulation in food systems.



Reymondin, et al

Methods

1 Input data

The input data consist of a set of features calculated by compiling Sentinel 1 and 2 images together with a dataset of geo-located occurrences of certain land covers based on human interpretation of high-resolution imagery.

2 Model calibration

Based on these data, a deep learning model is calibrated, and a potential land cover map is created.

3 Assessment

The map is checked by interpreters and a quick assessment of the accuracy is performed. If the map passes this first quality assessment, it proceeds to validation (step 4). If not, more data collection is needed (step 1).

4 Validation

The map is validated based on sampling and human interpretation of high-resolution imagery.

5 Map publication

The map is ready to be used. It is overlaid with datasets such as historical patterns of deforestation in order to create actionable metrics. The metrics will inform key actors in the coffee industry and support them to achieve zero deforestation within their supply chain and optimize their sourcing strategy.

Reymondin et al

The links between sustainability and transparency could be better understood.

ELSEVIER

World Development

Volume 121, September 2019, Pages 163-177

Transparency and sustainability in global commodity supply chains

T.A. Gardner [a], M. Benzie [a], J. Börner [b], E. Dawkins [a], S. Fick [a], R. Garrett [c], J. Godar [a], A. Grimard [d], S. Lake [d], R.K. Larsen [a], N. Mardas [d], C.L. McDermott [e], P. Meyfroidt [f g], M. Osbeck [a], M. Persson [h], T. Sembres [i], C. Suavet [a], B. Strassburg [j], A. Trevisan [k], C. West [l] ...P. Wolvekamp [m]

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https://doi.org/10.1016/j.worlddev.2018.05.025

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Highlights

- The links between transparency and sustainabilityare poorly understood.
- We present a typology of information for supply chain governance.
- The coverage of existing transparencyinitiatives is limited and biased in scope.

The ESG financing opportunity

requires science-based advisory and technical assistance

"Food Systems are responsible for a **third of global GHG emissions"** (FAO, 2021)

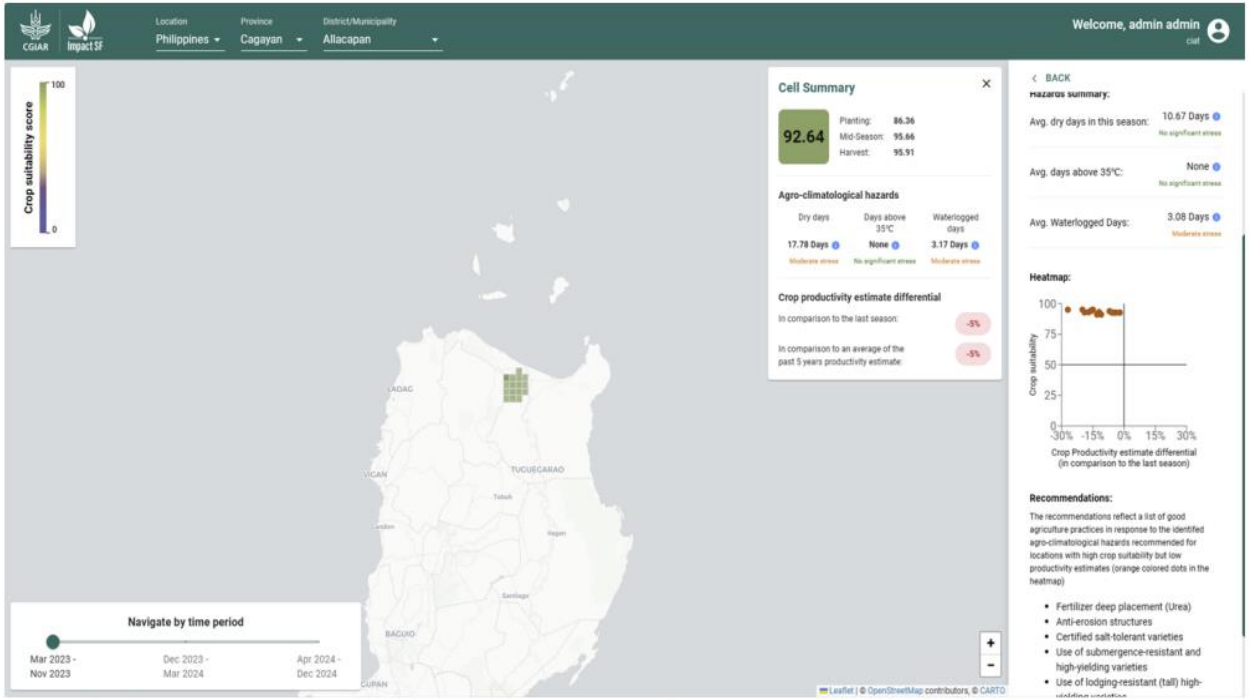
"Food Systems are the **main contributor to biodiversity loss**" (Chatham House, 2021)

