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# Environmental compliance related to cattle production in the Amazon and Cerrado biomes

**Authors:** Osvaldo Pereira[a], Paula Bernasconi[a], André Vasconcelos[a], Ana Paula Valdiones[b], Vinicius Silgueiro[b], Raoni Rajão[c], Laura Veloso[d], Felipe Nunes[c,d], Britaldo Soares-Filho[c], Amanda Oliveira[c], Jinlong Liu[e].

**a.** Trase/Global Canopy
**b.** Instituto Centro de Vida
**c.** Centro de Sensoriamento Remoto da Universidade Federal de Minas Gerais (CSR/UFMG)
**d.** Centro de Inteligência Territorial (CIT)
**e.** Renmin University of China

## Executive summary

This briefing is part of a series assessing environmental non-compliance risks in Brazil's beef and soy producing landscapes, developed through a new partnership between Trase, ICV, Federal University of Minas Gerais, Centro de Inteligência Territorial (CIT) and Renmin University of China. This document focuses on environmental compliance in cattle production. A companion briefing applies the same methodological approach and similar datasets to soy producing regions and is available here.

Brazil is the world's largest beef exporting country, with cattle expansion a leading driver of deforestation in the Amazon and Cerrado. We assessed compliance with the Forest Code (Law No. 12,651/2012) – which requires properties to maintain Legal Reserve (LR) and Permanent Preservation Areas (APP) and to obtain authorisation for any permitted clearance – across 88 million hectares of pasture on SICAR-registered properties in both biomes.

We identified 36.7 million hectares of pasture (41.7% of the total) on properties where deforestation with non-compliance issues occurred between August 2008 and July 2024. Of this area, 28.8 Mha (78.6%) fell into the two stronger evidence categories: properties with environmental enforcement records (11.83 Mha) and properties where deforestation had no matched authorisation and native vegetation was below on-property Legal Reserve requirements (17 Mha). Cumulative deforestation with non-compliance issues across these properties totalled 15.65 Mha — equivalent to 80.9% of all mapped deforestation on properties with pasture. On the positive side, 52.7% of mapped pasture was on properties without post-2008 deforestation.

Non-compliance is geographically concentrated. Just 136 municipalities account for 60% of pasture area in the two stronger evidence categories, totalling 17.33 Mha across the Amazon and Cerrado. This concentration allows traders, financiers, processors and public authorities to focus verification and enforcement where risk is greatest.

Linking this analysis to supply chain data shows that of beef exports attributed to the 136 priority municipalities, 61.8% went to China and 3.8% to the EU-27 – representing 32.6% of all China-bound and 41.8% of all EU-27-bound exports mapped to the two biomes. Brazil's domestic market, however, accounts for approximately 68% of total beef supply, underscoring that progress requires action from Brazilian authorities and domestic buyers as much as from importing markets.

These findings are particularly timely given the forthcoming application of the EU Deforestation Regulation (EUDR) to cattle and beef products from December 2026, the UK's expected due diligence legislation in 2027, and emerging efforts in China to strengthen the environmental footprint and traceability of Brazilian beef imports. The municipality-level indicators presented here can serve as a first screening layer for risk-based due diligence, and the analysis concludes with recommendations for all actors across the supply chain.

# Introduction

Brazil is the world's largest beef exporting country and the second-largest beef producer[1]. Pasture is Brazil's largest agricultural land use, and cattle expansion has been an important driver of deforestation and conversion of native vegetation[2,3]. This challenge is particularly important in the Amazon and Cerrado which contain both major cattle producing areas and large remaining areas of native vegetation[2,3]. Addressing these impacts is challenging due to the complex structure of the cattle supply chains. Animals may move through multiple breeding, rearing and finishing properties before slaughter, meaning that environmental risks associated with indirect suppliers can remain undetected when monitoring focuses only on the final supplying property[3].

Brazil has developed several mechanisms to address these risks. Key supply chain controls include the voluntary Public Livestock Commitment (G4) and legally enforceable Terms of Adjustment of Conduct (TACs), implemented through the Beef on Track protocol[3,4]. Historically, however, these mechanisms have been concentrated in the Amazon and on direct suppliers, leaving important gaps in the monitoring of indirect suppliers and production in other biomes. Recent developments could help narrow these gaps. This includes the implementation of governmental compliance monitoring and traceability platforms, such as SeloVerde and MonitoraCAR, that in the case of Pará and Minas Gerais already cover both direct and indirect suppliers, and recent phased rules for monitoring first-tier indirect suppliers under the Amazon cattle agreement[4]. Together, these initiatives can strengthen verification.

