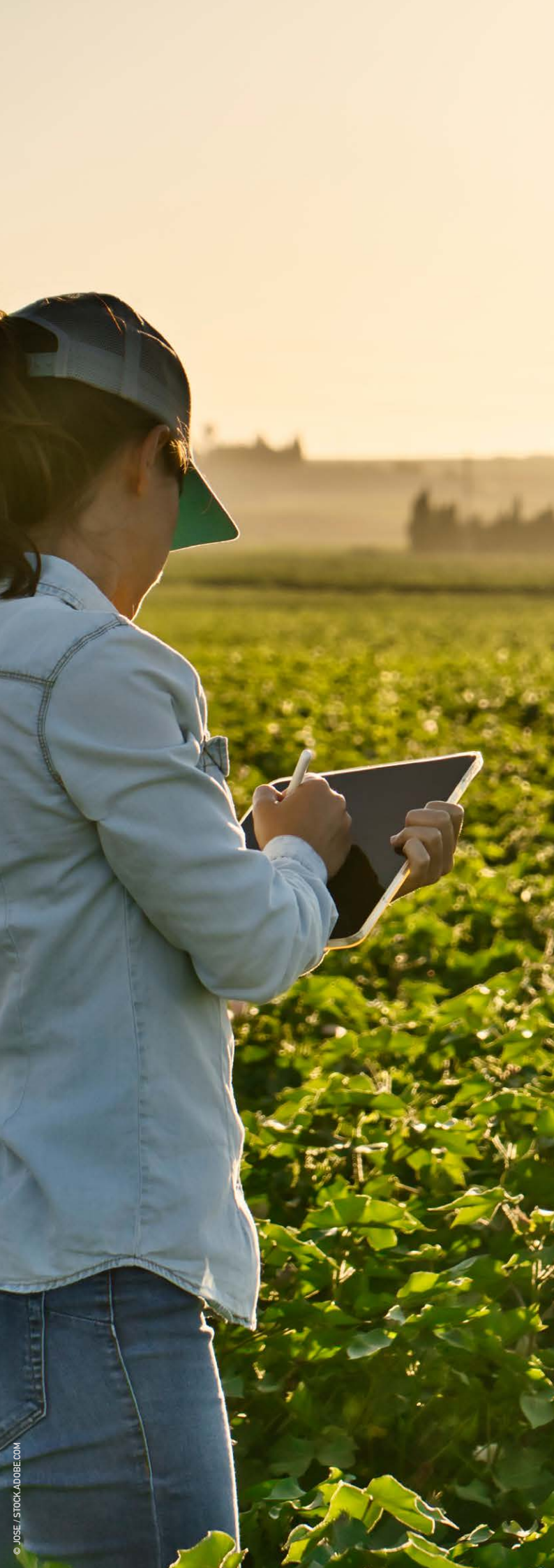


AGRIFOOD SUPPLY CHAINS AND TRACEABILITY

A SUMMARY FOR BUSINESSES IN THE SOY,
BEEF AND PALM OIL INDUSTRIES





CITATION AND ACKNOWLEDGEMENTS

This business brief highlights the importance of supply chain traceability in the agrifood sector, particularly for high-risk commodities like beef, soy, and palm oil. It discusses the benefits of traceability in enhancing sustainability, accountability, and resilience in supply chains. It outlines best practices for businesses implementing traceability systems and touches on specific issues related to traceability in key commodities and producing countries, drawing insights from recent stakeholder events.

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FROM SOURCE TO SHELF: WHY SUPPLY CHAIN TRACEABILITY MATTERS

As climate change is putting at risk the production of many agricultural commodities and the prosperity of the communities that rely on their production and consumption, the agrifood sector should focus on enhancing the resiliency of supply chains.

This involves transparency in the supply chain to locate major issues that require urgent action. Supply chain traceability has emerged as a critical focus for businesses and financial institutions, particularly in supporting the implementation of sustainable trade of agricultural commodities. Supply chain mapping, in turn, identifies all actors and locations involved in a particular supply chain and enables the tracking of materials as they exchange hands. The resulting increase in transparency, thus, enhances accountability and drives improvement in multiple sustainability areas (such as human rights, labour, environment and anti-corruption) where needed.

