AGRICULTURAL POLICIES IN DEBATE

Animal Traceability in Brazil

Inputs for establishing a nationwide system to ensure deforestation-free cattle production in Brazil

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ABOUT THIS STUDY

This study is used as a reference document for the APD | AGRICULTURAL POLICY DIALOGUE BRAZIL - GERMANY. The content of this study is the sole responsibility of the authors, and any opinions expressed herein are not necessarily representative or endorsed by APD.

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Amigos da Terra is a Brazilian non-governmental, non-profit organization, with more than 25 years of experience in the socio-environmental area. Its mission is to promote sustainable initiatives aimed at achieving zero deforestation in Brazilian natural habitats, with a priority, but not exclusive focus on the Amazon.

With this mission we work together with governments and companies in influencing public and private policies that can promote sustainable development and prevent environmental degradation. We also support local communities and work to generate and share relevant information about our areas of activity.

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Executive Summary

The purpose of this technical report is to present a brief overview of the current situation with animal traceability in Brazil, highlighting its main challenges and opportunities, and to propose a series of measures to be implemented mainly by the government. The goal with this report is to establish a minimum legal framework for domestic production of deforestation-free cattle and reduce the participation of cattle production chain in the processes of natural habitat conversion, degradation and deforestation in all Brazilian biomes.

Traceability for sanitary purposes is already well consolidated in Brazil. However, to meet the most recent global demand for food, attributes such as social and environmental issues have become equally important. This discussion is even more relevant when the subject is cattle ranching, because despite its economic relevance, this has been the main activity associated with deforested areas in the country and is even classified as a high-risk commodity by some international markets.

Considering that new international regulations seeking to bar the importation of products associated with deforestation that are already being discussed and approved by relevant importing markets, Brazil very soon will need to promote improvements and modernizations in the currently existing systems and implement new instruments capable of attesting to the socio-environmental traceability of its cattle.

To make these changes feasible in a fast, robust and scalable manner, the report proposes the creation of a National Traceability Plan, one of whose roles would be to organize the different government bodies and instances around the establishment of a National Cattle Traceability System. This system would be composed of a single database, available to all actors in the chain, and guidelines to regulate the national production of cattle free of deforestation and other socio-environmental irregularities. With this, it is expected to overcome some of the main current challenges to implementing animal traceability: low transparency of official data about the movement and identification of animals and the absence of guidelines and regulations that address traceability for socio-environmental purposes.

It is recommended that a phased implementation strategy be adopted for the National Cattle Traceability System, using different approaches and technologies in a complementary manner. Initially, traceability by batch could be accepted for the commercialization of

deforestation-free meat and hides in the national market. With the large-scale feasibility of individual identification, traceability by batch could be gradually replaced or restricted to biomes and less critical regions for conservation. In order to meet specific international market demands, the system should also contemplate voluntary adherence protocols, which should go through independent verification systems to obtain seals and certificates. It is in this second context that individual traceability should be implemented with more urgency.

The present report does not intend to provide detailed technical guidelines for drafting the national plan or to exhaust all the details, mechanisms and instruments necessary to make the establishment of this type of public policy feasible. That must be done within a specific working group composed of government agencies and representatives of the main segments of the Brazilian beef supply chain.

1. Cattle ranching and deforestation in the Brazilian Amazon

Agribusiness is a strategic sector for Brazil. Over the last decade, its contribution to the country's economy rose from 19.1% to 24.8% of the national GDP (CEPEA, 2023). Notwithstanding its relevance and economic growth, the sector is considered the largest driver of deforestation and conversion of natural habitats in the country, which is also the case in other regions occupied by tropical forests around the world (DUMMET; BLUNDELL, 2021). This widespread dynamic in agricultural frontier regions has led to the loss of biodiversity and ecosystem services that contribute to accentuate the effects of climate change.

Within the scope of Brazilian agribusiness, the participation of the ranching sector is very significant, especially regarding beef cattle ranching. Brazil has the largest cattle herd in the world and is the largest global exporter of beef (ABIEC, 2022). In 2021, 224 million head of cattle were counted nationwide, 43% in the Brazilian Amazon region (IBGE, 2022). A large part of the growth in Brazilian cattle ranching observed in the last two decades has occurred in the states covered by this region. Between 2001 and 2021, the increase in the country's herd was 27.3%, while in the Brazilian Amazon it was 87% (IBGE, 2022). It is estimated that about 2/3 of the domestic herd is in the Amazon and Cerrado biomes (TNC, 2021).

