

TIME TO ACT 2

SPREADING AND SCALING SOLUTIONS FOR DEFORESTATION AND CONVERSION-FREE SUPPLY CHAINS

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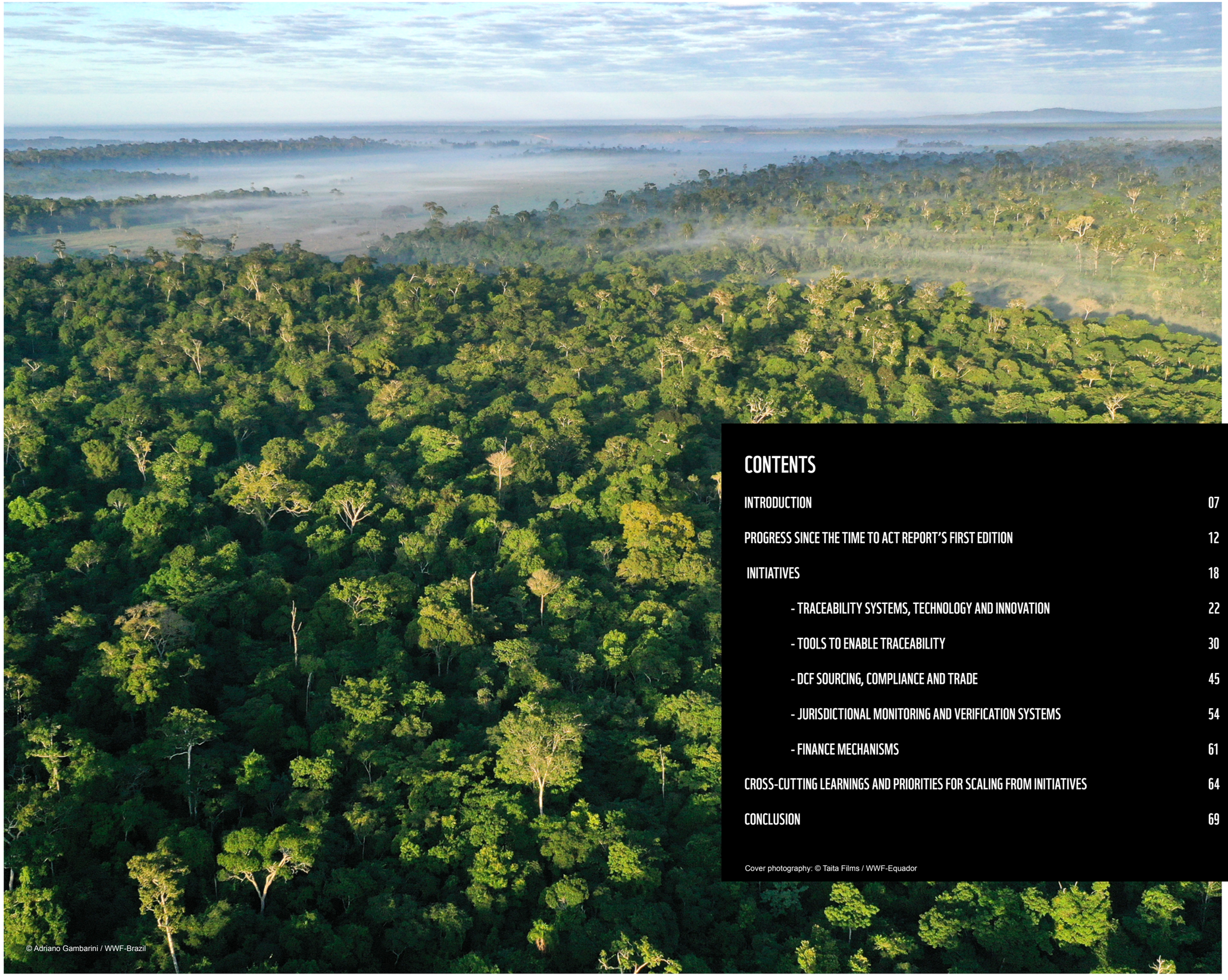
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Cover photo:
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Recommended Citation:
WWF (2026), Time to Act 2. Spreading And Scaling Solutions for Deforestation and Conversion-free Supply Chains. WWF, Gland, Switzerland.



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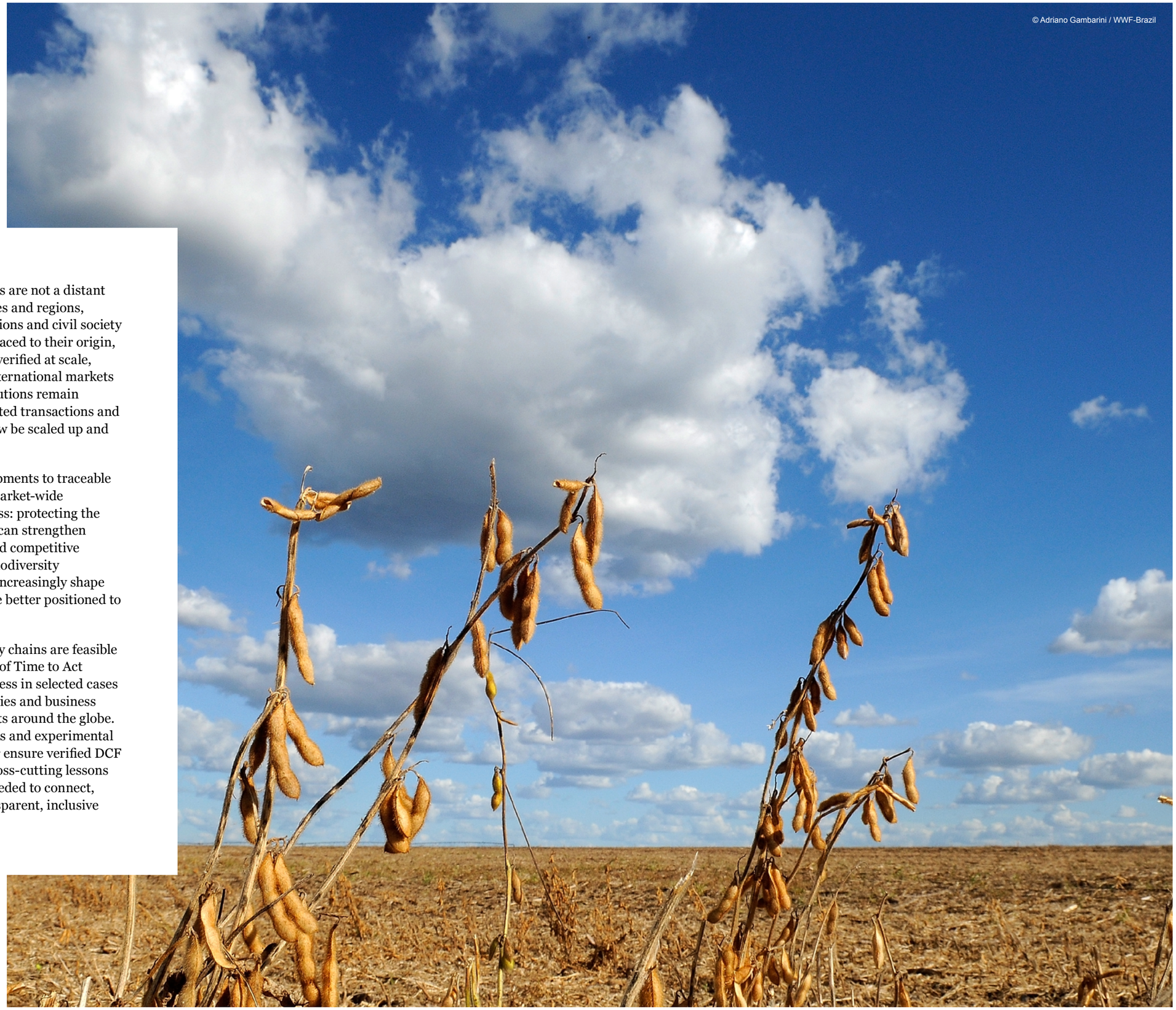
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Deforestation and conversion-free (DCF) supply chains are not a distant ambition; they are happening now. Across commodities and regions, companies, producers, governments, financial institutions and civil society are already demonstrating how commodities can be traced to their origin, risks can be identified and managed, and compliance verified at scale, while supporting producers to supply domestic and international markets without driving further ecosystems loss. Yet many solutions remain limited to individual companies, pilot projects or isolated transactions and ecosystem loss continues. Proven approaches must now be scaled up and embedded as standard practice across supply chains.

Achieving this shift means moving from traceable shipments to traceable commodities, and from pioneering commitments to market-wide expectations. The benefits extend beyond market access: protecting the ecosystems and livelihoods that underpin production can strengthen supply chain resilience, reduce business risks and build competitive advantage, while contributing to climate mitigation, biodiversity conservation and food security. As DCF expectations increasingly shape the conditions of trade, companies that act now will be better positioned to capture these benefits and help shape the transition.

Building on the first edition's evidence that DCF supply chains are feasible and already taking shape globally, this second edition of Time to Act presents new practical initiatives and highlights progress in selected cases previously featured. Spanning commodities, geographies and business models, these cases offer a snapshot of the wider efforts around the globe. On all continents, dozens of initiatives, platforms, tools and experimental shipments are being developed to support, facilitate or ensure verified DCF sourcing and trade. Through case-specific insights, cross-cutting lessons and recommendations, this report explores what is needed to connect, replicate and scale these solutions, helping make transparent, inclusive DCF supply chains the norm.



INTRODUCTION

HALTING DEFORESTATION AND ECOSYSTEM CONVERSION REQUIRES TRANSFORMING COMMODITY SUPPLY CHAINS AT SCALE

Agriculture is the leading cause of nature loss worldwide. Globally, the expansion of agricultural land drives around 90% of deforestation and conversion of other natural ecosystems such as savannahs, grasslands and wetlands[1]. This is the primary driver of biodiversity loss and a major source of greenhouse gas emissions. The production of globally traded commodities accounts for a significant share of ongoing deforestation and conversion.

Forests and other natural ecosystems sustain biodiversity, store carbon, and regulate water and climate. They provide vital ecosystem services that support economies, and are essential for livelihoods and well-being, particularly for Indigenous Peoples and local communities. They also underpin agriculture itself through rainfall, soil protection, pollination and local climate regulation: agriculture that drives deforestation and conversion undermines its own foundations.

An average of 10.9 million hectares of forest was lost every year between 2015 and 2025, 86% in the tropics. That is lower than the annual average of 13.6 million hectares between 2000 and 2015, but still alarmingly high[2]. Other natural ecosystems also disappeared. Between 2005 and 2020, the expansion of annual crops resulted in the loss of up to 95 million hectares of non-forest natural ecosystems such as grasslands, savannahs and wetlands – an average of 6.3 million hectares per year[3].

While these figures are concerning, there is reason for hope. The Living Planet Report 2026 highlights that, despite the scale of the nature and climate crises, we know far more today about both the drivers of ecosystem loss and the solutions needed to address them. Around the world, conservation, restoration and sustainable production initiatives are demonstrating that positive outcomes are possible when governments, businesses, financial institutions and communities act together.

This is evident in the transition to DCF supply chains. As this report shows, proven solutions are already being demonstrated across multiple commodities and markets. The challenge is no longer identifying solutions but implementing them at the speed and scale required to trigger transformation.



TAKING SOLUTIONS TO SCALE REQUIRES COLLABORATION, FINANCE AND ENABLING POLICIES

Successful scaling requires more than technical solutions. The right enabling environment, in which private and public policies, incentives, data infrastructure and production models act in synergy, is critical. Achieving scale will also depend on increased public and private investment, capacity-building, technology transfer, and long-term cooperation between the private sector, governments and civil society. Importantly, smallholders, Indigenous Peoples and local communities must be able to participate in and benefit from DCF supply chains.

Guidance already exists to help translate DCF commitments into action. The Accountability Framework, for example, provides practical guidance on traceability, due diligence, supplier management, monitoring and verification to protect natural ecosystems and human rights. WWF has developed a global set of principles and asks that define responsibilities and enabling conditions for companies, financial institutions and governments to advance DCF supply chains at scale. Imaflora, The Nature Conservancy, World Resources Institute and WWF-Brazil have also developed minimum requirements for farm-level traceability, monitoring direct and indirect suppliers, and independent auditing to support credible DCF claims for soy and cattle products.

Companies play a leading role in developing solutions in their own operations, spreading these among their suppliers and influencing their sectors, including by aligning sourcing requirements. Buyers must sustain demand for verified DCF commodities, while financial institutions need to direct finance toward responsible production.

Financial institutions can help accelerate this transition by integrating DCF criteria into lending and investment decisions, engaging clients on measurable progress, and directing capital towards responsible production. Finance tailored to producers' needs, combined with technical assistance, can help smallholders invest in sustainable practices and overcome barriers to participation in DCF supply chains.

Governments can drive sector-wide change by establishing common definitions, binding rules and guidelines; strengthening land-use planning, tenure security and law enforcement; and supporting sustainable agriculture through policies, incentives and technical assistance. DCF objectives should also be incorporated into agriculture, trade and bioeconomy strategies.

Without coordination, efforts to protect forests or other natural ecosystems in one place can push destruction somewhere else. When one country, region or supply chain tightens its rules, production can shift to areas with weaker protections, or into other ecosystems such as grasslands and savannahs. This is known as "leakage". Preventing leakage requires coordinated sectoral and jurisdictional action. Cooperation is also needed to develop interoperable traceability and accurate monitoring systems. Increased exchange, cross-learning and integration between existing private, public and multistakeholder initiatives is an important first step.

DCF IS NOT ONLY ABOUT PREVENTING HARM; IT IS AN INVESTMENT IN RESILIENT ECOSYSTEMS, RESILIENT COMMUNITIES AND RESILIENT SUPPLY CHAINS

When natural ecosystems are cleared, farming and forestry become more exposed to harm[4]. The shift to DCF supply chains is an investment in resilience, or the ability to withstand and recover from shocks. Healthy ecosystems support resilient producers, resilient producers support stable supply chains, and transparent supply chains let markets and finance reward responsible practice, which in turn sustains the ecosystems that production depends on.

Climate change and nature loss are making shocks such as drought, extreme weather, price volatility and supply disruption more frequent and more costly. For example, a heatwave in Ghana and Ivory Coast in 2024 led to a 280% increase in cocoa prices in April that year.[5] In the southern Brazilian Amazon, large-scale deforestation reduces rainfall and farm productivity, with huge economic costs; reducing deforestation could prevent agricultural losses of up to US$1 billion a year.[6]

Transparent and responsible supply chains strengthen land tenure and human rights, sustainable livelihoods and diversified rural economies. Each of these help communities absorb shocks. Secure tenure gives producers the confidence to invest for the long term. Diversified incomes cushion against falling commodity prices or failed harvests.