Alongside these domestic developments, major consumer markets are introducing or considering stronger requirements for forest-risk commodities. The European Union Deforestation Regulation (EUDR) covers cattle and listed beef products and requires them to be deforestation-free and produced in accordance with relevant legislation in the country of production[5]. For cattle, the information requirement extends across the animal's lifetime and to all establishments where it was kept, making full-chain geolocation particularly important[6]. The Regulation will apply from 30 December 2026 to large and medium oper-

**1.** United States Department of Agriculture, Foreign Agricultural Service (2025). Brazil: Livestock and Products Annual. Link

**2.** MapBiomas (2026). Collection 10 land-cover and land-use data. Link

**3.** zu Ermgassen, E. K. H. J. et al. (2020). The origin, supply chain, and deforestation risk of Brazil's beef exports. Proceedings of the National Academy of Sciences, 117(50), 31770–31779. Link

**4.** Ministério Público Federal (11 March 2026). MPF aprimora regras para controle de fornecedores indiretos na cadeia da pecuária na Amazônia. Link

**5.** European Union (2023, consolidated 2025). Regulation (EU) 2023/1115 on deforestation-free products. Link

**6.** European Commission (2026). FAQ on EUDR implementation, fifth edition. Link

ators and from 30 June 2027 to most micro and small operators[5,6]. In June 2026, the United Kingdom announced plans for a Great Britain due diligence regime covering cattle and other forest-risk commodities, with implementing legislation expected in 2027[7].

China is the pivotal external market for Brazilian beef. According to Trase[8], China-bound exports increased from approximately 1.20 million tonnes (40.6% of total exports) in 2019 to 1.92 million tonnes (53.7%) in 2023, and according to Comex Stat[9] it increased to 1,94 million tonnes (47%) in 2024. In 2025, these hit the highest absolute value in more than 10 years reaching 2.36 million tonnes (48%)[9]. Unlike the EU, China's engagement on imported deforestation has so far centred on bilateral cooperation and industry-led initiatives rather than an EUDR-equivalent requirement[10–12]. The 2023 Brazil-China climate statement supports cooperation against illegal logging, deforestation and associated illegal trade[10]. Voluntary initiatives include the China Meat Association–WWF green-trade framework and a corporate commitment by Tianjin to purchase 50,000 tonnes of certified deforestation-free Brazilian beef by the end of 2027[11,12].

However, Brazil's domestic market remains larger than its export market. Conab's national balance for 2023 records 9.54 million tonnes carcass-weight equivalent (CWE) of beef supply, comprising 3.03 million tonnes of exports (31.7%) and 6.51 million tonnes (68.3%) for domestic consumption[13]. Progress towards legal and deforestation-free cattle supply chains therefore depends on Brazilian public authorities and domestic buyers as well as importing markets.

Across these different approaches, a common challenge is the availability of supply chain information needed to identify and manage environmental risk. Radar Verde found that all assessed slaughterhouse plants in the Legal Amazon authorised to export to China and Hong Kong had low or very low performance based on publicly available evidence, and that none presented sufficient public evidence of effective control of indirect suppliers[14]. Limited transparency, lack of information on environmental compliance and incomplete traceability constrain the ability of buyers and authorities to implement green procurement guidelines and bilateral commitments.

Given the forthcoming application of the EUDR and changing signals from China and the UK[5,7,10–12], an updated analysis of environmental compliance of Brazilian beef production in these biomes is urgent. This study presents data related to compliance with essential elements of the Forest Code, identifying the municipalities where deforestation with non-compliance issues is concentrated and showing which of them export to China, the EU-27 and other markets. It is intended as an input for demand-side due diligence and implementation, and it concludes with recommendations for different actors to advance environmental compliance in the beef supply chain.

**7.** UK Department for Environment, Food & Rural Affairs (2026). The UK's approach to deforestation regulations. Link

**8.** zu Ermgassen, E. K. H. J. et al. (2025). Brazil beef supply chain 2010–2017 and 2019–2023, Version 2.2. Trase. Link

**9.** Brazilian Ministry of Development, Industry, Trade and Services (MDIC), Secretariat of Foreign Trade (SECEX) (2026). Comex Stat: Brazilian foreign trade statistics database. Data accessed 12 September 2026. Link

**10.** Governments of Brazil and China (2023). Brazil–China Joint Statement on Combating Climate Change. Link

**11.** China Meat Association and WWF (2021). Specification for Meat Industry Green Trade. Link

**12.** Xinhua (5 June 2026). China's growing appetite for climate-conscious food helps protect Brazil's rainforest. Link

**13.** Companhia Nacional de Abastecimento (Conab) (2025). Perspectivas para a Agropecuária 2025/26, Table 7. Link

**14.** Imazon and Instituto O Mundo Que Queremos (24 March 2026). Radar Verde China: Beef transparency in the Brazilian Amazon. Link

# Environmental compliance and methodological approach

Agricultural expansion is a key driver of deforestation and conversion of native vegetation in Brazil[2,3]. The Forest Code (Law No. 12,651/2012) is Brazil's main federal legislation regulating native vegetation on rural properties and seeks to reconcile agricultural production with environmental conservation[15]. The law establishes two central mechanisms for protecting native vegetation: the Legal Reserve (LR) and Permanent Preservation Areas (APPs).