Data from Mapbiomas (2022), show that from 2001 to 2021 of the 31.9 million hectares (Mha) of forests deforested in Brazil, 85.9% were in the Brazilian Amazon. During this period, 27.36 Mha of forests were deforested in the region, while farming activities incorporated almost the same territory (27.64 Mha). Pastures expanded by 17.74 million hectares and will represent 78.2% of the area occupied by agriculture and cattle-raising in this region in 2021. The data produced by this land use and land cover monitoring system make explicit the clear relationship between deforestation in the biome and cattle ranching. Although much of the deforestation is motivated by land grabbing, cattle ranching has been the principal activity associated with deforested areas in the Brazilian Amazon.

The predominant livestock production system in the Amazon is typically less developed technically than what is found in the Center-South of the country. In general, the

activity is practiced extensively, with low use of chemical inputs, little management, low stocking rates (head of cattle per hectare) and, consequently, low productivity, resulting in gradual soil degradation (ZU ERMGASSEN et al., 2018). It is estimated that 57% of the total grassland area in this territory is at a moderate or severe degradation status (MAPBIOMAS, 2023).

Beef cattle raising for meat and leather production was responsible for the movement of 169.29 billion dollars in Brazil in 2021, a significant value that drives several subsectors related to this production chain, including inputs, investment in genetics, animal health, nutrition, exports and sales on the domestic market (ABIEC, 2022). In the same year, the volume of beef produced in the country was 9.71 million tons of carcass weight equivalent (CWE). The domestic market retained 74.5% of this volume, while 25.5% went to exports. Even though most of the beef production is absorbed by the domestic market, it is estimated that the portion destined for export will grow by 35% in the next two decades, driven by rapid growth in demand from the Chinese market, which will further increase pressure for the conversion of areas in the Amazon and Cerrado biomes (TNC, 2021; IFACC, 2022).

2. The demand for deforestation-free products and the commitments assumed by the sector

The growing demand for deforestation-free products that meet multiple sustainability criteria, especially in international markets, has led companies to make a number of voluntary commitments to supply deforestation-free commodities (STABILE et al. 2020, LAMBIN et al., 2018).

In the case of beef from the Amazon, the year 2009 was marked by the launching of commitments by the main meat processing companies operating in the region, the Conduct Adjustment Term (TAC) and the Livestock Production Public Commitment (CPP). Although voluntary, these commitments resulted, in the first case, from a broad investigative process conducted by the Pará Public Prosecutor's Office that exposed the connection of various links in this production chain with illegal deforestation and, in the second, from a campaign led by Greenpeace to pressure the three largest meatpackers into taking steps to eliminate deforestation in their supply chains (ARMELIN, BURNIER, GROSSI, 2020).

More than ten years later, the TACs remain in force, resulting in an interaction between actors both public (federal prosecutors and state and federal control agencies) and private (meatpackers, supermarkets, non-governmental environmental and research organizations and others). That has led to the emergence of a system of governance over the supply chain, which is largely responsible for the progress in controlling suppliers (INAKAKE, PIATTO, GARCIA-DRIGO, 2020).

Other advances observed over the last decade were the beginning of TAC audits in 2014, the entry into force of the Amazon Cattle Supplier Monitoring Protocol (PMFGA) in 2020, and the beginning of the unified TAC audit cycle in the states of Acre, Amazonas, Mato Grosso, Pará and Rondônia in 2023 (NAKAGAWA; INAKAKE, 2023). Despite the considerable effect of these interventions on the beef supply chain, a series of challenges to effectively delinking it from deforestation remains, among which the most critical

and pressing are extending the reach of agreements and monitoring systems to the most distant links in the chain - the indirect suppliers - where much of the deforestation continues to occur .[1]