Supply chain mapping and traceability are key for informing business decisions and strengthening the relationship between upstream and downstream actors. Therefore, the integration of traceability systems across food supply chains can benefit all stakeholders, from input providers and producers to traders, brands, retailers, and consumers. Traceability systems enable real-time monitoring of ESG (Environmental, Social and Governance) risks at different stages of supply chains, informing strategic decisions that enhance their resilience, security, and efficacy. Moreover, traceability helps companies meet regulatory compliance, achieve long-term business stability, and contribute to intergovernmental agreements like the Kunming-Montreal Global Biodiversity Framework, including Target 15.

Despite the evident benefits, implementing upstream traceability remains a challenge for businesses worldwide. Businesses have

reported barriers including a lack of technical expertise, insufficient industry alignment and the complexity of supply chains. Costs also pose a significant challenge. The costs associated with traceability depend on multiple factors, such as the regulatory environment, firm size, strategy and culture, technology adopted, characteristics of products and production processes, structure and complexity of the supply chain and the volume of information to be stored.

We present a set of best practices to guide businesses in navigating and implementing effective traceability systems. These are drawn from the report “[Traceability in food supply chains: Current landscape, mechanisms for implementation and potential success factors](#)” and aim to offer practical insights for organizations seeking to enhance traceability, transparency and accountability across their supply chains.

BEST PRACTICES ON TRACEABILITY AT THE CORPORATE AND INDUSTRY LEVELS

Businesses should understand and embrace the business case of adopting traceability and embed it into their strategic planning.

Top management support and determination are required to make traceability a priority. This includes implementing internal traceability progress goals, helping to measure and monitor key indicators, facilitating access to necessary data and ensuring budget allocation for these tasks. In this line, an internal cross-functional team of people from different backgrounds and departments should be set up to develop robust traceability practices and processes. This team should work together to implement the traceability goals set by company management and ensure that traceability is integrated across all relevant areas of the business.

Corporates’ traceability actions and strategies should extend across all stages of the supply chain, up to the point of origin and not be confined to

direct (tier 1) suppliers of the final product. To achieve commitments on decarbonization, water management, and deforestation, a comprehensive understanding of all supply chain stages locations, and actors is essential. This broad perspective enables the identification of the most significant opportunities for all sustainability issues including carbon reduction, water savings, and deforestation prevention.

Engaging and guiding suppliers through strong relationships, effective communication, clear requirements and attractive incentives is also crucial to encourage data sharing with the required levels of granularity and accuracy. Advanced distributed and cloud technologies can facilitate multistakeholder data aggregation and joint investment within supply chains. However, in implementing these systems, vulnerable supply chain actors (e.g. smallholders and women associations) must be given special consideration.

For these participants, traceability should serve as a supportive tool rather than a burden. Ideally, access to traceability data should enhance their eligibility for better financial resources and high-quality inputs, while efforts are made to mitigate any potential extra time and cost investments on their part.

Capacity building is key and can help organizations develop a corporate culture that emphasizes data management and quality while also fostering technical expertise. In addition to creating expertise by providing training, to engage and encourage internal and external stakeholders, businesses should also invest in strong reporting and communication on the progress and effectiveness of their traceability initiatives. This includes defining effective strategies to communicate traceability progress and outcomes to buyers and consumers.



REQUIRED MULTI-STAKEHOLDER SUPPORT TO IMPLEMENT SUPPLY CHAIN TRACEABILITY

Effective supply chain traceability requires multi-stakeholder enforcement and collaboration.

There is a need for more concrete and strict enforcement from both markets and governments, with a clear alignment on specific metrics, indicators, and reporting requirements across all stakeholders. This alignment should extend to the required level of assurance. Financial institutions also have a crucial role in enforcing traceability requirements for their clients. The finance sector, especially in trade finance, can further support traceability efforts by partnering with data providers, raising sustainability standards, requiring transparency for financial access, and mobilizing funds to incentivize sustainable practices in agricultural supply chains. By fostering this collaborative approach, governments, market actors, and financial institutions can work together towards a unified framework of standards, metrics, and indicators, enhancing the overall effectiveness of supply chain traceability initiatives.