Intact forests provide food, water and income when other sources fail. In addition, DCF supply chains can enable producers to access markets and finance on fair terms, and create greater recognition and opportunities for Indigenous Peoples, local communities and smallholders.

For business, DCF implementation increases supplier visibility and product traceability. This lets companies identify where their supply chains are exposed, spread their sourcing, and respond faster when disruptions occur, translating to greater efficiency, adaptability, security of supply and continued market access. By helping protect ecosystem services that underpin production, DCF supply chains also support long-term productivity and commercial stability.

In addition, verified environmental performance can improve access to responsible finance and enable incentives such as preferential lending conditions for producers, it also reduces risks for the financial system because it can decrease the volume of non-performing agricultural loans. In landscapes with high forest cover and low deforestation, DCF can reward those who already protect forests, making responsible production visible to buyers and discouraging expansion into intact ecosystems.

ENDING DEFORESTATION AND CONVERSION IS A COLLECTIVE RESPONSIBILITY, AND THE BENEFITS AND COSTS SHOULD BE SHARED FAIRLY

The transition to DCF supply chains is a shared responsibility. Those who benefit from resilient supply chains must help build them. Producer countries can strengthen governance and implementation. Large operators, consumer countries, financial institutions and international partners need to provide financial and technical support to enable a just and effective transition. This transition should enable smallholders, Indigenous Peoples and local communities to thrive through fair access to finance, technical assistance, secure tenure and meaningful participation.

The costs of DCF implementation can be manageable when systems build on existing infrastructure and actors collaborate. For example, WWF research estimated that, even under a high-transition cost scenario, transitioning to 100% verified DCF soy supply from Argentina would just add around 1% to production and export costs, while collaboration could reduce the cost per tonne by around two-thirds. Estimated costs for Brazil were substantially lower due to larger traded volumes and pre-existing monitoring and sourcing arrangements. These findings are commodity- and context-specific but indicate that the additional costs are primarily transitional. Coordination and investment in shared systems could generate efficiencies that potentially reduce costs below current operational levels.[7]



MARKETS ARE INCREASINGLY REWARDING TRANSPARENCY AND TRACEABILITY, WHILE OPAQUE SUPPLY CHAINS FACE GROWING REGULATORY, COMMERCIAL AND FINANCIAL RISKS

Buyers, regulators, investors and consumers increasingly expect companies to know the precise origin of their products. Transparent and traceable commodity supply chains are becoming a prerequisite for market access. An assessment of 500 influential companies in forest-risk commodity supply chains found that public evidence of traceability mechanisms increased across eight of nine commodities in 2025, with 45 companies citing regulatory requirements as a driver.[8]

The European Union Deforestation Regulation (EUDR) establishes the most comprehensive mandatory framework so far, requiring covered commodities and products to be deforestation-free and traceable to their plots of origin from the start of 2027. The UK Environment Act, applicable from 2027, provides the basis for mandatory due diligence to prevent products associated with illegal deforestation from entering British supply chains. In China, the China Meat Association's Sustainable Meat Declaration and Specifications for Meat Industry Green Trade, developed in partnership with WWF, provide a voluntary framework for improving traceability and eliminating deforestation and conversion from meat and animal-feed supply chains. These initiatives demonstrate how DCF expectations are increasingly being embedded in regulation, market access and industry standards across influential consuming markets.

Building on the first Global Stocktake under the Paris Agreement, which emphasized the importance of halting and reversing deforestation and forest degradation, the Presidency of the 30th Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC COP30) developed a voluntary roadmap on enhancing efforts towards halting and reversing deforestation and forest degradation by 2030. This roadmap is another opportunity to strengthen the DCF agenda.

DCF supply chains are both a compliance response to emerging regulations, and a pathway towards resilient, competitive and future-fit commodity sectors. DCF production can simultaneously lower business risk and enable long-term market access while delivering climate mitigation, climate adaptation, biodiversity conservation, sustainable livelihoods and food security.



THE PATH FORWARD IS CLEAR: BY SCALING SOLUTIONS ACROSS SECTORS, WE CAN MAKE DCF SUPPLY CHAINS THE NEW GLOBAL MARKET NORM

The first Time to Act report highlighted proven solutions demonstrating that DCF supply chains are feasible. Building on that foundation, this second edition presents progress in existing initiatives and new solutions, drawing lessons on what it takes to expand their reach and impact. It aims to inform decisions, support collaboration and identify opportunities for replication and investment.

By sharing these experiences, it seeks to help companies, financial institutions, governments and civil society build on emerging practices and accelerate progress.The priority is now to mobilize incentives, partnerships, investment and market alignment, linking solutions and coordinating stakeholders across sectors. By enabling the replication, scaling and mainstreaming of proven solutions, these efforts can make transparent, inclusive DCF supply chains the new global standard.

PROGRESS SINCE THE TIME TO ACT REPORT'S FIRST EDITION

This section highlights notable advances in selected case studies featured in the first edition of Time to Act.



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VISEC PROTOCOL
ARGENTINA | SOY AND BEEF

STARTING POINT

VISEC is a pioneering platform in the Argentine agribusiness sector that brings together all stakeholders in the soybean and beef value chains. The platform designed and implemented a robust and innovative socio-environmental traceability system that enables the industry to demonstrate compliance with international regulations.

In 2025, three soybean meal pilot shipments totalling 56,243 tonnes from 321 production units were delivered to France, Ireland and Spain. These pilots demonstrated field-to-port traceability, while highlighting the need to strengthen legal compliance verification beyond producers' sworn declarations.

PROGRESS SINCE THE FIRST EDITION

VISEC now reports 10 pilot shipments covering approximately 250,000 tonnes of soybean meal and beef products, sourced from more than 1,500 production units across 10 Argentine provinces and delivered to 7 European countries. These results demonstrate broader operational use across commodities, production regions and destination markets, supported by independent third-party certification at shipment level.

Following national government recognition in 2025, VISEC strengthened collaboration with public agencies and access to official databases. The platform incorporates Argentina's EUDR-aligned legality matrix criteria, including land-use rights, environmental protection, Indigenous Peoples' rights and free, prior and informed consent, labor and human rights, third-party rights, and tax and commercial compliance. During the past year, labor rights and Indigenous land criteria were improved. Better databases were incorporated, with interoperable connections with public and private databases strengthening the evidence available to support due diligence.

KEY LEARNINGS AND PRIORITIES FOR SCALING

- Governance proved to be just as important as technology. Establishing a multistakeholder governance structure helped build trust among participants, align incentives and facilitate the adoption of a common system.
- Collaboration with public institutions and access to official databases were essential to operationalize legal compliance requirements and strengthen the robustness of the system.
- VISEC demonstrates that large-scale traceability developed as a shared public-private infrastructure can be more efficient than multiple disconnected company-level systems.



FURTHER INFORMATION

Time to Act — First edition, pp. 25–26

VISEC Argentina

VISEC Anual Report 2025

SANTA FE TRACEABILITY MODEL
ARGENTINA | BEEF AND LEATHER

STARTING POINT

The project was initially part of Argentina's Sante Fe province's "Carnes Santafesinas 2030" programme. In the pilot stage, the province established the Santa Fe Process Verified Programme to verify compliance, cross-referencing digital and satellite information.

The first edition documented preliminary verification of 313 farms, issuance of 30 beef and 22 leather certificates, and two shipments – to Germany and China – involving three meatpacking plants and two tanneries. The pilot established a provincial verification model, while identifying gaps in labor and community-rights checks, and the need to consolidate implementation following its resumption in 2025.

PROGRESS SINCE THE FIRST EDITION

Santa Fe advanced a digital public certification service through Santa Fe Produce Sustainable (SFPS). Presented publicly in July 2026, the programme provides a free certification pathway linking producers' farm registry numbers (RENSPA) to declared land parcels. Its online workflow validates parcel information against the cadastral database in real time and cross-references official deforestation records before issuing a certificate. The first producer certificates were issued in October 2026.

The updated model also reports checks on animal health (SENASA) compliance and the absence of labor-related complaints. Environmental verification entails the use of deforestation alert reports issued every two weeks, complemented by provincial field inspections. A criterion addressing Indigenous land rights is under development. These advances broaden the verification framework and establish a digital pathway for wider participation.

KEY LEARNINGS AND PRIORITIES FOR SCALING

- The province provides verification and certification at no cost to producers or industry; public platforms can remove entry barriers for producers regarding concerns about the use of confidential data by private stakeholders.
- Strengthening the capacities and role of local governments is a major challenge and a top priority for scaling.
- The model is fully applicable by other subnational governments. It's important to consider the public resources allocated to provide the service at no cost, as well as the indirect benefits for society and the public sector in terms of better markets and recognition of provincial production. A financial alternative could be to charge a fee for the service.

FURTHER INFORMATION

Time to Act — First edition, pp. 27–28

Santa Fe Responsible Produce

Santa Fe's tool recognition


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HAMURNI AND SINTANG

INDONESIA | PALM OIL

STARTING POINT

HAMURNI is an inclusive digital traceability platform developed to help Indonesian smallholders and palm oil buyers document where production comes from. Farmers can register plantation boundaries and production data, while buyers can map suppliers and identify potential risks related to legality and deforestation, helping target further verification.

The first edition reported 3,524 farmers registered, 3,540 plantations mapped and 3,501 transactions representing over 20,000 tonnes of fresh fruit bunches across five Indonesian regions, including Sintang in West Kalimantan. It also highlighted HAMURNI's potential to expand beyond palm oil, alongside the need for stronger farmer adoption, connectivity, field assistance and incentives for regular use.

PROGRESS SINCE THE FIRST EDITION

HAMURNI has now expanded to include rubber and coffee, moving its multi-commodity ambition into initial testing through a proof of concept in Jambi province. The application is also publicly available on the Google Play Store. Between December 2025 and September 2026, the platform recorded 507 new registered users, 694 registered plantations and 657 transactions.

In Sintang, HAMURNI's implementation continues to focus on palm oil. The district illustrates the potential to connect digital traceability with broader efforts to improve production practices and strengthen cooperation among farmers, companies and local government. Sintang covers approximately 2.1 million hectares and had 221,000 hectares of oil palm plantations in 2023—around 9% of West Kalimantan's total oil palm area. Although most palm oil companies had made No Deforestation, No Peat and No Exploitation (NDPE) commitments by 2020, an assessment done reports that fewer than 10% had fulfilled them four years later.

WWF's wider work in Sintang provides a foundation for expanding HAMURNI's use. Since 2014, support has reached 500 independent and plasma smallholders—farmers linked to company-supported production schemes—alongside two farmer groups and two cooperatives. Reported results include 461 independent smallholders achieving Roundtable on Sustainable Palm Oil (RSPO) certification across 1,003 hectares. These results reflect the broader programme, within which HAMURNI can help strengthen plantation records and supply chain transparency.

KEY LEARNINGS AND PRIORITIES FOR SCALING

- WWF's programme reaches around 4% of the district's 11,555 palm oil farmers. Farmer groups, cooperatives and local partnerships offer a practical route to extend support and increase HAMURNI's use.
- TRASE traced 14 of Sintang's 172 trade chains to plantations covering approximately 170,000 hectares. Exploring how this work could complement HAMURNI's farmer and transaction records offers an opportunity to strengthen transparency across the district.
- Experience with RSPO certification provides a foundation for supporting more cooperatives and improving readiness for Indonesian Sustainable Palm Oil (ISPO) certification. HAMURNI can support these efforts by helping organize plantation and transaction records.
- FOKSBI, the multi-stakeholder forum for sustainable palm oil, and SekBer, the Joint Secretariat, bring local actors together. Stronger mandates, stable financing and integration into local government structures could help connect HAMURNI's implementation with longer-term action across Sintang.

FURTHER INFORMATION

Time to Act — First edition, pp. 16–18

HAMURNI — Digital traceability platform

Gap analysis jurisdictional approach landscapes Sintang

INITIATIVES

Since Time to Act first edition was published in 2025, other noteworthy DCF initiatives have matured and are profiled in the following pages. The case studies are organized into five categories that illustrate crucial components of the transition to DCF supply chains.



TRACEABILITY SYSTEMS, TECHNOLOGY AND INNOVATION

Operational systems that connect products to their origins and suppliers, recording supply chain links and movements to improve transparency.

TOOLS TO ENABLE TRACEABILITY

Tools and frameworks that provide geolocation data, monitoring evidence, risk information, or common standards to support traceability and verification.

DCF SOURCING, COMPLIANCE AND TRADE

Initiatives that apply traceability and verification to sourcing decisions, due diligence and commercial transactions, translating requirements into operational practice.

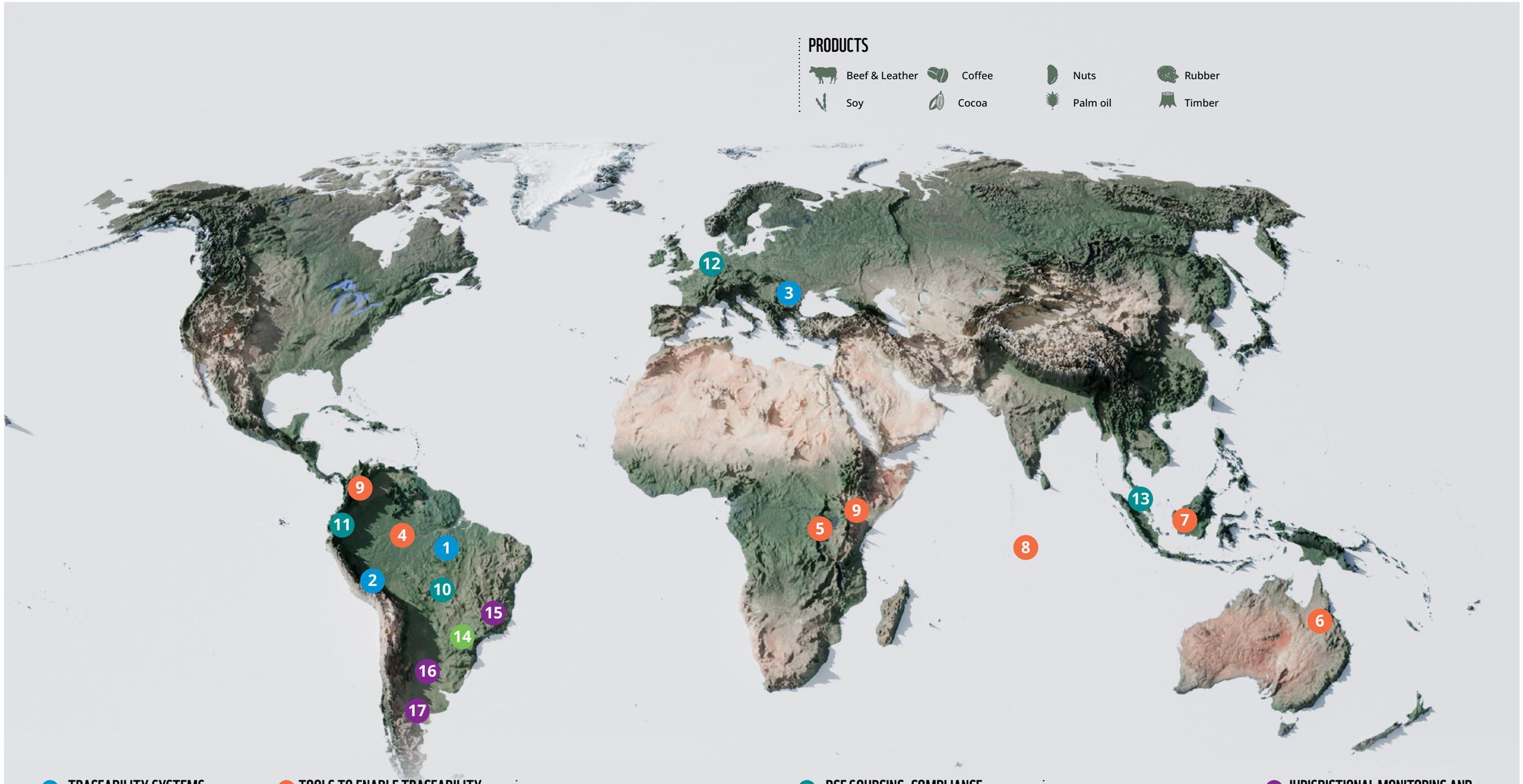
JURISDICTIONAL MONITORING AND VERIFICATION SYSTEMS

Systems that assess production and compliance across a defined territory, combining geographic data, official records and monitoring to support verification.