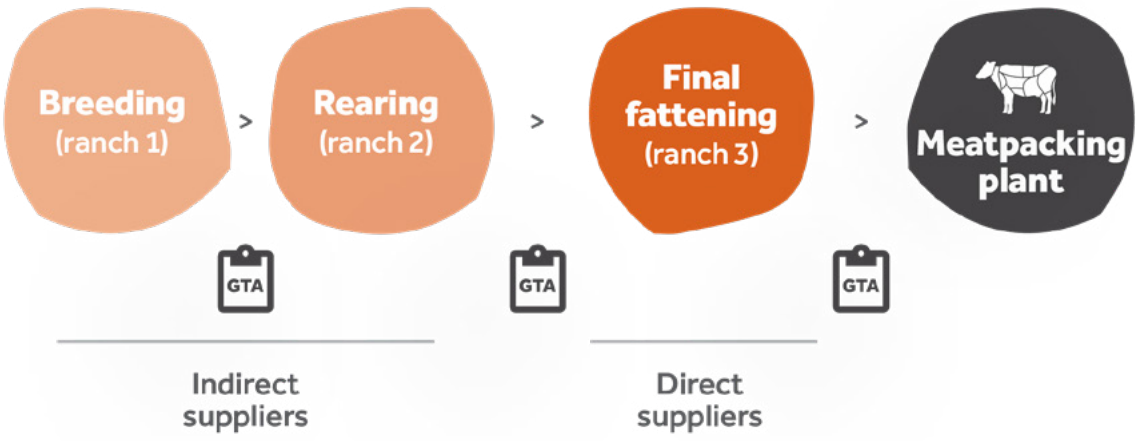
1 Although indirect suppliers are mentioned in both the Beef TAC and CPP agreements, when it comes to this link in the supply chain efforts at implementing them have been incipient (Da Mota et al., 2019).

3. The challenges and importance of traceability in Brazilian livestock production

The livestock production chain is composed of a complex network of links involved in the distinct stages of the animal's life - raising, rearing, and fattening - so that the same animal may pass through several ranches and intermediaries until it is destined for slaughter (Figure 1).

Cattle ranchers that dedicate themselves to breeding are the calf producers, while those engaged in rearing buy calves in order to produce yearling steers and bullocks. Finishers dedicate themselves to fattening the young animals for slaughter, whereas those cattle ranchers who work with the complete cycle perform all the activities described. In the Amazon, because there are many areas recently incorporated into the production process, which is relatively cheap and uses extensive production methods, there is a predominance of the breeding-rearing and fattening system, with the complete cycle being the one least often encountered.

Figure 1 – The different production links involved in the beef supply chain.