The Legal Reserve requires rural properties to maintain a minimum percentage of native vegetation. In forest areas within the Legal Amazon, this requirement may range from 50% to 80% depending on the statutory conditions; in Cerrado areas, it is 35% within the Legal Amazon and generally 20% elsewhere. Permanent Preservation Areas protect riverbanks, springs, steep slopes, hilltops and other environmentally sensitive areas[15,16].

The Forest Code also requires prior authorisation from the competent environmental authority for the suppression of native vegetation where the law requires it. Deforestation undertaken without a legally required Authorisation for Vegetation Suppression (Autorização de Supressão de Vegetação, ASV) is non-compliant and may result in fines or embargoes, depending on the circumstances[15].

The Rural Environmental Registry (Cadastro Ambiental Rural, CAR) is the main spatial framework for property-level environmental monitoring and regularisation. It is mandatory and integrates self-declared information on property boundaries and conservation areas. Registration alone does not prove that the information has been validated or that the property complies with the Forest Code, but CAR provides the basis for monitoring and for mechanisms such as state Environmental Regularisation Programmes (Programas de Regularização Ambiental, PRAs)[15].

For rural-property boundaries, we used the February 2025 SICAR database, which provides spatially explicit CAR registrations[17]. We excluded cancelled records, duplicate registrations and registrations overlapping protected areas. We cross-checked these boundaries with pasture mapped in MapBiomas Collection 10[2] and retained properties containing more than 6.25 ha of mapped pasture. We assessed Legal Reserve balance using the property accounting approach developed by Rajão et al. (2020)[18]. We obtained environmental infraction data from IBAMA and filtered records related to damage to native vegetation[19]. We assessed deforestation using official PRODES data for 2008–2024 in the Amazon and Cerrado[20].

Deforestation with non-compliance issues was assessed based on the property's compliance with Forest Code requirements and available enforcement data, supporting a risk gradient analysis. Three categories were used:

**15.** Brazil (2012). Federal Law 12,651/2012—Law on the Protection of Native Vegetation (Forest Code). Link

**16.** Amaral, P., Reis, T. and del Giudice, R. (2017). Assessing compliance with the Forest Code: A practical guide. Link

**17.** Brazilian Forest Service (2025). SICAR public property consultation. Link

**18.** Rajão, R. et al. (2020). The rotten apples of Brazil's agribusiness. Science, 369(6501), 246–248. Link

**19.** IBAMA Open Data Portal (accessed December 2025). Environmental inspection notices. Link

**20.** National Institute for Space Research (INPE). TerraBrasilis data portal: PRODES. Link

1. Unauthorised deforestation in properties with a Legal Reserve surplus relative to the minimum required by law.

2. Unauthorised deforestation in properties with a lack of native vegetation within the farm as required by the Legal Reserve, but with no administrative measures.

3. Deforestation in properties with an embargo or notices of violation related to damage to native vegetation.

The authorisation databases have known completeness limitations, and the absence of a match should not be read as conclusive proof that no valid ASV existed[21]. The analysis uses 2025 CAR data, which may not reflect subsequent boundary changes, while the 6.25-hectare minimum mapping threshold, adopted to avoid indications of non-compliance arising from simple overlaps between property boundaries and PRODES polygons, may fail to detect smaller clearings, potentially underestimating total unauthorized deforestation. Legal Reserve compliance is assessed on-property only, without accounting for off-property compensation mechanisms admitted by Law 12,651/2012 due to SICAR database limitations. Additionally, the hydrographic baseline used to assess Permanent Preservation Area compliance may underestimate the actual extent of these areas, affecting the accuracy of APP-related liability estimates.

**21.** Valdiones, A. P. G. et al. (2021). Desmatamento ilegal na Amazônia e no Matopiba: falta transparência e acesso à informação. Link

Our dataset is based on deforestation from 2008 to 2024, classified within properties selected because they contained more than 6.25 ha of pasture. It is not an annual series and is not restricted to pasture pixels overlapping deforestation. The dataset contains municipality aggregates calculated from individual farm CAR boundaries and the total pasture area in the analysed properties within each municipality and deforestation compliance category. Based on this dataset we cannot directly estimate the share of cattle beef production associated with each category of deforestation.