FINANCE MECHANISMS

Funds and financial instruments that help producers and supply-chain actors invest in DCF implementation, overcome financial barriers and scale adoption.

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TRACEABILITY SYSTEMS, TECHNOLOGY AND INNOVATION

1 **Visipec**
Monitoring and supporting compliance among indirect suppliers

2 **Wildnet**
Improving traceability and highlighting bio-diversity benefits in Amazon nut production

3 **SUMAL**
Developing a national timber tracking system

TOOLS TO ENABLE TRACEABILITY

4 **Observatório Socioambiental**
Strengthening transparency and socio-environmental due diligence

5 **The Coffee Canopy Partnership**
Mapping coffee and forest landscapes in East Africa

6 **Deforestation-free Beef Supply Chain Enablement Initiative**

7 **Hamurni and Sintang**

8 **Global Traceability Framework for Beef and Leather**
Creating common sector standards

9 **AIM4Commodities**
Open Foris Ground, Whisp and GeoID for transparent, deforestation-free supply chains

DCF SOURCING, COMPLIANCE AND TRADE

10 **Facilitating the first verified DCF beef shipment between Brazil and China**

11 **Piloting EUDR Compliance with Kallari and Wiñak Amazonian Cacao Producer Associations**

12 **Albert Heijn's Transition to DCF Cocoa Sourcing**

13 **Supporting DCF rubber sourcing through smallholder certification and traceability**

FINANCE MECHANISMS

14 **Deforestation-Free Leather Fund**
Investing in sustainable production and traceability

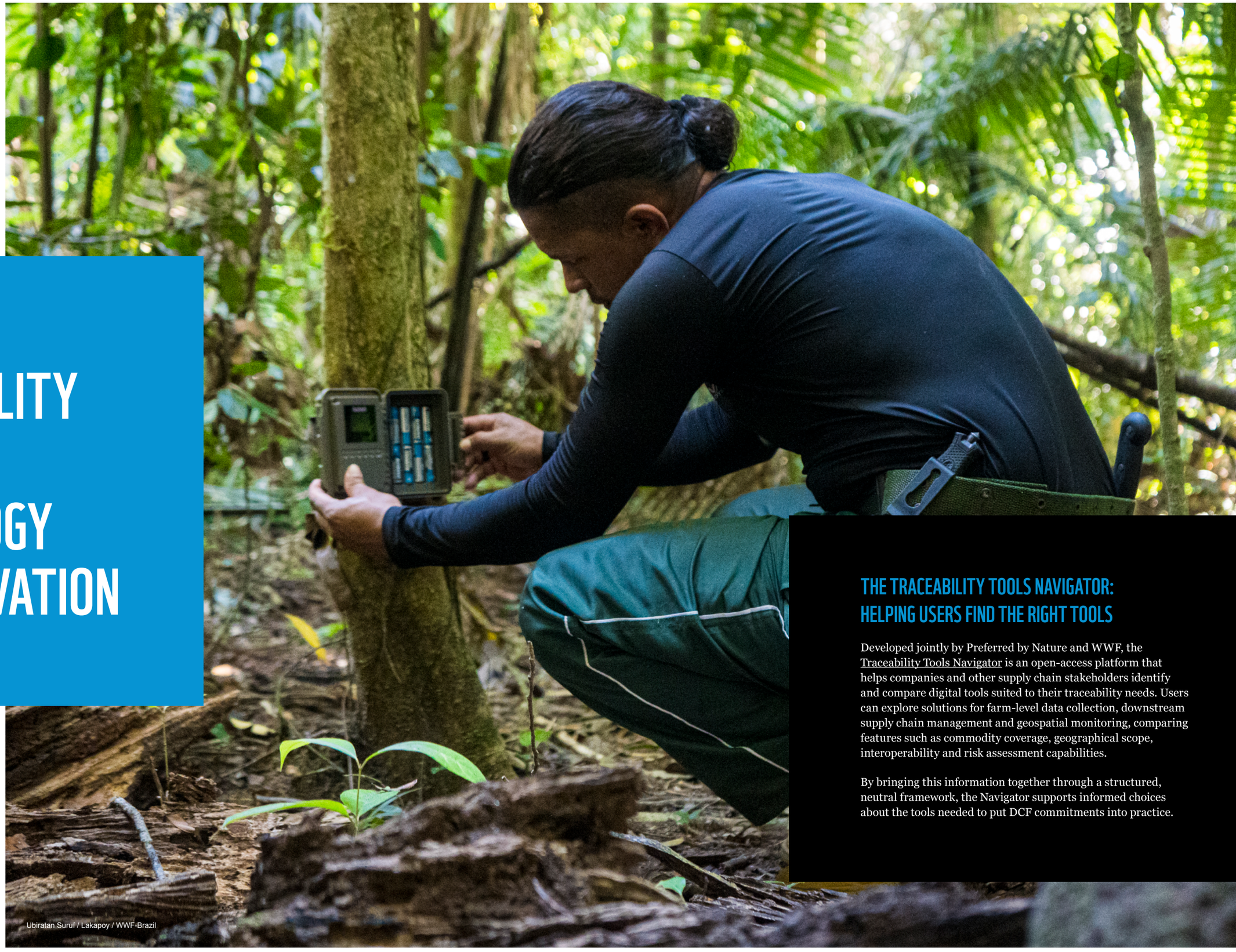
JURISDICTIONAL MONITORING AND VERIFICATION SYSTEMS

15 **SeloVerde Minas Gerais**
A state-wide public system for DCF supply chains

16 **Santa Fe Traceability Model**

17 **Visec Protocol**

TRACEABILITY SYSTEMS, TECHNOLOGY AND INNOVATION



Ubiratan Surui / Lakapoy / WWF-Brazil

THE TRACEABILITY TOOLS NAVIGATOR: HELPING USERS FIND THE RIGHT TOOLS

Developed jointly by Preferred by Nature and WWF, the Traceability Tools Navigator is an open-access platform that helps companies and other supply chain stakeholders identify and compare digital tools suited to their traceability needs. Users can explore solutions for farm-level data collection, downstream supply chain management and geospatial monitoring, comparing features such as commodity coverage, geographical scope, interoperability and risk assessment capabilities.

By bringing this information together through a structured, neutral framework, the Navigator supports informed choices about the tools needed to put DCF commitments into practice.



VISIPEC: MONITORING AND SUPPORTING SOCIO-ENVIRONMENTAL COMPLIANCE AMONG INDIRECT SUPPLIERS

GENERAL INFORMATION

Geography:
Amazon and Cerrado biomes in Brazil, with potential to expand nationally

Commodity:
Beef, leather and other cattle-derived products

Stakeholders involved:
Direct involvement – meatpackers, producers, tanneries, retailers and traders; indirect involvement – banks, other NGOs, other consumer-facing companies, sectorial associations, federal prosecutors

CONTEXT

Voluntary and government-led efforts to address deforestation in the cattle sector in Brazil have recently focused on enabling meatpackers to monitor socio-environmental compliance among the ranches who sell to them directly (direct suppliers). However, the impact on deforestation rates has been limited since much of the deforestation occurs on ranches that sell exclusively to other ranches (indirect suppliers). Meatpackers were unable to identify and monitor indirect transactions at scale. While government data that could facilitate this has existed for many years, there were challenges in terms of availability and interoperability of datasets, and new technical rules were needed to manage the complexities of indirect suppliers.

In 2015, a multi-stakeholder initiative, the Brazilian Working Group on Indirect Suppliers of Cattle (GTFI), was established to address these challenges and develop an approach for monitoring indirect suppliers. Members include meatpackers, consumer-facing companies, financial institutions, technical consultants, research institutions and civil society groups.

DETAILS AND RESULTS

The University of Wisconsin–Madison developed a technical system to assess socio-environmental compliance in cattle supply chains, including among indirect suppliers, using publicly available data. With industry input and in collaboration with civil society partners, this system was then refined to create the Visipec tool for traceability and monitoring of indirect suppliers*.

*Visipec was originally developed by the National Wildlife Federation in 2019. Since September 2026, Visipec is led in partnership by Instituto Aliança Agro Sustentável (AgroAliança), Global Canopy and the University of Wisconsin-Madison. For more information contact support@visipec.com.

In 2019, the GTFI agreed on a set of pre-competitive, industry-specific rules for monitoring indirect suppliers, known as the GTFI Good Practices. The Good Practices aim to optimize impact on reducing deforestation while minimizing supply chain disruption and are subject to continuous improvement.

The Visipec tool strengthens traceability by enabling meatpackers to monitor indirect suppliers' compliance with DCF criteria and GTFI Good Practices. Currently, meatpackers representing nearly 50% of the Brazilian Amazon's cattle market employ Visipec to assess supply chain risks, enabling engagement with thousands of producers.

The Visipec programme includes support for rancher engagement and improved compliance and has enabled meatpackers to assess, report and increase socio-environmental compliance among their indirect suppliers.

SOCIAL IMPACT

The GTFI Good Practices include respect for Indigenous lands and avoiding practices analogous to slave labor, so using Visipec to monitor compliance can incentivize appropriate working conditions for ranch lands and reduce encroachment on Indigenous lands. In addition, the rules focus on ranches over 100 hectares to avoid harming the livelihoods of small family ranches who collectively are responsible for only a small percentage of deforestation and encroachment problems.

The team behind Visipec also supports direct engagement with suppliers, helping raise awareness of socio-environmental requirements and guiding producers through compliance processes. Over the past two years, the Visipec team has directly engaged more than 350 producers through one-on-one meetings, workshops and outreach events aimed at increasing awareness and adoption of DCF production practices. As a result, for example, one partner meatpacker was able to actively work with suppliers to resolve compliance issues and support the regularization (return to compliance) of 182,283 hectares over a two-year period.

KEY CHALLENGES IN SCALING AND LESSONS LEARNED

Challenges

- Uneven availability and access to public data across states can limit the tool's geographic coverage.
- Technical information alone doesn't lead to changes in company practices: companies need to be willing to improve, be able to interpret and use results to support decision-making and support their suppliers to comply with DCF criteria and good practices.
- Engaging producers requires dedicated communication tailored to local realities. Many producers have limited awareness of evolving market requirements and need support to translate technical requirements into practical actions.

Learnings

- Clearer supply chain visibility helps meatpackers identify risks and act. Visipec analyses often reveal that there are fewer non-compliant indirect suppliers than companies expect, because a single non-compliant indirect supplier is often responsible for non-compliance of several direct suppliers.
- Febraban SARB 026/2023, a Brazilian banking self-regulation on illegal deforestation risks in meatpacker lending, prompted several meatpackers to seek support to establish or strengthen their traceability and monitoring systems, as well as improve public disclosure of their results and commitments.
- Companies progress faster when owners and senior managers treat traceability and monitoring as priorities for long-term business sustainability and competitiveness.
- Clear communication adapted to local conditions helps producers turn technical requirements into practical actions.
- Brazil's Federal Prosecution Service, the Indirect Suppliers Working Group for Brazilian Ranching, the Consumer Goods Forum and Febraban helped clarify requirements and align practices across the sector.

RECOMMENDATIONS FOR REPLICATION AND SCALING

Visipec has already served as a model for the development of other cattle traceability tools in Paraguay and Colombia. Its analysis of the GTFI Good Practices has been used in developing guidance for both the finance sector and audits by federal prosecutors in the Amazon. Efforts are underway to adapt Visipec for additional uses and users beyond meatpackers, as well as to meet new regulatory and voluntary compliance requirements.

FURTHER INFORMATION

Visipec

GTFI



SUMAL: DEVELOPING A NATIONAL TIMBER TRACKING SYSTEM

GENERAL INFORMATION

Geography:
Romania

Product/raw material:
Timber (forest supply chain – wood products)

Stakeholders involved:
Public authorities (MMAP, forest control structures), forest administrators (RNP–Romsilva, private entities), WWF-Romania (technical and policy expertise), economic operators within the timber supply chain (harvesting, transport, processing), digital solution providers (traceability, monitoring), local communities and forestry workers, international partners (within regional/EU initiatives)

CONTEXT

Romania is home to some of Europe's last remaining undisturbed forests and has a long tradition of closer-to-nature forestry, yet associated logging and illegal timber trade pose serious threats and continue to fuel public concern. Weak governance and institutional capacity, poorly coordinate land restitution alongside corruption and lack of transparency have compounded the problem, combined with unsustainable demand of timber, making stronger oversight of harvesting and trade a national priority.

Romania's forestry sector is aligning with European requirements concerning the sustainability and legality of timber harvesting, including preparations for the EUDR. This reinforces the importance of tracing timber throughout the value chain and providing credible evidence of its origin, legality and deforestation-free status. A central challenge has been to connect information from forest inventories, harvesting permits, transport records, processing activities and forest management plans, allowing authorities to cross-check records and identify potential irregularities.

DETAILS AND RESULTS

SUMAL is Romania's official information system for timber tracking and control. It enables real-time tracking of timber from harvesting through transport and processing. By digitizing forest management plans and harvesting permits and integrating GIS data with timber transport records in centralized databases, the system allows authorities to cross-check and analyse origin, volume and transport information, supporting enforcement and compliance with EU requirements.

The system includes applications such as SUMAL Marcare, which forestry engineers use to digitally register and mark trees authorized for harvesting before any cutting takes place, and SUMAL Control, which allows police officers and forest rangers to check the vehicle's registration number and instantly verify if a timber shipment is legal. GPS monitoring and linked records help detect unauthorized transport routes and the reuse of transport documents. Licence holders must register every timber shipment departing from a harvesting site, recording its volume, species, location, departure date and time, and permit number. Transporters must also upload photographs of the load and the vehicle's odometer reading at departure, which create an electronic seal for the shipment.