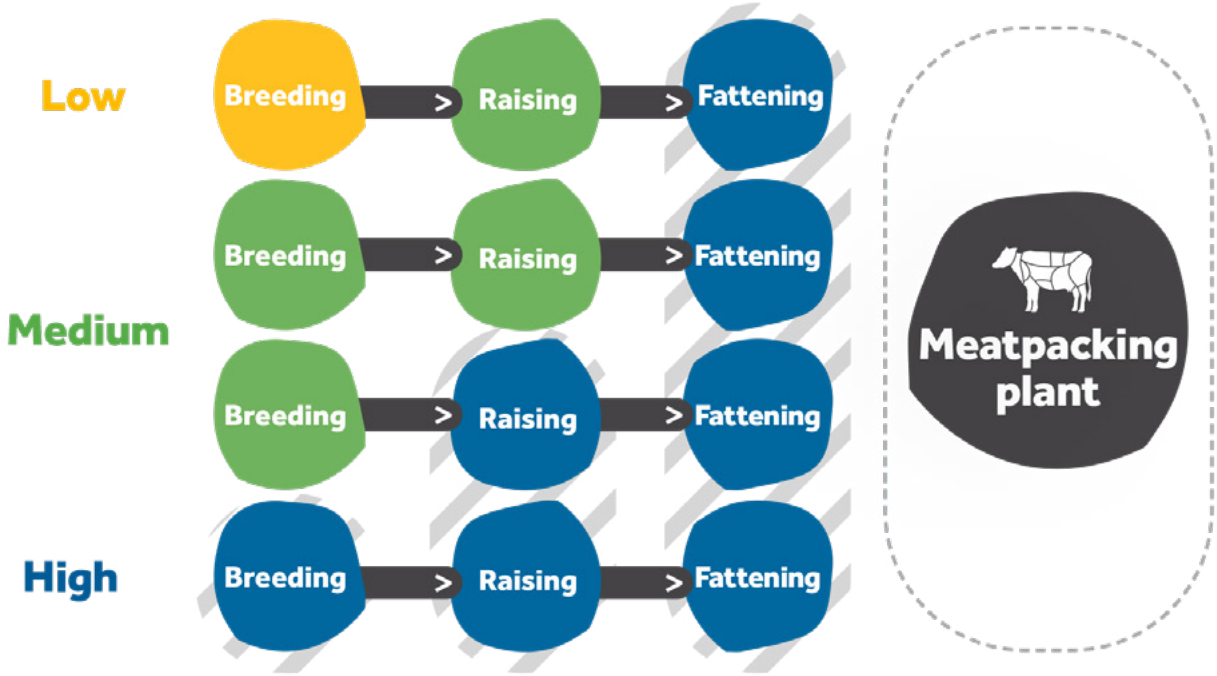


Notes: For each transport between ranches an Animal Transportation Permit (GTA) is issued. Figure 1 provides a simplified illustration of the productive links in the beef chain. It should be noted that a single ranch may handle one or more phases in raising cattle. This means that cattle may be shifted in a complex series of transactions until their sale to a meatpacking plant. To facilitate understanding, the different possibilities for moving cattle throughout the chain are presented in Appendix 1.

Source: Data from the current report (2019)

Due to this complexity and the low transparency of environmental data for the properties and the health data of the herds contained in the government's official databases, the control systems of the companies mostly reach only the last property that sold the cattle to the slaughterhouse (direct supplier) who is generally in charge of the final fattening. That leaves much of the supply chain without any kind of monitoring and, consequently, exposed to compliance risks.

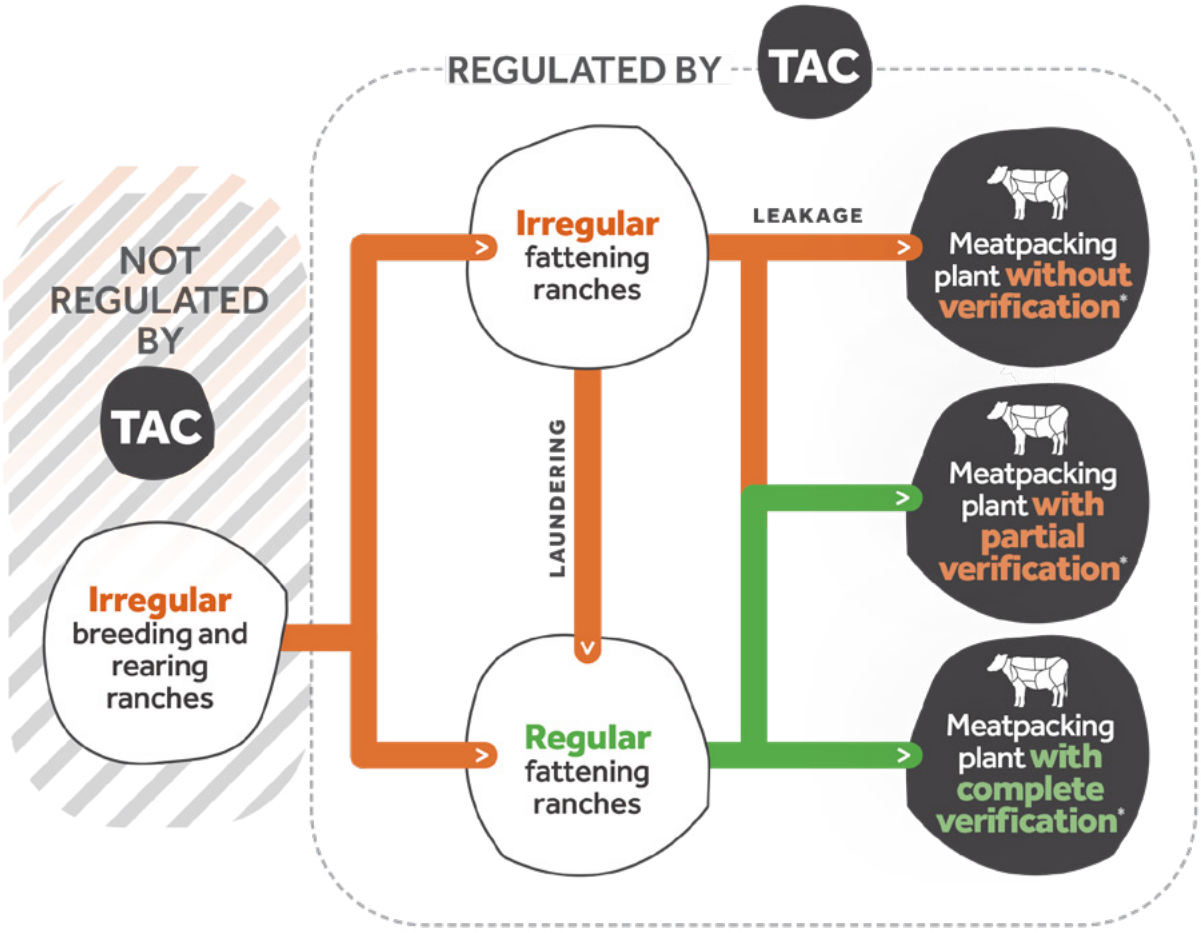
Appendix 1 – Possibilities for flw of cattle inside the supply chain and degree of visibility