Environmental, health and social costs [of the food system] amount to "at least **US$12 trillion a year**" (FOLU, 2019)

Over-reliance on a hand-full of crops and livestock erodes genetic resource base, increasing i) reliance on chemical inputs, ii) production losses from pests and disease, and iii) food system vulnerability to global shocks

"**USD 300 - 350bn annual funding gap** to transform food and land use systems" (The Food and Land use Coalition, 2019)

"Of the total climate finance tracked, **only 1.7% targets small-scale agriculture"** which produces c. 1/3 of global food (Climate Policy Initiative, 2019)



Limited set of inputs
Provide only the location and crop / value chain

AI-powered / CGIAR data
Deep learning models based on years of context-specific CGIAR data

New layers & features
biodiversity risks and impact quantification (soil health, water saving etc.)

Key outputs:

- ✓ Crop/livestock suitability
- ✓ Resilience estimate for upcoming seasons (for a set of crops)
- ✓ Climate hazards (e.g., Number of Dry Days, Number of waterlogging days etc.)
- ✓ Recommendation of best practices to mitigate climate hazards

CGIAR Hub for Sustainable Finance (ImpactSF)
Science for Sustainable Food Investment

Carbon markets for de-risking and scaling climate mitigation with CGIAR-related technologies

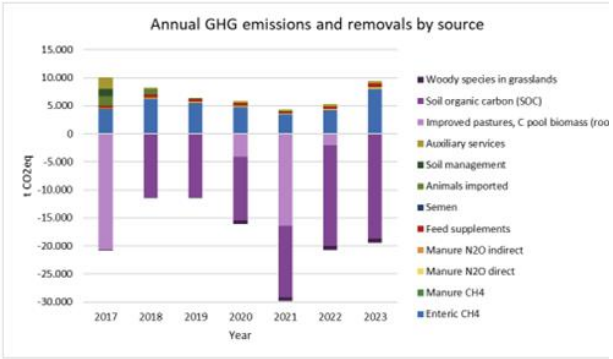
- Hacienda San Jose (Colombia) carbon project has the potential to generate ~1 Million carbon credits/year
- 9,000 ha implemented with CGIAR improved forages – expansion plan to 180,000 ha
- Carbon market potential in LAC for livestock: USD 100Billion/year (by 2050)

Colombia's new agricultural frontier

Improved animal & pasture management

Efficiency

	Colombian Average	NELORE Short Cycle
First Pregnancy	39 months	16 months
Pregnancy Rate	52%-66%	77%-95%
Interval between births	700-550 days	400-380 days
Waning weight 7 months	150kg	200kg
Weaning Age	8 – 9.5 months	7 months

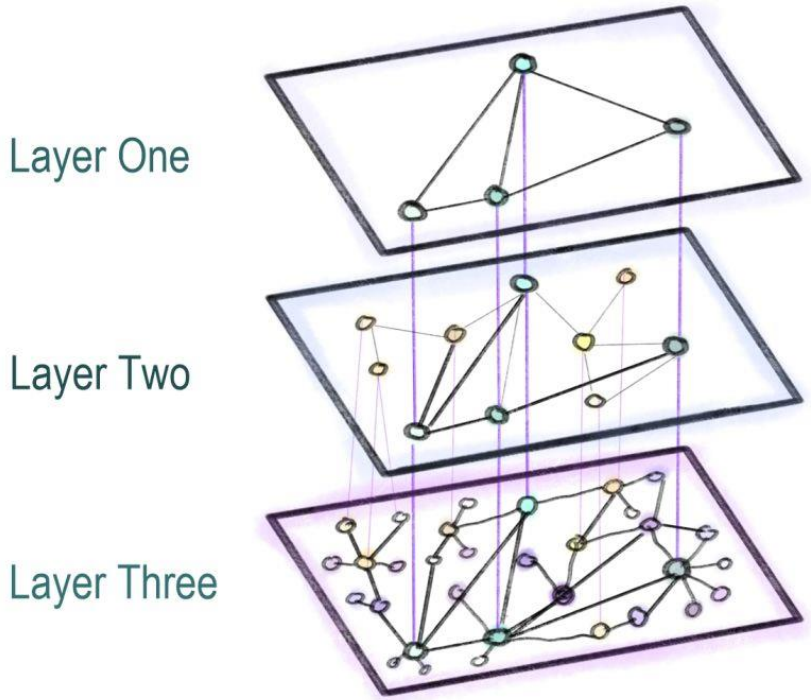


Carbon Footprint

-13.9 kg CO_2eq kg^{-1} LW

https://cgspace.cgiar.org/handle/10568/121105

It's a Small World



Source: Tony Seale

Thanks

b.king@cgiar.org