A defining feature of the system is the "Forest Inspector" web portal and mobile app, which strengthens transparency and public oversight by allowing citizens to verify timber transport against registered shipment information, identify potentially unregistered shipments, overloading or suspected misreporting of timber quantities, species or assortments. With forest protection recognized as a matter of national security, citizens can report suspected illegal timber transports through the national emergency hotline, triggering an immediate authority check.

In its first year of operation, the Forest Inspector app and web portal together recorded more than 150,000 users and 6.8 million queries. Public scrutiny connects digital transparency with reality on the ground, helping authorities identify and investigate irregularities. Through SUMAL, citizens become an extra set of eyes in the forest.

SOCIAL IMPACT

SUMAL generates significant benefits for various stakeholders. For local communities, it increases transparency and reduces risks associated with illegal logging, strengthening trust in forest governance. For forestry workers, it supports more predictable working conditions. For economic operators, it improves efficiency, facilitates access to international markets, through clearer digital procedures compliance with forest certification schemes and EUDR requirements, enhancing competitiveness and promoting fair competition. For the state, it strengthens monitoring and enforcement capacity, contributing to a significant reduction in illegal logging, a stronger rule of law, and a smaller shadow economy in the forest sector.

KEY CHALLENGES IN SCALING AND LESSONS LEARNED

- Further development requires stronger interoperability between public databases and operators' own data systems, bringing information together to improve risk identification, reduce administrative burdens and enable innovation.
- Initial reluctance among some stakeholders highlighted the importance of early engagement and ensuring solutions are simple and easy to use.
- Limited mobile connectivity has constrained field data collection, emphasizing the need to adapt solutions to local conditions. Continuous system updates are essential to close loopholes and respond to evolving patterns of non-compliance.
- Automated tools can estimate timber volumes on transport vehicles and generate alerts, but technology must be complemented by independent checks on the ground using a risk-based approach.

RECOMMENDATIONS FOR REPLICATION AND SCALING

Replication and scaling can be supported by standardizing methodologies and tools, integrating the solution with existing national systems, building public–private partnerships, and securing funding through EU and national programmes. Public access to traceability information, interoperability with other systems and proportionate requirements for smallholders should underpin this process. Controls should focus on timber's first placement on the market, combining automated checks of timber volumes and risk alerts with independent, risk-based field verification.

Expansion to other regions and supply chains, alongside a European system connecting national platforms, could strengthen its reach.

FURTHER INFORMATION

SUMAL 3.0 for simplicity, transparency and efficiency

National Forest Inventory

Digital fingerprint of wood transport

Monitoring report June 2026


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WILDNET: IMPROVING TRACEABILITY AND HIGHLIGHTING BIODIVERSITY BENEFITS IN AMAZON NUT PRODUCTION

GENERAL INFORMATION

Geography:
Peruvian Amazon

Product/raw material:
Amazon nut (Brazil nut)

Stakeholders involved:
Organized Amazon nut harvesters and their associations; the Association of Organic Amazon Nut Harvesters of Peru (RONAP); forest concession holders for Amazon nut production; buyers and commercial actors along the value chain; public entities linked to forest management and oversight, including SERFOR and OSINFOR; technical support organizations

CONTEXT

The production of Amazon nuts (also known as Brazil nuts) depends directly on maintaining standing forests: Amazon nut trees are among the largest and longest-living trees in the Amazon rainforest, but they rarely fruit outside healthy forests.

However, the value chain faces limitations in demonstrating its DCF status in a standardized, digital and verifiable way. The lack of integrated traceability from collection areas to market makes it difficult to consolidate information on origin, legality, conservation and commercial flows. This limits access to certain markets, reduces buyers' ability to conduct due diligence, and weakens economic incentives to conserve Amazon nut forests.

RONAP, a participant in WWF's Forests Forward programme, has piloted the Wildnet platform to strengthen transparency in the Amazon nut value chain and highlight its contribution to forest conservation, biodiversity and local livelihoods. Through its engagement with WWF, RONAP also contributes to restoring cleared plots and degraded forest land using modern technology and agroforestry techniques.

DETAILS AND RESULTS

Wildnet integrates traceability, conservation and biodiversity information in Amazon nut production areas. It combines three main components:

- Digital traceability: registration of RONAP members and their Amazon nut harvesting production areas, volumes, and commercial flows from origin to buyers.
- DCF evidence: linking production to georeferenced areas, legality information and forest-cover monitoring to demonstrate that Amazon nuts come from standing forests.
- Transparency and contribution to conservation: visualization of biodiversity and conservation results in production areas, with the option to channel contributions or donations to support forest protection.

Wildnet aligns with DCF supply chain principles, as well as due diligence approaches inspired by frameworks such as the EUDR: traceability to origin, georeferencing, risk assessment, verifiable documentation and transparency for buyers. Since Amazon nuts are not currently included among the commodities regulated by the EUDR, the pilot is a tool to strengthen preparedness and due diligence, not an EUDR compliance mechanism.

DCF status can be supported through a methodology that combines geographic delimitation of origin areas, verification of rights or titles, review of deforestation and land-use change alerts, production and sales records, and validation by technical or independent actors.

The platform also displays biodiversity results in Amazon nut production areas and enables people to donate to support their conservation.

SOCIAL IMPACT

The pilot is working with 38 producer families, and is strengthening their capacities in information management, forest monitoring, commercial organization and communication with buyers. These families will benefit from improved income opportunities and greater market access.

By adding value to a product that depends on standing forests, the solution promotes sustainable livelihoods compatible with conservation. It also creates economic incentives to keep forest concessions free from deforestation and degradation, reinforcing the role of local producers as key actors in sustainable forest management.

The pilot has strong scaling potential, considering that Madre de Dios has more than 1,200 Amazon nut forest concessions. This could expand social, economic and environmental benefits to a larger number of Amazon nut-producing families, strengthening a value chain based on Amazon forest conservation.

KEY CHALLENGES IN SCALING AND LESSONS LEARNED

Challenges

- Information recorded in the platform must be complete, up to date and verifiable.
- Connectivity is limited in rural areas.
- Continuous training and integration with public forest information systems are critical factors for the model's sustainability.

Learnings

- Engaging harvesters and local associations from the outset is important.
- Commercial traceability needs to be combined with environmental evidence.
- Coordinating public, private and technical actors helps build trust across the value chain.

RECOMMENDATIONS FOR REPLICATION AND SCALING

The Wildnet platform has potential to be expanded to other Amazon nut associations and concessions, while maintaining a common standard for digital traceability from origin to market. Scaling can be achieved by integrating the platform with public forest information systems, strengthening the capacities of harvesters and local organizations, and generating market and financing incentives for DCF non-timber forest products.

FURTHER INFORMATION

RONAP Wildnet Platform



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TOOLS TO ENABLE TRACEABILITY



OBSERVATÓRIO SOCIOAMBIENTAL (SOCIO-ENVIRONMENTAL OBSERVATORY): STRENGTHENING TRANSPARENCY AND SOCIO-ENVIRONMENTAL DUE DILIGENCE

GENERAL INFORMATION

Geography:
Brazil

Commodity:
Cattle, cocoa, coffee, palm oil, rubber and soy

Stakeholders involved:
Institute for Society, Population and Nature (ISPN), WWF, Fern, CPT (Comissão Pastoral da Terra), Imaflora, ICV (Instituto Centro de Vida), AidEnvironment, Global Canopy, Trase, Observatório do Matopiba

CONTEXT

Brazil is a major global producer of agricultural commodities, yet their expansion continues to drive deforestation, ecosystem conversion, land conflicts, and growing pressure on Indigenous Peoples and traditional communities.

Regulations such as the EU Deforestation Regulation (EUDR), alongside broader human rights due diligence frameworks, are increasing the need for geographically explicit data to identify, assess, and address environmental and social risks across supply chains.

In Brazil, this information is fragmented across different databases and institutions. Environmental monitoring, commodity production, land tenure, climate risk, traditional territories and social conflicts are rarely analysed together.

The Socio-Environmental Observatory, developed by the Institute for Society, Population and Nature (ISPN), WWF, the Pastoral Land Commission (CPT), Fern and other civil society organizations, addresses this gap by integrating these dimensions into a geospatial platform. Its objective is to strengthen transparency and socio-environmental due diligence by showing where environmental risks occur and which territories, communities and rights may be affected by commodity expansion.

DETAILS AND RESULTS

The Observatory integrates geospatial data on commodity production and expansion, deforestation and conversion, climate risk, Indigenous and traditional territories, protected areas, and documented socio-environmental conflicts and violations.

By cross-referencing these datasets, users can identify areas where commodity production overlaps with environmental change, territorial rights and social conflicts. This provides a broader understanding of supply-chain risk than environmental monitoring alone.

The development of the Observatory involved around 25 institutions, including civil society organizations, technical partners, research institutions and social movements. Over three years, these actors contributed to discussions on data, methodology and the development of the platform, which was publicly launched in April 2026. CPT has played a particularly important role as a key provider of data on rural conflicts and human rights violations.

The platform can support frameworks such as the EUDR and broader corporate due diligence processes by providing independent contextual information for risk assessment. While the Observatory does not certify a property, commodity or supply chain as DCF, it complements traceability and verification systems by providing evidence that can identify areas requiring further investigation.

The initiative is currently strengthening engagement with government agencies, civil society and other potential users and developing case studies to demonstrate how these datasets can support concrete analyses of commodity-producing landscapes.

SOCIAL IMPACT

The Observatory strengthens the visibility of rural conflicts and human rights violations affecting Indigenous Peoples and local communities in Brazil from 2002 to 2023. By bringing this information together with data on deforestation, commodity production and territorial rights, the platform helps identify where environmental pressures overlap with social vulnerability and documented conflicts.

The data covers conflicts affecting Indigenous Peoples and a wide range of traditional communities. By making these patterns more visible and accessible, the Observatory provides evidence to civil society organizations and affected communities for strengthened advocacy, territorial claims and engagement with public authorities and companies.

The platform can also help governments, companies and other stakeholders identify areas requiring investigation or preventive action.

KEY CHALLENGES IN SCALING AND LESSONS LEARNED

- The Observatory provides contextual risk analysis but does not replace traceability, field verification or certification systems.
- Data coverage and update frequency vary across sources.
- Involving civil society organizations, social movements and technical partners in data validation, governance and priority setting helps ensure the platform remains credible, relevant and responsive to socio-environmental realities.

RECOMMENDATIONS FOR REPLICATION AND SCALING

The Observatory can be replicated where reliable social, environmental and production data is available, supported by collaborative governance involving civil society, data providers and technical partners. To increase its scale and impact, the next phase will focus on annual data updates and the integration of new datasets, including specific location and data about Indigenous, traditional and other communities. Case studies will demonstrate how integrated data can be applied to concrete socio-environmental issues, while presentations and partnerships with government agencies, companies, universities and other strategic actors will expand the platform's use and reach. In parallel, the Observatory will seek diversified funding to ensure the long-term sustainability of data curation, platform maintenance and collective governance.

FURTHER INFORMATION

Socioenvironmental Observatory

Socioenvironmental Platform

COFFEE CANOPY PARTNERSHIP: MAPPING COFFEE AND FOREST LANDSCAPES IN EAST AFRICA



© Andre Dib / WWF-Brazil

GENERAL INFORMATION

Geography:
Ethiopia, Kenya, Tanzania, Uganda, Rwanda and Burundi (approximately 1.2 million km² area of interest)

Commodity:
Coffee

Stakeholders involved:
Stakeholders involved: JDE Peet's (initiator and lead), Airbus Defence and Space (Earth-observation imagery and technical implementation), participating coffee companies and traders, coffee-producing country authorities, research and implementation partners, and local coffee-sector stakeholders. The wider partnership includes Tchibo, Louis Dreyfus Company, Neumann Kaffee Gruppe, Sucden, Sucafina and Touton.

CONTEXT

Coffee depends on healthy forest landscapes. Forests regulate local climate, protect water resources, preserve biodiversity and create the conditions that allow coffee to thrive. Climate change, agricultural expansion and deforestation are increasingly threatening coffee production and farmer livelihoods.

While regulations such as the EUDR have accelerated the need for better traceability and transparency, demonstrating that coffee was not produced on recently deforested land is only part of the solution. The real challenge is ensuring that future coffee production no longer comes at the expense of forests.

The Coffee Canopy Partnership was created around a simple ambition: "No coffee at the expense of forests." Its objective is to provide producing countries, companies and farmers with the shared infrastructure needed to identify risks early, prevent new deforestation, remediate legacy issues where appropriate, and support farmers in protecting forests while maintaining productive coffee systems.

Rather than creating another proprietary compliance tool, the initiative develops open, sector-wide infrastructure. High-resolution coffee plot maps are one component, enabling better decision-making, landscape planning, farmer engagement, restoration activities, monitoring and regulatory compliance while strengthening the resilience of coffee landscapes against climate change.

DETAILS AND RESULTS

The Coffee Canopy Partnership combines very high-resolution satellite imagery, artificial intelligence and collaborative governance to help prevent and remediate deforestation across coffee landscapes. The process includes defining country areas of interest; assembling 2020 baseline and recent imagery; training and validating coffee-detection models; conducting independent quality checks; and engaging national stakeholders to interpret results and agree how the information can support prevention, remediation and farmer inclusion.

Core outputs are: (i) a harmonized coffee plot map for the 2020 EUDR cut-off baseline; (ii) a 2024–2026 refresh; (iii) change analysis to identify potential forest-risk areas; and (iv) an accuracy report documenting methodology, limitations and confidence levels. Coffee plot maps provide the common geographic reference that allows governments, companies and farmers to identify risks, target interventions, monitor progress and verify outcomes over time.

The East Africa pilot will produce harmonized coffee plot mapping across six countries, supporting EUDR due diligence, improving deforestation risk assessments, reducing false positives in shaded coffee systems and enabling coordinated prevention and remediation strategies. The initiative aligns with EUDR and internationally recognized geospatial methodologies. Rather than replacing national systems, it complements them with a shared sector infrastructure that can support independent verification and continuous improvement.

SOCIAL IMPACT

The initiative is expected to strengthen farmer inclusion by reducing the risk of unnecessary exclusion from EU supply chains, particularly for smallholders producing shaded coffee that may otherwise be incorrectly classified as forest or deforestation areas. By improving the accuracy of coffee mapping, the partnership aims to support remediation rather than disengagement where possible and help governments and companies target investments toward farmers and landscapes where they can deliver the greatest environmental and social benefits. These outcomes are expected to contribute to more resilient coffee-dependent communities as the initiative moves from mapping to implementation.