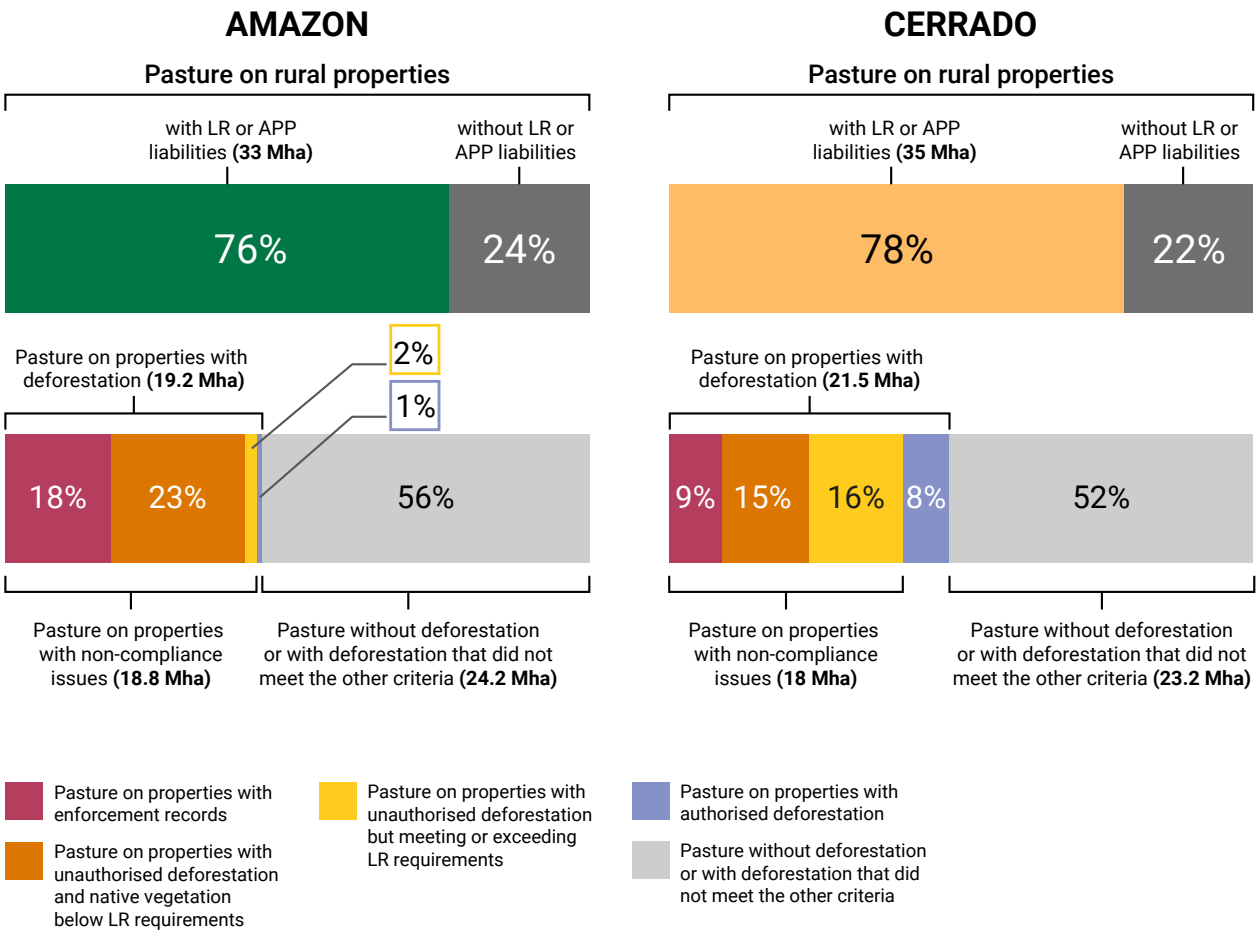
# Results

We identified 88.05 million hectares of pasture on SICAR-registered properties in the Amazon and Cerrado in 2024. Of this total, 43.38 Mha were in the Amazon and 44.67 Mha in the Cerrado. Of the pasture areas in the Amazon and Cerrado, respectively, 43.3% and 40.2% were on farms with deforestation which have enforcement issues, including the lack of ASV. Some properties may already have addressed their LR obligations through restoration, compensation or participation in an Environmental Regularisation Programme (PRA), depending on their individual circumstances. However, this is difficult to determine given incomplete public information and slow validation of CAR records. Nevertheless, the results highlight the importance of advancing CAR validation and PRA implementation in both biomes. Given the widespread evidence of LR liabilities (**Figure 1**), new clearing of native vegetation is very likely to be illegal, as in-farm native vegetation surpluses are a basic requirement for obtaining clearing authorisations.