In order to convene the range of stakeholders mentioned above and facilitate the development of harmonized standards for traceability data (including collection, storage, and sharing considerations), an international independent body should be established. This independent body should also take care of managing any unintended consequences of regulatory and market policies to make sure vulnerable actors (including smallholders and women farmers) are supported and rewarded.

TRACEABILITY IN HIGH-RISK COMMODITIES: BEEF, SOY AND PALM OIL

Food supply chains are responsible for producing and trading important

commodities such as soy, palm oil and beef, which have significant economic value and a major impact on the food security of many countries globally.

These commodities are also known for having complex and far-reaching supply chains, and historically having practices associated with deforestation, soil degradation and human rights violations. Additionally, various structural challenges, including issues related to land tenure and certification, disproportionately impact women in farming communities, underscoring the critical need for a gender-sensitive approach in policy formulation and implementation. In this context, traceability systems can play a key role in identifying, preventing and addressing these negative impacts.

While some progress has been made in tracing Indonesian palm oil imported into Europe (most of it traced down to the mill level), in the case of other commodities such as soy and coffee, progress has only been made in tracing certified or directly sourced products. In the case of cattle, also raised in many of the most important and vulnerable ecosystems around the world, the level of traceability implemented varies significantly between countries of origin. Much more needs to be done to minimize the risk of triangulation and increase the reliability and granularity of traceability data.

In 2023, WWF and UNEP-WCMC organized a series of events under the GCRF TRADE Hub project to examine sustainability and traceability in the soy, palm oil, and beef supply chains, with a focus on Brazil, Indonesia, and China. The programme included [webinars](#) and field discussions on commodity production impacts, traceability tools, market demands, and government roles. It brought together diverse stakeholders, including representatives from the private sector, farmer and industry associations, financial institutions, government bodies, NGOs, and academia. Based on the insights gathered from these events, the next section presents recommendations to enhance supply chain traceability and sustainability in these key commodities and countries. We would like to thank all the speakers who participated in person and online, and all the workshop participants for sharing their knowledge and experiences, which have been used to prepare this summary.

BEEF TRACEABILITY – CASE BRAZIL TO CHINA

By Julie Sigles Robert, in collaboration with WWF-Brazil and WWF-China



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Why Brazil/China? What are the challenges in this industry?

Brazil and China are pivotal actors in the global beef industry. Brazil is the world's largest beef exporter as it leverages its vast natural resources and extensive cattle herds. China is the largest beef importer globally, driven by increasing meat consumption among its growing middle class and its demand significantly influences global beef prices and trade flows.

In Brazil, transforming forests into pastures not only increases CO₂ emissions, intensifying climate change, but also drastically reduces biodiversity. Moreover, the cattle industry emits significant amounts of methane and the expansion of ranching commonly triggers land disputes, often resulting in violence and the displacement of indigenous communities.

Recommendations for the private sector

The Chinese beef market and the Brazilian beef industry:

- Align in establishing data requirements to prevent cattle triangulation and ensure deforestation-free claims are accurate. This should include clear indicators (what, where, and by whom), verification mechanisms and accessibility conditions end-to-end across beef supply chains. Requirements and indicators must align with relevant international regulations, standards and certifications.
- Support the development of new pilots and knowledge transfer initiatives (e.g. drafting new case studies demonstrating the cost-effectiveness of traceability initiatives and translating relevant reports and databases into Chinese).
- Attribute value to traceability data through mechanisms that grant access to premium prices, green finance, payments for ecosystem services and/or technical assistance.

- Support non-compliant ranchers (by helping them fund the transition) and compliant ranchers (with capacity, productivity, market, financial, and/or taxation incentives), and make them participate in the design of new traceability initiatives.
- Create a list of premium suppliers (based on their degree of traceability and sustainability compliance) to inform purchasing decision-making processes.
- Design cost-effective and scalable capacity-building programs supported by technology experts. Technologies such as artificial intelligence, machine learning, blockchain and enhanced network infrastructure should be considered.
- Drive demand for traceable and sustainable beef by linking enhanced transparency to quality meat brands.

Financial Institutions (FIs):

- Participate in Public-Private Partnerships (PPP) and offer green supply chain finance aligned with traceability strategies.

Industries involved in the beef supply chain

(e.g. beef, food, pharmaceuticals, cosmetics and leather):

- Join forces in defining sustainability standards as well as financing and employing a common cattle traceability system.