The partnership also promotes participation by producing-country authorities and local coffee institutions, so that interpretation and response are not determined only by downstream companies. In the next phase, the maps can help direct technical support, remediation and prevention measures toward vulnerable farmers and landscapes. As the pilot is still being completed, quantified livelihood or income impacts are not yet available.

KEY CHALLENGES IN SCALING AND LESSONS LEARNED

- A satellite-derived coffee map is a risk-screening and decision-support layer, not proof of compliance or non-compliance by itself. The maps identify coffee land use, not property ownership or cadastral boundaries, which remain the responsibility of national authorities. To ensure accuracy and accountability, the partnership intends to establish a feedback mechanism through which farmers and other stakeholders can report potential mapping errors. These will be assessed through a robust assurance process, with corrections made where errors are confirmed, while safeguarding against fraudulent or unsupported changes. The pilot currently addresses deforestation rather than ecosystem conversion.

- Early involvement of governments, local coffee institutions and technical experts is essential to validate results, avoid false positives and establish credible remediation pathways. Shared methodologies and transparent accuracy reporting are equally important for trust and replication.

- While the EUDR has accelerated investment in traceability and transparency, regulatory compliance alone will not prevent future deforestation. The ultimate objective is to stop deforestation associated with coffee production across all markets, not simply demonstrate compliance for coffee entering the EU. Shared monitoring infrastructure can help reduce duplication and direct investments toward targeted prevention, remediation and farmer resilience. Achieving this requires governments, companies and producer organizations to collaborate on a shared approach, with incentives that recognize and reward demonstrable progress in preventing deforestation.

- Shared infrastructure only creates value when it is accompanied by strong country ownership and sector-wide collaboration. Building trust among stakeholders, agreeing on common methodologies and establishing remediation pathways are just as important as the underlying technology.

- The initiative is not simply a geospatial solution but a collaborative platform that enables countries and the coffee sector to move from compliance toward long-term prevention, restoration and climate resilience. Technology identifies where deforestation occurs; collaboration is what prevents it.



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RECOMMENDATIONS FOR REPLICATION AND SCALING

The model can be replicated by combining a clearly defined geography and cut-off date; access to suitable high-resolution imagery; representative training and validation data; transparent accuracy thresholds; local expert review; and a governance process involving public authorities, companies and farmer representatives. Outputs should be interoperable with national systems and available under access conditions that protect sensitive data while enabling broad sector use.

Future phases will expand geographic coverage, regularly update coffee maps, strengthen remediation monitoring and integrate additional environmental and social datasets to support climate resilience, nature protection and farmer livelihoods. The aim is to ensure no coffee grows at the expense of forest globally.

FURTHER INFORMATION

Coffee Canopy Partnership launch press release (JDE Peet's)

Airbus announcement: Worldwide coffee plantation mapping with satellites

Tchibo – Coffee Canopy Partnership


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DEFORESTATION-FREE BEEF SUPPLY CHAIN ENABLEMENT INITIATIVE

GENERAL INFORMATION

Geography:
Australia
(eastern and northern regions)

Commodity:
Beef

Stakeholders involved:
WWF Australia; Accountability Framework initiative (AFi); research partners (Australian National University); beef processors and retailers; finance institutions

CONTEXT

Eastern Australia is a global deforestation hotspot, with land clearing – primarily driven by agricultural expansion for beef production – remaining a key driver of biodiversity loss and emissions.

At the same time, global expectations are shifting. Increasing numbers of companies are adopting deforestation free commitments, and regulatory frameworks such as the EUDR are requiring companies to demonstrate that commodities are not linked to deforestation.

Despite these pressures, two key gaps have persisted: a lack of locally relevant guidance on how to define and assess deforestation free supply chains, and limited access to credible spatial monitoring tools.

DETAILS AND RESULTS

The Deforestation free Beef Supply Chain Enablement Initiative focused on establishing the foundations of deforestation-free beef supply chains in Australia.

WWF-Australia, in collaboration with the Accountability Framework initiative, developed a Guideline for Implementing Deforestation-free Assessments in Australia. This translates global frameworks into the Australian context and provides a practical pathway for producers and supply chain actors to assess deforestation risk.

In parallel, WWF-Australia supported the development and application of the Vegetation Monitoring and Assessment Program (VMAP), a satellite-based platform providing spatial data on vegetation extent and change over time. VMAP enables the detection of forest loss and supports assessment of potential deforestation to inform deforestation-free supply chains.

Together, the guideline and VMAP enable the first deforestation free assessment approaches in the Australian beef sector, combining agreed definitions with spatial evidence.

Industry actors have since independently initiated a project that will apply the VMAP outputs in practice, testing integration into sourcing, supplier engagement and due diligence processes. The project is expected to deliver around 4,000 property-level deforestation free assessments, providing an important proof point for operationalization at scale.

SOCIAL IMPACT

The initiative supports improved transparency and preparedness across the supply chain. Producers benefit from clearer expectations on deforestation free requirements and emerging market access conditions, and the c.4,000 assessments support more informed, risk based decision making at the producer and supply chain level. The process has provided opportunities for dialogue and knowledge sharing, supporting gradual shifts in understanding around deforestation risk and supply chain expectations.

There is also growing recognition that stronger engagement with First Nations stakeholders is essential to achieving more holistic and durable outcomes. Incorporating First Nations' knowledge and perspectives is an important next step, with the potential to strengthen approaches to land stewardship, landscape understanding and long term sustainability outcomes.

KEY CHALLENGES IN SCALING AND LESSONS LEARNED

Challenges

- Australia-specific guidance was needed to translate global deforestation definitions into operational criteria, definitions, thresholds and data sources.
- Limited access to clear guidance and credible spatial data make it difficult to operationalize deforestation-free supply chains.
- Given varying levels of trust in NGOs and differing perspectives across the sector, early stages of the initiative required a strong focus on building relationships, demonstrating practical value, and creating a foundation for engagement.

Learnings

- Pairing definitions with practical tools (e.g. spatial monitoring) supports implementation.
- Work needs to be sequenced from guidance to pilot to scaling rather than attempting immediate large scale rollout.
- Sustained engagement and bringing different groups in at relevant stages helped build trust and shared understanding, and enabled industry to take ownership of implementation at scale.
- Harnessing momentum from external drivers, including the EUDR and corporate commitments, can accelerate implementation.

RECOMMENDATIONS FOR REPLICATION AND SCALING

This model has strong potential for replication and scaling both within Australia and internationally.

The approach is anchored in the Accountability Framework, which provides a common foundation that can be adapted to different country contexts. The model combines globally aligned definitions, locally relevant guidance and spatial monitoring.

A key consideration for replication is the importance of sequencing and trust building. With differing levels of trust between stakeholders, initial phases may need to prioritize building credibility, demonstrating practical value and establishing shared understanding before expanding engagement more broadly.

As a global beef exporter, Australia is highly exposed to evolving international requirements, including deforestation free regulations and corporate commitments, offering a significant opportunity to scale through the beef export market.

Scaling pathways include:

- Expanding industry-led implementation across additional supply chain actors and regions
- Broadening from a focus on avoiding deforestation to supporting wider sustainable and regenerative production outcomes and nature-positive food and agricultural practices
- Progressive broadening of stakeholder engagement, including deeper partnership with First Nations organizations and communities.

The combination of export market drivers, increasing corporate commitments and a phased, trust based approach to engagement provides a strong enabling environment for scale up.

FURTHER INFORMATION

Vegetation Monitoring & Assessment Program | VMAP

Deforestation-free Assessment Guideline | VMAP


© Michel Gunther / WWF

GLOBAL TRACEABILITY FRAMEWORK FOR BEEF AND LEATHER: CREATING COMMON SECTOR STANDARDS

GENERAL INFORMATION

Geography:
Global (initial focus on Australia, Brazil and USA)

Commodity:
Beef and leather

Stakeholders involved:
WWF, Institute of Food Technologists, Better Food Future, brands, retailers, technology providers, NGOs, regulators, industry groups

CONTEXT

Cattle production is a major driver of land-use change, deforestation and habitat conversion. At the same time, regulators, buyers and consumers increasingly expect proof of origin and responsible sourcing. Beef and leather supply chains are often fragmented, with inconsistent data systems that make it difficult to verify sustainability claims, identify deforestation risks and demonstrate compliance. The Global Traceability Framework for Beef and Leather was developed to create a common language and standardized approach for traceability across the sector.

DETAILS AND RESULTS

The framework establishes a harmonized, event-based traceability model built on globally recognized data standards. Rather than creating a separate approach for beef and leather, it builds on more than a decade of experience from the seafood sector, adapting proven methods, standards and implementation lessons.

The framework defines the key points where information should be recorded and the core details needed to show *who, what, when and where* across the supply chain. By standardizing data capture and exchange, it enables different systems and actors to work together globally. This helps companies achieve end-to-end transparency, enhances risk identification, supports DCF sourcing programmes, strengthens EUDR readiness and supports credible verification of sustainability claims. It also can enhance efficiencies and reduce costs, reducing economic barriers to traceability. The framework is designed to support large-scale traceability across countries and supply chains while allowing each actor to retain control of its own data.

SOCIAL IMPACT

Greater transparency can improve accountability across beef and leather supply chains, support responsible sourcing, and increase market access opportunities for compliant producers. Better traceability also helps promote environmental stewardship, protect forests and ecosystems, and strengthen trust among producers, brands, consumers and regulators.

KEY CHALLENGES IN SCALING AND LESSONS LEARNED

- Successful implementation requires broad alignment among supply-chain actors and across complementary sectors such as beef and leather, and consistent adoption of common data standards. Many existing systems operate in silos, with limited data exchange and differing definitions of traceability. Standardization is the critical enabler for interoperability and scalable DCF traceability across global supply chains.
- The foundations of traceability are largely the same regardless of the product being tracked. Cross-sector alignment reduces duplication, supports compatibility between supply chains and creates a stronger basis for scaling. The same approach could be adapted for other commodities linked to deforestation and conversion, allowing future initiatives to build on a common foundation rather than developing separate systems for each product.

RECOMMENDATIONS FOR REPLICATION AND SCALING

The framework is designed to support replication. It combines globally recognized standards with practical guidance, testing tools, reusable open-source software and implementation resources that organizations can apply without having to design a new approach from scratch. These resources support different starting points, from organizations still relying on paper records to those already using digital systems, and provide a step-by-step pathway for piloting, troubleshooting and expanding implementation over time. Because the framework allows organizations to retain the technologies and processes that best suit their operations while following a shared approach for recording and exchanging information, it can scale across companies, regions and supply-chain stages.

Continued adoption by brands, processors, producers, technology providers and industry initiatives will accelerate global alignment around transparent and DCF beef and leather supply chains. Future scaling can build on this foundation by integrating additional technologies, expanding participation across the supply chain, and applying the same core approach to other commodities and sectors, such as palm oil, timber, soy and rubber.

FURTHER INFORMATION

The Global Traceability Framework for Beef and Leather


© Andre Dib / WWF-Brazil

AIM4COMMODITIES: OPEN FORIS GROUND, WHISP AND GEOID FOR TRANSPARENT, DEFORESTATION-FREE SUPPLY CHAINS

GENERAL INFORMATION

Geography:
Global, with implementation and testing in multiple commodity-producing countries, including Colombia and Kenya

Commodity:
Examples presented here focusing on cocoa and coffee

Stakeholders involved:
FAO, GIZ, UK, Google, national authorities, producer organizations and cooperatives, private sector supply-chain actors and technical partners

CONTEXT

Demonstrating that commodities originate from land without deforestation requires reliable information on production locations and land-use history. However, fragmented datasets, limited connectivity and technical capacity can prevent producers, particularly smallholders, from generating and sharing the evidence required by buyers and emerging regulations.

Through AIM4Commodities (Accelerating Innovative Monitoring for Forests and Commodities), the UN Food and Agriculture Organization (FAO) in collaboration with partners is developing open-source and interoperable digital solutions to address these challenges. Complementary and interoperable building blocks connect field data collection, plot identification and forest-monitoring analysis, enabling different supply-chain actors to generate and exchange information while supporting producer participation and data ownership.

DETAILS AND RESULTS

AIM4Commodities connects three complementary open-source free solutions within a common workflow:

- Open Foris Ground, co-developed by the FAO and Google, collects georeferenced field data through a web console and Android app. Its map-first interface enables users to design surveys, map production plots and collect information offline, with automatic synchronization when connectivity returns. Data can be exported in various formats, and survey designers can define data-sharing arrangements.

- GeoID, developed by the FAO, converts a location into a fixed-size anonymous identifier. This provides a common reference for a plot across applications and organizations without requiring raw coordinates to accompany every exchange.

- Open Foris Whisp ("What's in that plot?"), developed by the FAO, combines geospatial datasets and satellite-derived information to support rapid, plot-level analysis of land use and deforestation risk. Its user interface, API and adaptable source code support both technical and non-technical users.

In a typical workflow, a producer or cooperative can geolocate a plot using Ground, assign a GeoID, analyse the plot through Whisp and share its identifier alongside relevant monitoring information through a traceability system. Where digital plot boundaries already exist, they can be used directly without repeating the mapping step in Ground. They have an interoperable approach as a building block for digital public infrastructure.

In Kenya, Toroton cooperative in Nandi county has used Ground to map members' farms. Thirteen local youths mapped 1,621 coffee plots in six weeks, collecting data on boundaries, yields, varieties, pests and farmer needs. Whisp flagged no plots with high deforestation risk. Peer-to-peer training with 111 smallholders and cooperative representatives helped expand use to nearby cooperatives, with nearly 2,000 plots now mapped in Nandi. Kenya's Coffee Directorate is considering Open Foris for export authorizations, and the country's largest coffee exporter has shown interest in traceability use.

In Colombia, Ground is being applied to support cacao traceability. Corpoteva, a women-led cooperative in Tumaco, Nariño, used Ground to map its 286 members' farms, collecting plot, cacao-practice and household data while retaining data ownership. With FAO and UN-REDD support, the work expanded to Afro-descendant communities and the Rescate Las Varas Community Council, mapping 290 cacao polygons, training 73 young "forest guardians" and introducing the OECD-FAO due diligence handbook to strengthen deforestation-risk assessment and traceability.

Global adoption continues to grow rapidly. By October 2026, Open Foris Ground had been installed on over 23,000 Android devices and used to map more than 250,000 locations. Meanwhile, Whisp had analysed over 7.5 million land plots, with 2.5 million analysed directly through its web application and over 5 million through other connected applications. Whisp also had over 700 active API keys, enabling other digital solutions to connect to Whisp automatically. These figures continue to rise.

SOCIAL IMPACT

Easy-to-use open-source solutions are enabling producers and communities, particularly women and youth, to participate more directly in generating and managing information about their land. Offline collection and accessible interfaces can reduce practical barriers in remote areas, while shared plot references can support collaboration between producers, cooperatives and downstream actors. Retaining full ownership of their data supports local communities and Indigenous Peoples alike.

KEY CHALLENGES IN SCALING AND LESSONS LEARNED

- Ground is currently only available in an Android version, but ongoing backend development will allow API functionalities and multiplatform support, including an iOS version. iOS support should be available by the end of 2026.