Based on this assessment of remaining native vegetation, we examined cumulative deforestation occurring between 2008 and 2024, particularly whether it occurred on properties already showing LR liabilities. In total, 18.92 million hectares of deforestation were identified within rural properties with pasture. Properties with deforestation, regardless of the compliance status, contained 41.63 million hectares of pasture, equivalent to 47.3% of the pasture area in the Cerrado and Amazon biomes in 2024.

Rural properties with deforestation with non-compliance issues contained 36.73 million hectares of mapped pasture in 2024 (18.77 Mha in the Amazon and 17.96 Mha in the Cerrado), equivalent to 41.7% of all pasture assessed. Of this pasture area, 28.85 Mha (78.6%) was located on properties with stronger evidence of non-compliance: 11.83 Mha on properties with enforcement records and 17.03 Mha on properties with deforestation without an ASV and native vegetation was below on-property Legal Reserve requirements. The remaining 7.88 Mha (21.4%) was located on properties that met or exceeded Legal Reserve requirements, but for which no ASV could be matched in the available datasets.

**FIGURE 1.** Pasture area cultivated in the Amazon and Cerrado in million hectares (Mha) in 2024. We found 36.73 Mha (41.7%) of pasture cultivated on rural properties where deforestation with non-compliance issues occurred between August 2008 and July 2024.



Deforestation with matched ASV, making it likely to be legal, accounted for 3.27 million hectares, or 17.3% of total mapped deforestation. This corresponds to 1% and 7.8% of mapped pastures in the Amazon and Cerrado, respectively. On the positive side, 52.7% of mapped pasture was located on properties without post-2008 deforestation.

Despite differences in the relative proportions of each type of deforestation between biomes, deforestation with non-compliance issues was dominant in both biomes. Within this set, the stronger evidence categories, namely deforestation on properties associated with fines or embargoes, or with no matched ASV and LR liabilities, represented 95.6% of pasture area with non-compliance issues in the Amazon and 60.8% in the Cerrado.

We found a high concentration of pasture area on properties in the two stronger evidence non-compliance categories in a relatively small number of municipalities (**Figure 2**). The 136 municipalities with the largest combined pasture area on properties with enforcement records or without matched authorisation and below on-property Legal Reserve requirements represent 8.4% of the 1,625 municipalities in the Cerrado and Amazon dataset. Together, these municipalities account for 60% of pasture area in these two categories across the two biomes. Mato Grosso contained the largest pasture area associated with these stronger evidence categories, totalling 7.58 Mha. These 136 municipalities form the priority set highlighted by thick white outlines in Figure 2.