Recommendations for the public sector and NGOs

Governments upstream and downstream:

- Foster cooperation between governmental institutions in Brazil and China (e.g., their embassies, customs offices, ministries of livestock and agriculture, ministries of finance and economic development, ministries of infrastructure and technology) to establish aligned regulations on supply chain traceability.
- Define a risk-based prioritization plan.
- Participate in Public-Private Partnerships (PPP) to support the implementation of a national traceability system in Brazil that is mandatory, inclusive, and transparent. This approach aims to reduce costs and facilitate quick adaptation to new market demands. It would leverage existing public tools with advanced features from the private sector.

- Attribute value to traceability data through mechanisms that grant access to tax incentives, payment for ecosystem services and/or technical assistance.

The third sector:

- Build a business case for enhanced traceability that aligns with the needs and expectations of the Brazilian internal beef market too.
- Analyse how new traceability systems could support landscape and jurisdictional approaches by integrating data from different economic activities taking place in the same region.
- Benchmark China's traceability technology.
- Guide the Chinese companies to employ Brazil's public tools.

Public-Private Partnerships could be created to:

- Support the implementation of a national traceability system in Brazil that is mandatory, inclusive, and transparent to lower costs and facilitate quick adaptation to new market demands. Leveraging existing public tools and complementing them with advanced functionalities of private tools.

Conclusions

- Various public and private beef traceability tools exist that offer differing degrees and scopes of beef traceability.
 - A collaborative approach combining public and private expertise, data, funding, and commitment is essential for implementing effective traceability and mitigate negative ESG impacts.
 - Moreover, public leadership and regulatory initiatives at the multilateral level are crucial to accelerate this process.
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SOY TRACEABILITY – CASE BRAZIL TO CHINA

By Julie Sigles Robert, in collaboration with WWF-Brazil and WWF-China



Why Brazil/China? What are the challenges in this industry?

Brazil has long faced significant deforestation and social issues linked to soy cultivation. As a major importer, China indirectly connected to these negative environmental, social, and governance (ESG) impacts through its demand for soy, primarily used in animal feed. TRASE data highlights that this impact is particularly concentrated in 30 Brazilian municipalities. Sustainable production practices are crucial not only for mitigating adverse environmental and social effects but also for addressing critical issues such as food security and long-term stability in the consumer market.

Soy traceability requires leveraging existing data systems, adopting common standards, and strengthening ESG requirements. Emphasis is placed on implementing traceability systems aligned with international regulations and using traceability data to incentivize and support both compliant and non-compliant suppliers in improving their sustainability performance. Success depends on engaging diverse stakeholders and ensuring transparency down to the farm level.

These efforts aim to create more sustainable soy supply chains while enhancing the accountability of supply chain participants.

Recommendations for the soy industry and financial institutions

Soy industry actors upstream and downstream in collaboration with financial institutions:

- Leverage the existing data in letters of credit and transportation documents, and make some of it accessible to public traceability systems (anonymization considerations for sensitive data would apply).
- Define a common strategy for traceability data sharing and integrability through green supply chain and supply chain finance integration models.
- Make joint investments in traceability.
- Adopt common standards and set common requirements for upstream actors.

Actors in the Chinese soy (and meat) industry and NGOs:

- Promote action from the China Securities Regulatory Commission, the Ministry of Ecology and Environment, the Central Party Committee, and the State Council to extend the scope of their ESG requirements to address the impacts linked to the production of imported goods too (including Scope 3 and deforestation and conversion free considerations).
- Better inform end-consumers about the relevance of valuing sustainable supply chains.
- Promote better visibility and disclosure of the presence of soy and associated ESG impacts in end-products (e.g. in meat packaging).

Multistakeholder collaboration upstream and downstream: national and local governments, custom offices, industry actors and associations, financial institutions, academia, NGOs, certification schemes, commodity exchanges and tech developers:

- Participate in Chino-Brazilian multilateral groups to inform new multilateral traceability strategies and roadmaps for soy.
- Develop new pilots and case studies that provide relevant insight to inform future industry and public strategies.
- Collaborate in supporting the implementation of soy traceability systems that follow common standards and are designed to demonstrate compliance of ESG requirements in alignment with relevant international regulations.
- Leverage on already existing public tools and aim for their improvement and complementation.