- Whisp supports due diligence reports, but there is no certification involved – it does not in itself provide evidence of compliance with deforestation-free regulations, for example EUDR.

RECOMMENDATIONS FOR REPLICATION AND SCALING

The approach is designed for replication. Ground, Whisp and GeoID are open-source and can be used independently or integrated into existing government, cooperative or private sector systems. Scaling does not require countries or supply-chain actors to adopt a single centralized platform. Instead, the solutions can function as reusable building blocks within a broader digital public infrastructure, connecting field data, forest-monitoring information and traceability systems through common standards and interfaces.

Next steps include further country implementation, integration with national datasets and information systems, continued engagement with commodity-sector actors, and refinement of the solutions based on user experience.

FURTHER INFORMATION

Aim4Commodities

Open Foris Ground

Ground eLearning

GeoID

Whisp

FAO Forest Monitoring and Data Platforms team



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DCF SOURCING, COMPLIANCE AND TRADE

THE FIRST VERIFIED DCF BEEF SHIPMENT BETWEEN BRAZIL AND CHINA

GENERAL INFORMATION

Geography:
Supplying farms located in the Legal Amazon and the Cerrado (Brazil); exported to China

Commodity:
Beef

Stakeholders involved:
China Meat Association (CMA), WWF-China, WWF-Brazil, a Brazilian meatpacker (supplier), a Chinese buyer, BDO RCS Auditores Independentes SS Ltda (independent verifier)

Transparency note:
Both the supplier and the buyer preferred not to be identified, for reasons that were not disclosed to WWF. The shipment was traced, monitored and verified through the supplier's own systems. These systems, processes and evidence were independently assessed by an independent auditor, BDO RCS Auditores Independentes SS Ltda (BDO).

CONTEXT

As the largest export market for Brazilian beef, Chinese buyers have a significant influence on production practices in Brazil. WWF-Brazil and WWF-China have been collaborating to leverage this market influence to address deforestation and conversion. On the production side, WWF-Brazil engages with producers, traditional communities, local organizations, businesses and government authorities. On the demand side, WWF-China actively engages key stakeholders across the meat supply chain to promote market awareness, credible standards and DCF commitments, alongside efforts in policy advocacy, finance incentives and sustainable consumption.

In 2017, the China Meat Association (CMA), together with 64 member companies and WWF, launched the Chinese Sustainable Meat Declaration, which included commitments to avoid deforestation and conversion of natural vegetation in livestock and feed supply chains. Subsequent initiatives, including CMA's 2021 Specifications for Meat Industry Green Trade and the 2023 China Sustainable Meat Supply Chain Promotion Plan, translated these commitments into increasingly robust market expectations and implementation guidance.

A first pilot shipment of verified DCF beef was exported from Brazil to China in 2025, showing how these commitments can be put into practice. The shipment involved a Chinese buyer and a Brazilian meatpacker, and was independently verified by a third-party auditor. The verification methodology was informed by WWF's Minimum Monitoring Criteria for DCF Products Originating in Brazil and CMA's Specifications for Meat Industry Green Trade. Both frameworks are aligned with the Accountability Framework's principles, which call for companies to establish clear commitments, operationalize them through sourcing and supplier engagement, and demonstrate progress through credible monitoring, verification and reporting mechanisms.

SOLUTION DETAILS AND RESULTS

The pilot was supported by a robust assurance framework that relied on independently verified evidence rather than supplier declarations alone.

The verification process integrated multiple layers of assurance, including documentary review, stakeholder interviews, and testing of monitoring and exclusion controls. It also included a risk-based assessment of a random sample of five cattle farms, selected from a total of 167 supplier properties located within the Legal Amazon. The sampled farms were assessed against publicly available datasets covering environmental embargoes, deforestation alerts, protected areas, Indigenous lands, quilombola territories, and indicators of labor conditions analogous to slavery. This comprehensive approach enabled the buyer to gain visibility over both environmental and social risks while demonstrating traceability between farm-level performance and the final commercial shipment.

No material inconsistencies or non-conformities were identified within the sampled properties or the control systems assessed. As a result, the shipment became the first beef import into China independently verified against DCF criteria. The transaction demonstrated the feasibility of embedding robust sustainability requirements into commercial procurement processes, establishing a practical and replicable model for buyer-led implementation of DCF sourcing commitments.

The approach encompasses five key elements: defining clear DCF requirements; ensuring traceability to production units; assessing land-use change and social risks through credible data sources; evaluating supplier monitoring and control systems; and obtaining independent assurance linked to specific commercial transactions. For broader adoption, buyers should seek traceability across both direct and indirect supplier networks. This approach is consistent with WWF guidance and the Accountability Framework's principles, which identify traceability, monitoring, and verification as foundational elements for credible DCF claims.

SOCIAL IMPACT

DCF sourcing criteria safeguard not only forests and other natural ecosystems, but also the rights, livelihoods, and well-being of Indigenous Peoples, local communities and workers.

By integrating social safeguards into procurement requirements and verification processes, buyers can help create stronger incentives for transparency, accountability and continuous improvement throughout agricultural value chains. This demonstrates how purchasing decisions can contribute both to environmental outcomes and to broader social objectives linked to human rights, equity, and sustainable rural development.

KEY CHALLENGES IN SCALING AND LESSONS LEARNED

- DCF requirements should define scope, cut-off dates, traceability expectations, acceptable evidence, and the assurance method before contracting.
- Indirect-supplier visibility remains the central integrity challenge. Buyer assurance needs to look beyond the final supplying farm and progressively close traceability gaps across cattle movements.
- Verification must be claim-specific. The pilot used sampling and agreed-upon procedures; communications should therefore describe exactly what was tested and avoid implying assurance beyond the shipment and controls reviewed.
- Biome differences require transparent communication. Applicable cut-off dates and monitoring approaches should be stated clearly so that a DCF claim is understandable across Brazilian and Chinese contexts. In this pilot, the applicable cut-off dates were 2009 for the Amazon and 2020 for the Cerrado biome.
- DCF sourcing will scale only if credible assurance becomes part of mainstream procurement rather than a niche offer dependent on exceptional premiums.

RECOMMENDATIONS FOR REPLICATION AND SCALING

Scaling this model begins with integrating DCF requirements into procurement processes. Buyers can incorporate DCF criteria into sourcing policies, contracts and tenders, require shipment-level documentation, and apply risk-based independent verification to strengthen confidence in supply chain integrity.

The pilot pathways can be further translated and adopted with wider shared market demand asks on green trade for beef. Greater alignment among buyers would create clearer market signals for suppliers, encouraging investment in traceability while reducing verification costs through economies of scale.

To accelerate the transition from pilot transactions to market practice, buyers should track the share of procurement volumes independently verified as DCF, assess suppliers' company-wide commitments and implementation plans, and disclose methodologies and progress transparently.

Over time, enhanced traceability infrastructure, improved data interoperability and better alignment between market, regulatory and financial incentives can complement private-sector due diligence and make DCF sourcing more efficient and scalable.

FURTHER INFORMATION

WWF — Press release: China has received the first verified deforestation and conversion free (vDCF) beef shipment from Brazil

Accountability Framework initiative — Chinese meat industry pursuing sustainable development with new Accountability Framework-aligned Green Trade Specifications (2022)

China Development Brief — WWF, China Meat Association launch sustainable supply chain plan (2023)



PILOTING EUDR COMPLIANCE WITH KALLARI AND WIÑAK AMAZONIAN CACAO PRODUCER ASSOCIATIONS

GENERAL INFORMATION

Geography:
Ecuador

Commodity:
Fine aroma cocoa (dried beans)

Stakeholders involved:
Cacao cooperatives (Kallari and Wiñak associations), European buyer, GIZ, WWF-Ecuador, WWF-Germany, ProAmazonia, Ministry of Economic and Productive Development, Ministry of Environment and Energy

CONTEXT

In the Ecuadorian Amazon, producer associations are key players in supply chains, especially for fine aroma cocoa. They consolidate quality and volume, enabling access to high-value markets that are difficult to access individually, and that demand traceability and sustainable practices.

Wiñak association comprises approximately 250 cocoa producers and another 300 growing crops such as guayusa and plantains. It promotes the Chakra, a traditional Indigenous agroforestry system that combines crops with trees and other plants, conserving biodiversity and forests while supporting community livelihoods. Kallari association comprises approximately 1,000 producers and has more than 20 years of commercial experience.

The pilot supports progressive preparation to meet EUDR requirements, focused on closing implementation gaps and strengthening internal capacities, including around digital systems. Kallari's relationship with a regular European buyer provided a practical setting to review compliance information, prioritize gaps and implement improvements to maintain market access.

SOLUTION DETAILS AND RESULTS

The initiative constitutes an operational model for managing information and evidence to help the cocoa supply chain comply with the EUDR. The model integrates i) a digital traceability system from the source, ii) georeferencing of plots and an internal mechanism for identifying and verifying deforestation, and iii) documentation to support legal compliance and information exchange.

For Kallari, this involved assessing its existing digital traceability system to define adjustments according to the new market requirements. The deforestation-free module was then adapted to capture additional producer and farm information, strengthen post-harvest and segregation records, and store commercial documents.

For Wiñak, implementation began by reviewing operational processes, responsibilities, infrastructure and record-keeping. The association's system comprises three components: 1) management of producers, farms and plots, 2) a traceability module, including deforestation-free status, and 3) a digital form for collecting information in the field.

Both teams received training in GIS and open-source GPS tools. Georeferenced cocoa plots were assessed using the Ministry of the Environment and Energy's 2020 and 2022 land-cover maps. The variation in forest areas between the years enabled plots with potential deforestation to be identified. A verification process will confirm whether or not deforestation occurred.

Compliance with legal regulations was also analysed, and the necessary documentation identified. Kallari's buyer helped review information consistency and suitability for due diligence formats.

Both associations now have validated georeferencing for 100% of plots and QR-code traceability from plot to point of sale in the country of origin. They have systems and documentation in place to comply with EUDR requirements, and procedures to respond to deforestation alerts.

SOCIAL IMPACT

The project has strengthened trust among producers, the association and the buyer, helping ensure continued market access and income stability. It also expands access to sustainability-oriented markets and highlights the role of communities in conserving biodiversity and forests, supporting greater recognition of producers' livelihoods. In addition, alignment with EUDR requirements helps the associations identify gaps and improve labor practices and internal management processes.

KEY CHALLENGES IN SCALING AND LESSONS LEARNED

- Assessments of cocoa origin should recognize not only cultivation methods but also ancestral knowledge, such as integrated Chakra production practices, and the conservation of native species.
- The pilot identified the minimum enabling conditions for managing EUDR requirements: i) operating a digital traceability system, ii) strengthening technical capacity to geolocate plots and identify potential deforestation, and iii) improving internal decision-making in cases of non-compliance.
- Buyer involvement aligned Kallari's readiness to real demand, allowing gaps to be prioritized and internal operational processes to be adjusted to meet EUDR requirements.
- Collaboration with NGOs and the public sector strengthened coordination and provided technical assistance, training and financing.
- Assessing production and compliance costs for small-scale producers and associations is key.
- Defining and sharing compliance responsibilities must be done across the value chain.
- Financing needs to be secured to expand coverage and sustain implementation, and to coordinate actors and clarify requirements through regular dialogue.

RECOMMENDATIONS FOR REPLICATION AND SCALING

This pilot is highly replicable for associations beginning the EUDR preparation process. The findings and lessons learned can shorten the learning curve, providing greater clarity on operational processes and the availability of tools such as templates and standardized procedures. The Practical Guide for Implementing the EUDR in Ecuador: Experiences with Associations of Small-Scale Amazonian Producers includes an infographic outlining the EUDR implementation process and a set of recommendations for key stakeholders in the cocoa supply chain.

FURTHER INFORMATION

Educommunication Products for EUDR LINK Compliance


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SUPPORTING DCF RUBBER SOURCING THROUGH SMALLHOLDER CERTIFICATION AND TRACEABILITY IN MALAYSIA

GENERAL INFORMATION

Geography:
Perak, Malaysia

Commodity:
Natural rubber and rubberwood

Stakeholders involved:
Rubber smallholders, CMO Malaysia, WWF-Malaysia, Rubber Industry Smallholders Development Authority (RISDA), International Furniture Alliance (IFA), collection centers, FSC-accredited certification bodies, buyers, and relevant government agencies and local authorities.

CONTEXT

Rubber smallholders in Hulu Perak district of Malaysia face limited access to sustainable production guidance, traceability systems, and Forest Stewardship Council (FSC) certification support. Gaps in documenting product origin and demonstrating DCF production can limit their participation in responsible sourcing markets.
The project uses certification, capacity building, and buyer engagement as an entry point to encourage responsible plantation management and reduce incentives for further forest clearance.

SOLUTION DETAILS AND RESULTS

The Sustainable Natural Rubber and Rubberwood Project in Hulu Perak aims to build a traceable, DCF supply chain through FSC group certification, land-use verification, and certified collection infrastructure.

The project bases its DCF assessment on FSC group certification requirements, particularly Criteria 6.9 and 6.10 concerning natural forest conversion and plantation establishment history. These are complemented by checks of land-use records, historical maps or satellite imagery to assess whether deforestation or conversion of natural ecosystems occurred after 31 December 2020, with field inspections where necessary. Plot registration and mapping, protection of High Conservation Value areas, and regular monitoring support this approach.

CMO Malaysia, the Group Manager, assesses each smallholder before admission through documentation reviews and internal checks. Members receive training and sign an agreement through the Empower mobile application committing to FSC requirements. An independent FSC-accredited certification body conducts the initial group certification audit and annual surveillance audits using sampling.

Three natural rubber collection centers have obtained FSC Chain of Custody certification with funding from WWF-Malaysia. Certified rubber is identified, labelled, and physically separated from non-certified material during collection, storage, and handling. Records of incoming and outgoing materials are maintained to prevent mixing and allow certified rubber to be traced back to its source. The Rubber Industry Smallholders Development Authority (RISDA) and the International Furniture Alliance (IFA) maintain records of collection centers, origins, volumes, and sales to support traceability. These systems contribute information for EUDR due diligence and support compliance.

To date, 247 hectares managed by 135 smallholders have achieved FSC certification, while another 977 hectares managed by 189 smallholders are undergoing certification. Approximately 200 certified hectares are intended for rubberwood production. A buyer for Grade A logs has been identified but harvesting and sales await the required State Forestry Department permit. The remaining certified area continues to produce latex and other natural rubber materials. IFA connects producers with potential domestic and international buyers, including furniture manufacturers, retailers, and importers. Discussions on price premiums are ongoing, but completed commercial transactions have not yet been reported.

SOCIAL IMPACT

The project helps rubber smallholders develop the skills and systems needed to participate in responsible sourcing markets. Training and practical support strengthen plantation management, record-keeping, and understanding of certification requirements covering worker safety, environmental protection, and legal compliance.