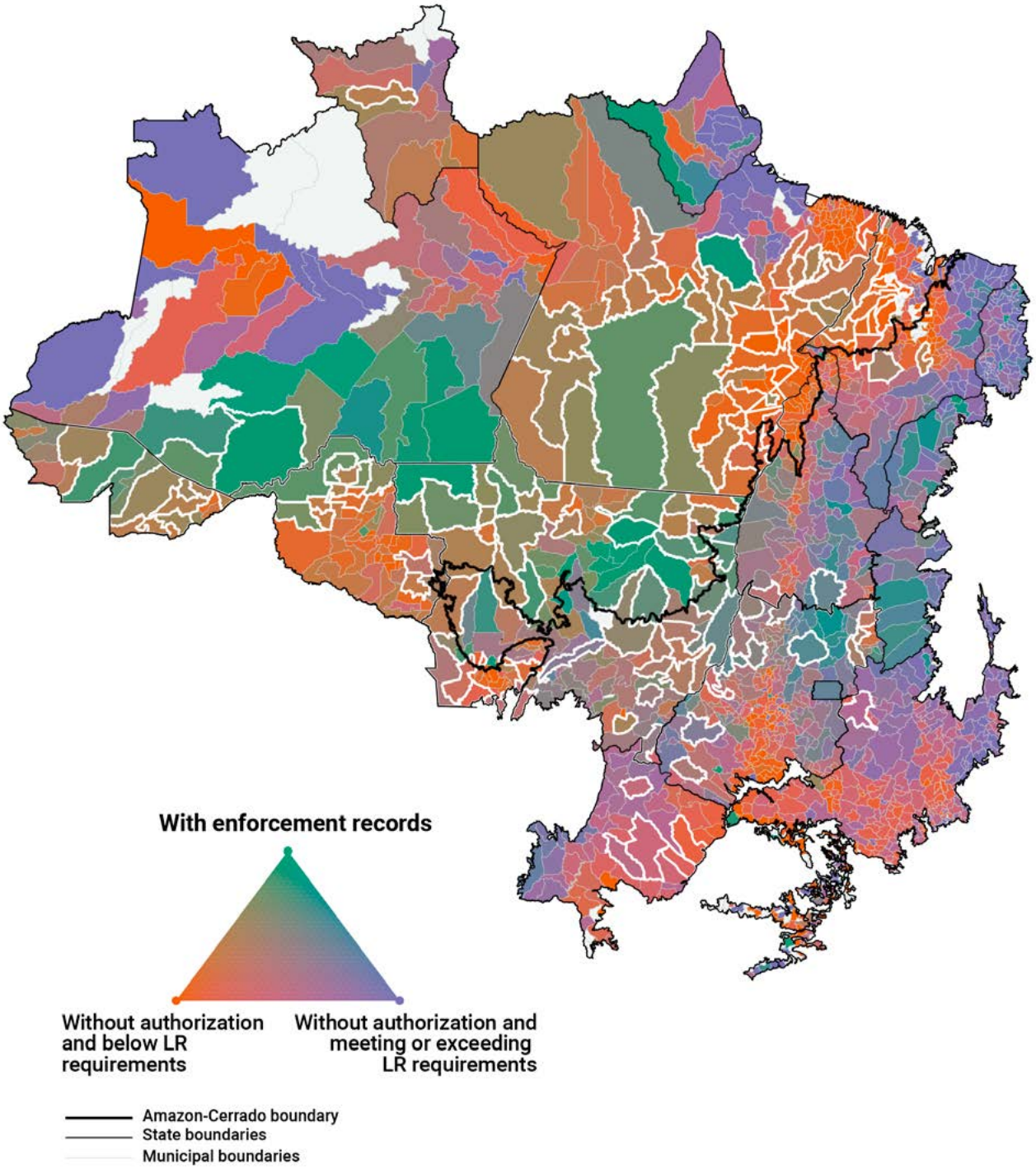
The geographic concentration of pasture area associated with these stronger evidence categories allows traders, financiers, processors and public authorities to focus verification efforts towards the most critical municipalities. In practice, it supports a tiered approach: more intensive property and supply chain verification in jurisdictions with larger areas of pasture on properties associated with fines or embargoes, or without a matched ASV and below on-property Legal Reserve requirements, combined with simplified procedures for other municipalities.

## Markets exposure to non-compliance issues

Combining Trase supply chain data with the spatial analysis of Forest Code compliance provides an indication of the extent to which major export markets are exposed to beef sourced from areas where risks of non-compliance are concentrated.

For the market analysis, focusing on the top-tier municipalities with more risk, we used the Figure 2 priority set of 136 municipalities that cumulatively account for 60% of pasture area in the two stronger evidence categories. These categories comprise properties with: (i) environmental enforcement records (fines and embargoes); (ii) properties where deforestation had no matched authorisation and native vegetation was below Legal Reserve requirements. This helps identify links between major export markets and higher risk sourcing areas.

**FIGURE 2.** Relative composition of pasture area associated with the three deforestation-related non-compliance categories, by municipality, in the Amazon and Cerrado. Municipal colours blend three dimensions of pasture area on properties with enforcement records; properties without matched authorisation and below Legal Reserve requirements; and properties without matched authorisation but meeting or exceeding Legal Reserve requirements. Colours closer to each corner of the triangular legend indicate greater relative dominance of that category. Thick white outlines identify the 136 municipalities that cumulatively account for 60% of the combined pasture area on properties with enforcement records or without matched authorisation and below Legal Reserve requirements.



Based on Trase data, of the identified international beef exports attributed to the 136 priority municipalities in the Amazon and Cerrado biomes in 2023, 61.8% went to China, 3.8% to the EU-27 and 34.3% to other identified international markets. These volumes represented 32.6% of China-bound exports and 41.8% of EU-27-bound exports mapped to municipalities within the Amazon and Cerrado.

**FIGURE 3.** Municipalities within the 136-municipality priority set identified in Figure 2 with Trase-allocated beef exports to China (a) and the EU-27 (b) in 2023, ranked by export volume. Bars show export volumes (tonnes of beef products). Accompanying values show cumulative deforestation between August 2008 and July 2024 within rural properties containing more than 6.25 ha of pasture and classified in the two stronger evidence categories: properties with environmental enforcement records, and properties without a matched authorisation and below on-property Legal Reserve requirements. Each panel presents the 15 municipalities with the largest export volumes; the remaining 115 China-linked and 60 EU-27-linked municipalities are grouped as “Others”.