- Support the creation of a public green list of vDCF (verified deforestation and conversion free) soy providers that is regularly monitored and updated.
- Incentivise direct and indirect soy suppliers based on insights provided by traceability data (e.g. the use of restored lands, the elimination of deforestation and social injustice, or the reduction of GHG emissions were considered particularly relevant).
- Use traceability and mapping data to help uncompliant suppliers enhance their sustainability performance.

Conclusions

- While physical traceability of soy volumes in global supply chains can be complex and costly, the soy industry holds many unexploited opportunities to enhance transparency and traceability.
 - This can be achieved by leveraging existing systems and improving the sharing and management of public databases.
 - Creating a multilateral platform to facilitate alignment and knowledge transfer between Brazil and China would be an enabling starting point.
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PALM OIL TRACEABILITY – INDONESIAN CASE

By Julie Sigles Robert, in collaboration with WWF-Indonesia



Why Indonesia? What are the challenges in this industry?

Indonesia is the world's largest producer of palm oil, and the livelihoods of around 3 million smallholders depend on this industry. The negative impacts linked to this industry, including deforestation, biodiversity loss, and issues with labour practices, significantly influence both local communities and progress on global sustainability targets.

Palm oil traceability is essential to comply with new regulations that arbitrate market access, especially in the Indonesian context. The Indonesian government is driving farm legalization and geolocation, but faces the challenge of legalizing a large number of smallholders before new EU regulations take effect. Effective implementation requires the involvement of local smallholders, key yet often overlooked actors. The success of the initiatives depends on balancing compliance with smallholders' needs, leveraging technological innovation and industry alignment.

Recommendations for the private sector

Industry-wide:

- Agree on a traceability strategy that sets clear measurable goals in line with the most pressing needs of key stakeholders (e.g., farmers' need to enhance productivity and access to finance and incentives; all actors' need to demonstrate regulatory compliance and the attainment of sustainability commitments – e.g. on carbon-, and enhance supply chain resilience).
- Set clear requirements on who, what, where and how specific data points need to be gathered and to whom they should be made available under which safety conditions.
- Define key system functionalities that enable:
 - 1) tracing seeds and fertilizers to guarantee cost-effectiveness and enhanced productivity, and
 - 2) informing data-driven strategic investments that enhance supply chain sustainability and resilience.

Buyers:

- Require traceability in their supplier codes of conduct.
- Support supply chain mapping.
- Participate in joint incentive schemes and awareness programs to build farmer trust and dismantle prejudgements on data sharing.

Financial Institutions:

- Digitize and share farmers' original land certificates to facilitate legality demonstrations.
- Require borrowers to adopt the sustainable palm oil certification schemes.
- Offer incentivized financing to those adopting sustainable and traceable practices.

Standards and certification schemes:

- Make their data available to public traceability systems.
- Seek alignment and integration with other public and private traceability systems.

Tech companies:

- Create cost-effective interoperable tools that are easily adoptable by farmers.

Recommendations for the public sector and civil society

Indonesian national and local governments:

- Set public policies that incentivize infrastructure development, tech innovation, smallholder association and ISPO (Indonesia Sustainable Palm Oil) compliance (e.g. public grants, public loans with preferential terms and tax discounts).

The National Indonesian Government could:

- Engage with the European Commission to seek alignment and support, ensuring the protection of farmers and the adoption of unified traceability and data governance standards.

NGO's:

- Drive end-consumer price recognition of sustainable and vDCF (verified deforestation and conversion free) palm oil in products through traceability data.

Multistakeholder / Public-Private Partnerships (PPP):

- Convene resource mobilization by involving all supply chain actors, financial institutions, governments (local and national), certification/standard schemes and NGOs in the form of PPPs.

Conclusions

- The Indonesian Government is actively driving the legalization and geolocation of palm oil farms, a pivotal step towards enabling farm-level traceability.
 - The pressing challenge lies in legalizing over 3 million smallholders before the new EUDR is implemented. This endeavor requires substantial resources, both financial and human.
 - In this context, technological innovation and automation, coupled with strong multilateral and industry alignment, are essential for rapid scalability.
 - It is imperative to initiate multiple pilot projects to test cost-effective, agile technologies that place smallholders' needs at the forefront.
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