FSC group certification reduces the cost and complexity of seeking certification individually, creating a collective pathway for smallholder participation. Farm assessments, documentation assistance, and regular checks support producers in identifying and addressing certification gaps.

Connections with potential buyers offer opportunities for improved market access and price premiums remain as potential benefits, as sales and associated income improvements have not yet been reported.

KEY CHALLENGES IN SCALING AND LESSONS LEARNED

- Limited smallholder awareness, insufficient financial support, human-elephant conflict, and the complexity of scaling FSC group certification are key challenges.
- Translating certification into commercial opportunities requires buyer engagement and the necessary harvesting approvals; rubberwood sales remain pending the required logging permit.
- Continuous community engagement, capacity building, multi-stakeholder coordination, financial support, and strong field verification and traceability systems are needed.
- Technical and business partnerships help connect certified production with potential demand.

RECOMMENDATIONS FOR REPLICATION AND SCALING

The approach piloted in Hulu Perak could be adapted to other rubber-producing areas, leveraging a partner network that has supported FSC certification in other Malaysian states such as Sabah and Melaka. Scaling would require smallholder engagement, capacity building, farm mapping and verification, traceability, FSC group certification, and collaboration with government agencies, technical partners, and supply chain actors. Partnerships that connect producers with buyers would also support the development of commercial opportunities.

WWF-Malaysia's direct support remains focused on Hulu Perak because of its strategic link to local conservation work, particularly tiger conservation, while the broader model can continue expanding nationally through existing partners.

FURTHER INFORMATION

Malaysia Responsible Forestry

Project Update


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ALBERT HEIJN'S TRANSITION TO DCF COCOA SOURCING

GENERAL INFORMATION ABOUT THE PROOF OF CONCEPT/PILOT

Geography:
Cote d'Ivoire and Ghana

Commodity:
Cocoa

Stakeholders involved:
Tony's Open Chain, farmers, cooperatives, processors, suppliers, retail

CONTEXT

Tony's Open Chain, initiated by chocolate brand Tony's Chocolonely, aims to increase production of sustainable cocoa and reduce poverty and exploitation in the cocoa sector.

Albert Heijn pursued a 100% cocoa certification target for several years, recognizing certification as a starting point, but insufficient on its own to address persistent issues such as poverty, child labor and deforestation. It sought a scalable approach to address these challenges across its largest cocoa volumes.

Albert Heijn joined Tony's Open Chain in 2018 with its Delicata chocolate brand, becoming its first external mission partner. Its approach aims to combine existing cocoa certification with Tony's Open Chain's five sourcing principles: traceability, higher prices, long-term commitments, strong farmer partnerships, and improved quality and productivity.

SOLUTION DETAILS AND RESULTS

Building on its experience with Delicata, Albert Heijn announced in October 2024 that it would extend Tony's Open Chain sourcing to more than 600 own-brand products containing cocoa by 2028. The expansion is expected to at least triple its Tony's Open Chain cocoa purchasing volume. This moves responsible sourcing from a single chocolate brand towards a retailer-wide purchasing commitment.

To enable this expansion, Albert Heijn uses the "Bean to Machine" model. Cocoa beans are purchased from Tony's Open Chain partner cooperatives and remain segregated until factory entry; segregation is no longer required thereafter. This enables wider adoption across its product range, without maintaining a separate physical cocoa stream through to the retail shelf.

Albert Heijn relies on a combination of Fairtrade certification and Tony's Open Chain's traceability and monitoring systems to support its DCF cocoa sourcing ambitions. Fairtrade certification includes environmental requirements prohibiting deforestation and the conversion of protected forests after 31 December 2018, verified through independent audits. Tony's Open Chain complements this with GPS polygon mapping, supply chain traceability, satellite monitoring and field verification to assess deforestation risks and overlap with protected areas. Its 2024–25 reporting identified two confirmed deforestation cases among the 42,540 farms in scope, with remediation support underway. Together, these systems help identify and investigate potential cases and inform action where needed.

SOCIAL IMPACT

Albert Heijn sources cocoa beans from cooperatives in Ghana and Côte d'Ivoire according to Tony's Open Chain principles, supporting local communities by addressing deforestation, child labor risks and the lack of a living income for cocoa farmers. Living-income-oriented pricing, cooperative strengthening and productivity support contribute to improved farmer livelihoods, while child labor risks are addressed through monitoring and remediation rather than an assumption that sourcing is risk-free.

KEY CHALLENGES IN SCALING AND LESSONS LEARNED

- The supply chain is not segregated until the retail shelves, rather the beans are mixed with conventional beans.
- Bean to Machine enables broader uptake. However, physical segregation ends at the factory – after this, beans may be mixed with other cocoa. Claims therefore need to distinguish verified sourcing practices from the physical cocoa content of individual finished products.
- At producer level, higher prices alone cannot resolve persistent poverty. Tony's Open Chain highlights climate pressures, cocoa disease and low yields as reasons to combine stable purchasing relationships with continued productivity support.

RECOMMENDATIONS FOR REPLICATION AND SCALING

The case suggests a phased pathway for other retailers: establish the model within a defined product range, then expand purchasing commitments across the wider assortment. Albert Heijn's experience highlights collaboration, transparency and long-term commitments as factors that can help accelerate the transition towards DCF cocoa sourcing. Retailers should assess which combination of certification, traceability and supply chain partnerships best supports their sustainability ambitions.

Scaling should combine all five sourcing principles with farm-level environmental monitoring, remediation and transparent communication about chain-of-custody limits. Bean to Machine offers a route to broader adoption, but retailers seeking a full DCF claim should also establish evidence addressing conversion of non-forest natural ecosystems.

FURTHER INFORMATION

Tony's Open Chain Results

Albert Heijn Tony's Open Chain Mission Ally

Albert Heijn fair and sustainable cocoa for all own-brand products announcement

JURISDICTIONAL MONITORING AND VERIFICATION SYSTEMS



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SELOVERDE MINAS GERAIS: A STATE-WIDE PUBLIC SYSTEM FOR DCF SUPPLY CHAINS

GENERAL INFORMATION ABOUT THE PROOF OF CONCEPT/PILOT

Geography:
State of Minas Gerais, southeast Brazil (Cerrado, Atlantic Forest and Caatinga biomes). Jurisdiction-wide: the platform covers all the approximately 1.15 million rural properties registered in the Rural Environmental Registry (CAR) in the state.

Commodity:
Coffee, soy, sugarcane and beef cattle

Stakeholders involved:
Government of the state of Minas Gerais – State Secretariat of Agriculture, Livestock and Supply (SEAPA-MG), Territorial Intelligence Centre (CIT) and State Forestry Institute (IEF-MG); Minas Gerais Agricultural Institute (IMA); Remote Sensing Centre of the Federal University of Minas Gerais (CSR/UFMG) and CT-Modelagem (methods and modelling); National Institute for Space Research (INPE, PRODES data); WWF-Brazil

CONTEXT

Until now, demonstrating DCF has largely been done by one company, one supplier and one shipment at a time. WWFs verified DCF (vDCF) beef shipment to Chinese buyer proved that a single transaction can be independently verified as DCF. It also showed the limits of that model: assurance based on samples, high costs and premiums that restrict accessibility, and a clear call from industry that traceability must become public policy, tied to incentives, for DCF to scale. The question this case answers is the next one: can a producing jurisdiction offer DCF evidence for its entire production base, as a public good?

Minas Gerais is Brazil's largest coffee producer, responsible for 52.7% of national production, and a major producer of sugarcane (11.7% of national production), soy (5.1%) and cattle (9.4% of the national herd). Through SeloVerde-MG, its official socio-environmental compliance platform, the state government set out to show buyers, regulators and investors in Brazil, Europe and China that every rural property in the state can be assessed for legality and DCF compliance, freely and on the basis of official data.

SOLUTION DETAILS AND RESULTS

SeloVerde-MG is the official platform of the government of Minas Gerais for assessing the socio-environmental compliance of every property in its Rural Environmental Registry (CAR). It integrates official government datasets on property boundaries, changes in native vegetation (federal and state datasets), licenses and authorizations, environmental embargoes, Indigenous lands, quilombola territories, conservation units, public lands, register of employers found to have subjected workers to conditions analogous to slavery, and cattle transit data.

Each property is assessed for legality against the Brazilian Forest Code, the Atlantic Forest Law, environmental embargoes, protected and traditional territories, and the register of employers found to have subjected workers to conditions analogous to slavery. To qualify as DCF, properties must also meet the criteria of no suppression of native vegetation after 31 December 2020. This criterion applies to both forest and non-forest native vegetation, whether suppression was legally authorized or not. Therefore, it extends beyond the EUDR's deforestation-free requirement and aligns with the approach set out in AFi guidance and WWF's Minimum Monitoring Criteria for DCF products originating in Brazil outside the Amazon.

Through the platform, IEF-MG automatically issues an official compliance certificate to every property with no impediment in the official records. The certificate can be checked online by CAR code or by the QR code printed on it. Access is free, both individually and in bulk through a public API, and data sources, criteria, thresholds and algorithms are documented on the platform's methods page.

The assessment draws on two independent native vegetation suppression datasets, one state and one federal, using published, reproducible methods. This provides a public-authority assurance model covering the full production base rather than a sample, which buyers, auditors, regulators and civil society can check against the same official sources. Companies can complement this evidence with their own due diligence or independent verification.

The 2026 assessment covered 411,786 rural property records in the four supply chains: 134,174 coffee, 26,781 soy, 10,446 sugarcane and 240,385 cattle (a property producing more than one commodity is counted in each chain). Of these, 366,405 (89%) are eligible for the official certificate of compliance with Brazilian law, while an estimated 365,500 also meet the DCF criteria.

SUPPLY CHAIN	PROPERTIES ASSESSED	COMPLIANT WITH BRAZILIAN LAW	%	DCF COMPLIANT	%
Coffee	134,174	129,301	96%	129,260	96%
Sugarcane	10,446	9,686	93%	9,646	92%
Soy	26,781	22,738	85%	22,520	84%
Beef cattle	240,385	204,680	85%	204,119	85%
TOTAL	411,786	366,405	89%	365,519	89%

Table 1. Rural properties assessed, compliant with Brazilian law and DCF compliant, by supply chain

Two findings stand out. First, compliance is the norm, not the exception: between 85% and 96% of properties in every chain are eligible for the official certificate, and between 84% and 96% are DCF compliant. Second, the step from legality to DCF is very small: in every chain the difference between the two scopes is under one percentage point.

Going beyond the law to exclude all conversion after 2020, authorized or not, removes only 41 coffee, 218 soy and 40 sugarcane properties, and an estimated 600 or so of the 240,385 cattle-producing properties. In Minas Gerais, a DCF supply base does not have to be built; it is already there, and the state can show and promote it, while also offering remediation solutions for the non-compliant and non-DCF farms.

Minas Gerais offers what international markets have been asking producing countries for: property-level traceability, full jurisdictional coverage, official evidence of legality, DCF screening that goes beyond the law, and free public access. For an importer, sourcing from a SeloVerde-certified property means lower due diligence costs, lower legal and reputational risk, and evidence to support compliance with regulations and voluntary commitments. Because the evidence is public and covers the whole state, the risk profile of each supply chain is known rather than estimated.

SOCIAL IMPACT

SeloVerde-MG is designed to include producers rather than exclude them. Access is free, so smallholders and family farmers can prove compliance at no cost. Without a public tool like this, the burden of proof often falls hardest on those least able to pay for audits or certification. The official certificate works as a passport to formal markets and to rural credit, which from January 2027 (and January 2028 for small properties) will also require proof that any detected suppression was legal.

Non-eligibility is not a permanent condition. Embargoes can be lifted once the infraction is resolved. The results therefore show where engagement with producers can restore eligibility, giving a fair alternative to automatic supplier exclusion.

The screening against Indigenous lands, quilombola territories, conservation units, public lands and the slave-labor register puts land rights and human rights on the same footing as forest protection in every purchasing decision that uses the platform. State-level results are published only in aggregate, in line with Brazil's General Data Protection Law, which protects producers' privacy and prevents commercial stigmatization, while property-level certificates stay available for specific sourcing and financing decisions.


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KEY CHALLENGES IN SCALING AND LESSONS LEARNED

- Property-level evidence still needs to be linked to purchases. The certificate establishes the status of the production unit. Buyers must still link each purchase to the CAR code of origin, and chain of custody beyond the farm gate (e.g. soy blending at silos and ports) is outside the platform's scope.

- Remote-sensing uncertainty is inherent. Overlaying suppression polygons with CAR boundaries can occasionally flag impediments that do not exist, for example, PRODES does not distinguish authorized from unauthorized suppression. Treating every overlap with a Conservation Unit as an impediment may also overstate non-eligibility, as some sustainable-use categories allow private property. Detections are a starting point for due diligence, not a final verdict.

- Official data is the enabler: integrating existing public records and making them free and verifiable turns DCF from a costly private exercise into a public good.

- The gap between legality and DCF depends on the jurisdiction. In Minas Gerais, it is below one percentage point. In states with active agricultural frontiers, where legal conversion is more frequent, the DCF layer will matter more, which is why both scopes should be reported side by side.

RECOMMENDATIONS FOR REPLICATION AND SCALING

Buyers and traders with DCF commitments can integrate the SeloVerde-MG API into their sourcing and due diligence systems, set sourcing targets for SeloVerde-certified DCF volumes and count them toward their AFi-aligned commitments. They can also give Minas Gerais producers preferential access through long-term contracts and recognition in green trade schemes, such as CMA's Specifications for Meat Industry Green Trade and the Brazil–China soy guide. Regulators can recognize competent-authority certificates as evidence of legality, and future reviews of EUDR risk benchmarking could consider subnational jurisdictions with demonstrated DCF systems. WWF and partners can also facilitate pilot shipments to test how official evidence can simplify buyer due diligence and audit requirements.

The model can be replicated in other Brazilian states, as it relies on data most Brazilian states already hold. Technical exchanges between Minas Gerais and the environmental and agricultural agencies of other states, starting with high-pressure regions such as MATOPIBA and the Centre-West, together with harmonized and interoperable state CAR systems, would allow DCF evidence to scale nationally.

In Minas Gerais, priorities include annual updates, an exact DCF count for cattle-producing properties, independent verification of results and tracking remediation to help producers regain eligibility.

FURTHER INFORMATION

SeloVerde-MG

SeloVerde-MG - Methods and technical publications

Public API for bulk queries



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FINANCE MECHANISMS



DEFORESTATION-FREE LEATHER FUND: INVESTING IN SUSTAINABLE PRODUCTION AND TRACEABILITY

GENERAL INFORMATION

Geography:
Brazil (initial focus) and other high-risk cattle-producing regions

Commodity:
Beef and leather

Stakeholders involved:
WWF, brands and retailers, tanneries, leather manufacturers, beef producers, cattle ranchers, local partners, traceability providers

CONTEXT

Cattle production is a major driver of tropical deforestation and habitat conversion. Leather, as a byproduct of the beef and dairy sectors, shares responsibility for embedded environmental impacts. The Deforestation-Free Leather Fund was established by WWF to help companies address deforestation risks through collective action, improving traceability and supporting producers to transition to more sustainable production approaches.