For the EU, these findings have direct relevance to the implementation of the EUDR. In addition to requiring cattle products placed on the EU market to be deforestation-free, the regulation requires them to have been produced in accordance with relevant legislation in the country of production. Spatial information on concentrations of Forest Code non-compliance risk could complement supply chain due diligence, helping companies and competent authorities prioritise scrutiny and additional verification in higher risk sourcing areas.

For China, where there is currently no equivalent mandatory import requirement, the findings could support emerging efforts by market actors to strengthen the environmental performance and traceability of Brazilian beef imports. In 2025, the Tianjin Meat Industry Association committed to purchase at least 50,000 tonnes of Brazilian beef certified as deforestation-free, using the Beef on Track certification. While initiatives of this kind remain small relative to the scale of Chinese imports, they signal growing interest among some market actors in mechanisms to identify Brazilian beef that meets environmental and legal criteria. This interest is emerging alongside a tightening import environment: China recently implemented meat import quotas and, for Brazil, the volume was set 35% below the amount imported in 2025[22]. A binding quota shifts the market from absorbing essentially all available supply towards selecting among competing volumes, creating an opening for sourcing criteria beyond price. Municipality-level indicators of the kind presented here could serve as a first screening layer for such prioritisation, helping importers and exporters concentrate verification and traceability requirements on the sourcing areas where compliance risk is concentrated. As a trade instrument with no environmental criteria attached, the quota does not by itself reduce deforestation risk; it does, however, make supplier selection more consequential.

**22.** Ministry of Commerce of the People's Republic of China (31 December 2025). Announcement No. 87 of 2025 on the safeguard measure on imported beef. Link

It is important to note, however, that international markets represent only part of the picture. Brazil's domestic market remains the main destination for Brazilian beef, accounting for approximately 6.51 million tonnes, or 68% of total supply in 2023, far exceeding the volume destined for any individual export market.

Yet, limited information on the domestic destination of cattle products makes it difficult to quantify the exposure of Brazilian consumers to production from the high-risk municipalities with the same level of detail as for international trade. There is also an important opportunity for importers to start using governmental systems already in place that are able to monitor both direct and indirect suppliers. SeloVerde Minas Gerais and Pará covers seven of ten largest exporting municipalities by volume for China with significant compliance issues. Likewise, four of the largest exporting municipalities to the EU are also covered by SeloVerde in Minas Gerais. Nevertheless, given the scale of the domestic market, a substantial share of beef originating from properties at risk of non-compliance with the Forest Code is likely to be consumed within Brazil. This underscores the importance of traceability and compliance mechanisms across the Brazilian cattle sector as a whole, alongside measures targeting individual export markets.

# Final considerations and recommendations

The identification of 36.73 million hectares of mapped pasture on properties with 15.65 million hectares of cumulative post-2008 deforestation carrying non-compliance issues reveals the scale of the Forest Code compliance challenge within cattle-producing landscapes. This does not attribute the clearing to cattle trade, but shows that mapped pasture occurs on properties where enforcement records were identified or where an authorisation could not be

matched in the available records. This scenario is particularly concerning given stricter requirements in the European Union and the United Kingdom and emerging signals from China, while control mechanisms within the cattle sector remain concentrated largely in the Amazon and on direct suppliers. Environmental compliance therefore needs to be recognised as a minimum condition for market access and the long-term economic viability of Brazilian beef.

The data also indicates that 52.7% of mapped pasture was located on properties without post-2008 deforestation, while 76.9% was located on properties with evidence of Legal Reserve or Permanent Preservation Area liabilities. Legal Reserves and Permanent Preservation Areas perform essential ecological functions, supporting water regulation, climate resilience, agricultural productivity and biodiversity conservation. Advancing CAR validation and regularising LR and APP liabilities are therefore not only legal requirements but also important measures for sustaining cattle production under intensifying climate change.

Importantly, this challenge is actionable. Just 136 municipalities account for approximately 60% of the pasture area on properties in the two stronger evidence categories across the Amazon and Cerrado: properties associated with enforcement records and properties without a matched ASV and below on-property Legal Reserve requirements. This concentration allows property validation, authorisation checks, indirect-supplier traceability, enforcement and producer support to be prioritised in a relatively small number of jurisdictions. Municipality-level screening should guide where additional verification is needed; it does not justify blanket exclusion or attribute non-compliance to individual companies, cattle or shipments. Because most Brazilian beef is consumed domestically, measures adopted by importing markets must be complemented by universal domestic traceability and compliance mechanisms.

Against the backdrop of growing global attention to climate and environmental issues, compliance with environmental regulations is no longer an option but rather an economic imperative for the Brazilian beef industry to maintain its international competitiveness and market credibility. We present the following recommendations for different actors in the beef supply chain to advance compliance:

## Production sector, meatpackers and exporters

- Adopt and strengthen multi-sectoral zero-deforestation agreements and mechanisms, such as Beef on Track, with criteria for zero-deforestation beef production and supply chains, including monitoring and reporting systems, and a member withdrawal mechanism. These requirements should be expanded to the Cerrado biome to prevent the worsening of native vegetation conversion in the coming years.

- Adopt due diligence protocols for both legality and deforestation and conversion-free (DCF) sourcing, prioritising municipalities with a high concentration of deforestation.

- Use existing governmental compliance monitoring platforms, such as SeloVerde, MonitoraCAR and Agro Brasil + Sustentável, to reduce risk of

non-compliance and implement voluntary DCF pledges, including the indirect suppliers in the case of Minas Gerais and Pará.

- Direct expansion onto already converted land: approximately 109.7 million hectares of pasture in Brazil (60% of the total pasture area) show moderate to severe degradation of vegetative vigour[23], representing a substantial land reserve for herd growth through pasture recovery and intensification without additional native vegetation conversion.

**23.** Bolfe, É.L. et al. (2024). Potential for Agricultural Expansion in Degraded Pasture Lands in Brazil Based on Geospatial Databases. Land, 13(2), 200. Link

## Financial institutions

- Condition access to finance on robust environmental compliance, the absence of deforestation (authorised or unauthorised), and the implementation of regularisation plans to restore environmental liabilities.
- Expand environmental criteria already established for agricultural loans also for private finance and barter.
- Create specific financing lines for forest restoration, Legal Reserve compensation and the recovery of degraded pastures, making environmental regularisation and deforestation-free intensification economically viable for producers.

## Brazilian universities, civil society and scientific research organisations

- Strengthen research on the environmental and social impacts of cattle production, and on the effectiveness of zero-deforestation commitments.
- Enhancing research cooperation with consumer countries, China and the EU in particular.
- Explore environmentally friendly, poverty-alleviating and sustainable livestock production models.
- Assess banks and the alliance of beef producers and exporters, and publish corporate social and environmental responsibility reports on major enterprises.

## Brazilian national and regional governments

- Accelerate CAR validation and the effective implementation of the PRA, promoting the environmental regularisation of rural properties.
- Integrate databases of vegetation suppression authorizations (ASV) and state and federal embargoes with the CAR database in transparent compliance monitoring platforms, ensuring the qualification of deforestation on the property and the identification of environmental infractions.

- Strengthen enforcement actions against unauthorised deforestation.

- Develop public and universal compliance monitoring and traceability platforms integrating animal movement (GTA) data with the CAR and enforcement databases, so that animals originating from embargoed or non-compliant properties can be identified along the supply chain, including indirect suppliers.

- Develop governmental traceability and compliance monitoring platforms that are universal in scope (integrating data on all farms) such as SeloVerde, without the need of voluntary registration of farmers as is currently the case with Agro+Brasil Sustentável, leveraging GEO and AI technologies.

- Based on sanitary and timber regulations, develop a regulation that establishes a mandatory environmental compliance declaration for exports of agricultural commodities.

## International consumer markets (EU and China)

- Actively encourage importers to collaborate with Brazilian exporters, prioritising the use of existing Brazilian government compliance monitoring platforms as tools for supply chain due diligence to allow compliant production to be distinguished from that associated with deforestation.

- Explore the establishment of a bilateral China-Brazil information sharing mechanism for environmental compliance verification of beef products.

- Strengthen policy dialogue and technical cooperation between China and the EU on environmental compliance in agricultural supply chains, and collaboratively explore the development of joint screening mechanisms and information sharing platforms for high-risk areas, in order to effectively mitigate the risk that the imposition of stringent standards in one market may lead to the diversion of non-compliant products to markets with relatively laxer standards.

- The Chinese government and companies should actively explore the inclusion of environmental compliance performance as a factor in quota allocation or importer qualification assessments, thereby enabling the quota – as a trade instrument – to positively guide green beef trade and serve as a lever for promoting the development of sustainable supply chains.

- Adopt risk-based inspections, enabling competent authorities to prioritise scrutiny in higher risk areas.

- Coordinate due diligence standards with the main major importing markets, including China, to prevent the displacement of non-compliant volumes rather than their elimination from trade.