DETAILS AND RESULTS

The fund pools financial contributions from participating companies and invests in three core areas: traceability systems, farm-level improvements, and farm regularization (including support to formalize land tenure, meet environmental requirements, and restore legal reserves and permanent preservation areas as required under Brazil's Forest Code). It supports end-to-end traceability to verify responsible sourcing, promotes adoption of DCF practices, and helps producers gain access to legal markets. Initial goals include supporting traceability for at least 1 million animals, restoring 15,000 hectares through improved ranching practices, and contributing to recovery of at least 30,000 hectares of degraded land. These efforts help companies meet DCF commitments, strengthen EUDR preparedness, reduce supply-chain risk, and demonstrate credible progress toward deforestation-free sourcing.

SOCIAL IMPACT

The initiative benefits producers and communities by improving livelihoods, increasing access to legal markets, building technical capacity, supporting land restoration and strengthening long-term resilience. Protection of forests and natural ecosystems also preserves biodiversity, water resources and ecosystem services that local communities depend upon.

KEY CHALLENGES AND LESSONS LEARNED

- Achieving full traceability across complex cattle supply chains remains challenging because animals may move through multiple properties.
- Collaborative financing and stakeholder engagement are essential.
- Producer incentives, scalable traceability systems, transparent monitoring and alignment between market demand and sustainable production are key components.
- By pooling resources, the fund can support small and medium farmers who might otherwise not be able to adopt more efficient and responsible cattle-raising practices.

RECOMMENDATIONS FOR REPLICATION AND SCALING

The fund and its KPIs depend on pooled funds. Additional corporate participation can expand investments, increase the number of verified DCF suppliers, and leverage other funding sources to accelerate landscape-scale transformation.

FURTHER INFORMATION

Deforestation-Free Leather Fund



CROSS-CUTTING LEARNINGS AND PRIORITIES FOR SCALING FROM INITIATIVES



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SOLUTIONS MUST BE LOCALLY ADAPTED AND TRANSLATED INTO OPERATIONAL GUIDANCE

DCF and traceability requirements must be translated into context-specific criteria, thresholds, data sources and procedures that reflect local production systems, regulatory frameworks, institutional capacities and environmental conditions. Brazil's minimum criteria for soy and beef and Australia's beef initiative highlight the importance of pairing definitions with tools and clear decision processes, then refining them through implementation.

SHARED GOVERNANCE AND OWNERSHIP DETERMINE WHETHER INFORMATION LEADS TO ACTION

DCF compliance must be a shared responsibility across producers, traders, processors, buyers, financial institutions and technical partners, as well as public authorities in government-led or jurisdictional approaches. Multistakeholder governance structures and regular spaces for dialogue help build trust, align incentives, validate results, resolve disagreements and support the adoption of common systems. Engagement should begin early and continue over time, while recognizing that different actors may need to participate at different stages and that different implementation contexts have specific needs that the approach must address. The Coffee Canopy Partnership, the Socio-Environmental Observatory and Visipec show that shared infrastructure works best when locally owned, based on agreed methodologies and validated by local actors. Civil society participation, senior management commitment, and engagement with public authorities, industry initiatives and finance actors help clarify requirements, set clear responsibilities, build trust and turn information into action.

MAKE PRODUCER PARTICIPATION PRACTICAL AND MEANINGFUL

Clear communication, continuous training, capacity building and early engagement help turn technical requirements into everyday actions. Visipec found that producers need tailored communication to translate evolving market requirements into practical actions; Wildnet highlighted the importance of involving harvesters and local associations from the outset and providing continuous training; the Kallari and Wiñak cacao pilot adds that assessments should recognize ancestral knowledge and Australia's beef initiative also identifies deeper engagement with First Nations organizations as a priority for expansion. Effective engagement therefore combines accessible guidance, regular dialogue and technical support with recognition of producers' e xisting knowledge.

STANDARDIZATION, INTEROPERABILITY AND FIELD USABILITY ARE ESSENTIAL FOR SCALE

Scaling requires common data standards, methodologies and reporting protocols to connect traceability systems across commodities, companies and jurisdictions. The Global Traceability Framework for Beef and Leather and AIM4Commodities illustrate how shared standards and reusable tools can connect existing systems. Integration with public information and national monitoring systems can reduce duplication and improve long-term sustainability. Priorities include integration with national infrastructure and data-sharing arrangements that protect sensitive information.

DESIGN FOR FIELD CONDITIONS AND LONG-TERM OPERATION

At the first mile, systems must remain simple, intuitive and functional under real field conditions, including limited mobile connectivity and technical infrastructure. Further downstream in the chain, traceability becomes more complex as products and data move through multiple actors and processing stages, requiring systems tailored to manage and connect information across supply chain tiers. Offline data collection, accessible interfaces and data-sharing arrangements should be treated as core requirements. Limited rural connectivity constrained field data collection in both SUMAL and Wildnet, while initial stakeholder reluctance in SUMAL underscored the importance of simple tools and early engagement. Implementation plans must account for field conditions, training, ongoing data updates and system maintenance.

COMBINE BUYER ENGAGEMENT, ACCESS TO FINANCE AND SHARED RESPONSIBILITY

Demand from committed buyers can accelerate the adoption of DCF practices. However, small and medium-sized producers may lack the resources needed to meet traceability requirements or adopt more sustainable practices. Buyer engagement must therefore be complemented by access to finance, technical assistance and appropriate incentives to connect credible DCF supply with markets without excluding resource-constrained producers. Buyer engagement helped Kallari prioritize readiness gaps; Visipec reported that Febraban's lending requirements prompted improvements in traceability, monitoring and disclosure; and the Deforestation-Free Leather Fund illustrates how pooled resources can support producers with limited investment capacity. These cases demonstrate the distinct but complementary roles of purchasing requirements and financing conditions in encouraging action. Scaling should connect credible DCF supply with committed buyers, mobilize collaborative and performance-based financing, and distribute responsibility for compliance costs, technical support and incentives for producer participation.

REPLICATION REQUIRES AN INTEGRATED PACKAGE OF INTERVENTIONS

Successful scaling depends on advancing several mutually reinforcing elements together: strengthening governance with governments aligning public policies and plans and companies embedding DCF requirements in procurement, supplier management and accountability processes; supporting smallholders and producer organizations to improve sustainable production; developing interoperable traceability and monitoring, reporting and verification systems; mobilizing sustainable and performance-based finance; and connecting credible DCF supply with responsible buyers and markets. The pilots show that traceability is one component of a broader enabling system that combines effective governance, producer support, finance and market engagement.



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CONCLUSION

FROM DCF PILOTS TO SYSTEMIC TRANSFORMATION

The case studies examined in this report demonstrate that DCF supply chains are both achievable and increasingly essential. Beyond responding to emerging compliance requirements, they offer a practical pathway toward resilient, competitive and future-fit commodity sectors that contribute to climate mitigation and adaptation, biodiversity conservation, sustainable livelihoods and long-term market access. Across commodities and geographies, progress depends on coordinated action among producers, buyers, governments and financial institutions, supported by credible traceability and monitoring, strong producer organizations and incentives that make responsible production economically viable. Their effectiveness also depends on a just transition: traceability must guide support and continuous improvement, while safeguarding smallholders, Indigenous Peoples, local communities, women and youth from disproportionate costs and market exclusion. Coordinated public and private finance, capacity-building, technology transfer and sustained institutional support are essential to enable inclusive participation and protect rights and livelihoods.

Beyond these cases, recent analyses document how regulatory frameworks are encouraging improvements in traceability, transparency and forest governance in producer countries, reinforcing the momentum for broader change.[9,10] Countries and companies that can demonstrate DCF production at early stages will be better positioned to anticipate evolving requirements, strengthen the resilience of their supply chains, secure market access, attract investment, support rural jobs and differentiate themselves in markets that are increasingly valuing verified responsible production.


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Governments should establish and enforce regulatory frameworks for DCF supply chains that move beyond voluntary commitments and set clear, binding requirements. They can also enable sector-wide transformation through land-use planning, land-tenure security, law enforcement, agricultural support policies, public data systems and incentives for sustainable production. Cooperation among producer and consumer country governments should align implementation efforts, promote interoperability between traceability and data systems, and support coordinated action across markets. They should also integrate DCF objectives into their economic, development, agriculture, trade and bioeconomy strategies; those that fail to adapt will face increasing trade, investment and reputational risks. The Forest Roadmap led by the COP30 presidency reinforces this need and can serve as a guide to align producer and consumer countries around practical implementation priorities, including traceability, producer support, finance, land tenure, governance and responsible trade. DCF supply chains can provide a practical bridge toward the roadmap's ambition of ending deforestation and forest degradation.

Companies must move beyond commitments toward verified implementation, supported by evidence that informs decisions, demonstrates compliance and drives continuous improvement. Transparent DCF supply chains can support delivery on Scope 3 commitments by combining traceability, credible land-use monitoring and supplier information to strengthen emissions inventories, identify risks and guide accountable procurement and supplier engagement. Turning this evidence into measurable progress requires investment in supplier relationships and internal capabilities. Companies should work with smallholders to address compliance gaps through technical assistance, appropriate incentives and clear, time-bound improvement plans, helping them remain in supply chains as they progress toward compliance.

Financial institutions can facilitate systemic transformation by integrating environmental performance into mainstream financial decisions and directing capital toward responsible production, while commodity buyers can reward – and increasingly require – transparent DCF supply.



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TOWARD A POSITIVE TIPPING POINT

WWF's Living Planet Report 2026 highlights the concept of positive tipping points. Change doesn't always happen in a gradual, linear fashion. Instead, after a certain point, it can accelerate rapidly and become self-sustaining. This dynamic can be seen in the proliferation of numerous technological innovations and social movements, as well as in the exponential growth in renewable energy over the last decade. But acceleration doesnt happen overnight: it is the result of a long enabling phase during which ideas are tested, solutions are refined, policies developed, coalitions built.

In the transition to DCF supply chains, this enabling phase is now well advanced, as the cases featured in this report show. A tipping point is now within reach, where the momentum toward DCF production becomes unstoppable.

Everyone has a role to play in the transition to DCF supply chains, and we invite you to be part of it. If you are implementing, supporting or financing another DCF case or helping take DCF solutions to scale, we would love to hear from you. Please scan the QR code to share your achievements, experience and learnings and help expand the collective evidence base.

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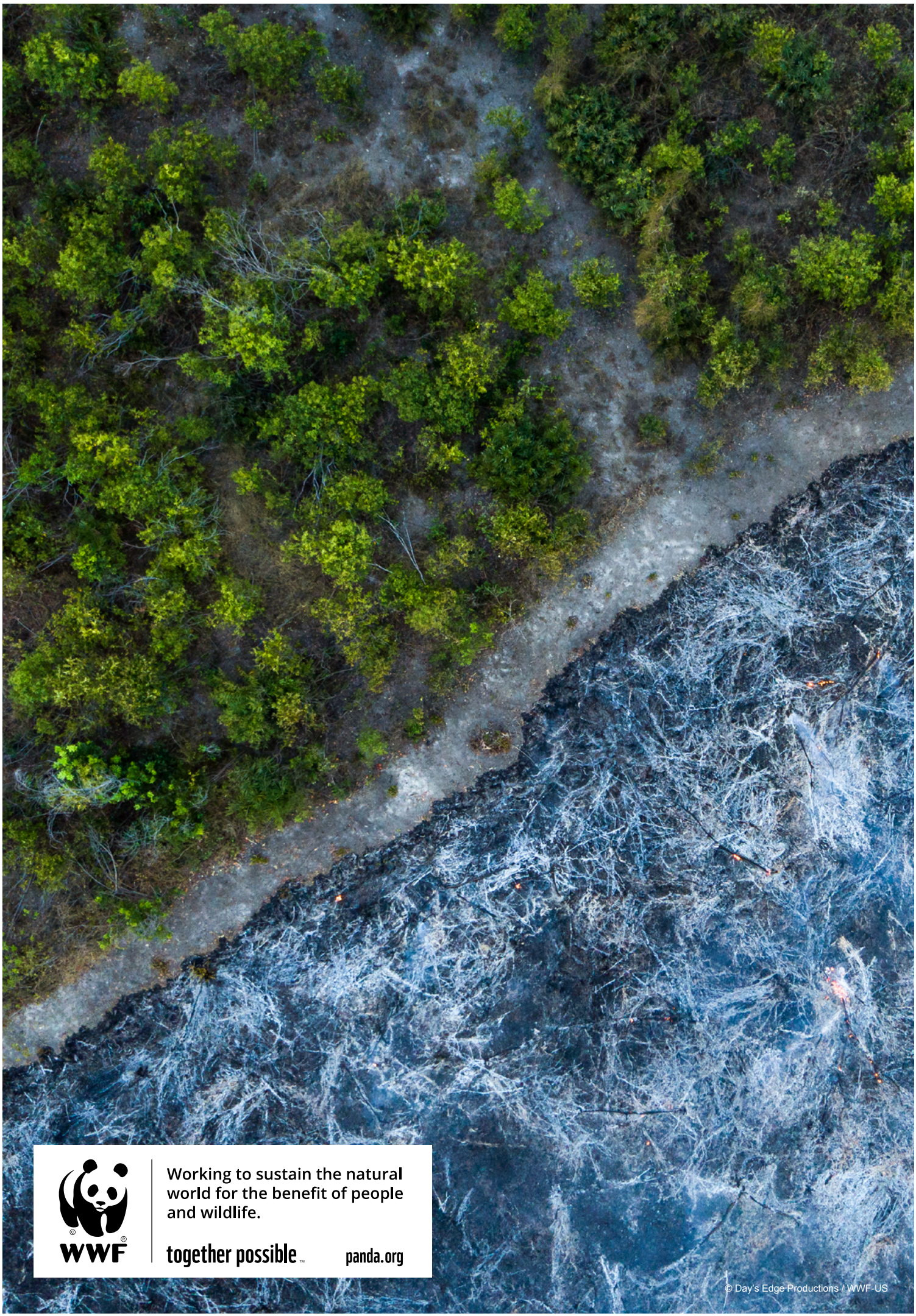
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The publication Time to Act 2 was produced with financial support from Norwegian Ministry of Foreign Affairs – Norad. Its contents do not necessarily reflect the views or policies of the donor.

The initiatives featured in this report are presented for informational purposes only and are intended to illustrate ongoing efforts and progress towards deforestation- and conversion-free (DCF) supply chains. Their inclusion should not be construed as an endorsement by WWF, nor does it imply that they constitute exemplary or fully realised DCF models. Each initiative is at a different stage of development and implementation and remains solely responsible for its activities, performance, statements and claims.

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