Source: Adapted from Briefing 09 on Produção Responsável e Compra Responsável do Proforest - Monitoramento Socioambiental da Pecuária no Brasil (Responsible and Production and Purchasing with Proforest - Socioenvironmental Monitoring of Ranching in Brazil)

The previous links not covered by the monitoring of the slaughterhouses, where the animal usually spends its first years of life, are called "indirect suppliers." Far from the reach of monitoring systems, much deforestation continues to occur on these properties. According to data from the University of Wisconsin-Madison, an estimated 41% of cattle ranching-related deforestation in the state of Pará from 2019 to 2021 occurred on indirect supplier properties (GTFI, 2021). This loophole in the system allowed some of the irregular direct suppliers blocked by the slaughterhouses to function as indirect suppliers, marketing their production through "clean" ranches, configuring practices known as "triangulation" or "cattle laundering."

Figure 2 – Possible arrangements for violating the TAC and voluntary agreements that are based only on monitoring the direct meat-packing plant suppliers



Source: Data adapted from Barreto and Gibbs (2015).

In recent years there has been a major advance in traceability systems that encompass direct suppliers (AGROSUISSE, 2020), which has made it possible for some processing plants in Pará to achieve up to 100% of socio-environmental compliance in the TAC audit for this state in 2021[2] . Although the number represents an evolution in the process of developing a responsible chain, the next step involves tracking of animals to the ranch where they were born, enabling the identification and monitoring of indirect suppliers. To this end, technology companies, civil society organizations and some slaughterhouses have been dedicated to finding efficient tools capable of involving all participants in this chain, covering the stages of breeding, rearing and fattening.

2 The results of the 4th Round of Audits of the Cattle Raising TAC in Pará were released in December 2022 and are available at: https://www.mpf.mp.br/pa/sala-de-imprensa/documentos/2022/apresentacao_resultados_4o_ciclo_auditorias_tac_pecuaria_pa_15-dez-2022.

4. The state of the art of traceability and beef chain monitoring in Brazil

Among the countries with tropical forests, Brazil is one of the most advanced in the development of traceability systems for agricultural and livestock production for public health purposes. Furthermore, it has governmental and civil society organizations initiatives that are globally recognized as references in monitoring forest cover and mapping land cover and land use in the various biomes of the country: the PRODES[3] and the DETER[4] , under the responsibility of the National Institute for Space Research (INPE), and the MapBiomas[5], a collaborative multi-stakeholder network. Such infrastructure facilitates the development of innovative tools and mechanisms for environmental monitoring, involving public, private and civil society actors in constructing deforestation-free supply chains.

It is worth mentioning that although they are distinct activities, traceability and monitoring can have complementary objectives. In the beef chain, traceability enables identification of the cattle, the properties that they passed through and their respective owners. From this information, it is possible to monitor the legal criteria, or those considered important for a given consumer market, and confirm whether or not they were met throughout the production chain. In Brazil there are two traceability systems in operation, tracking by batches and individual identification, and both use official documents and/or systems managed and maintained by state government and/or federal government entities and agencies.

3 The PRODES project provides satellite monitoring of deforestation by clearcutting in the Brazilian Amazon and has been producing the annual deforestation rates in the region since 1988.

4 The Real-Time Deforestation Detection System (DETER) is a rapid alert survey of evidence of forest cover change in the Amazon, conducted since May 2004. It was developed as an alert system to support the supervision and control of illegal deforestation and forest degradation by IBAMA.

5 The Mapbiomas project began in 2015. Since then it has been producing annual land cover and land use mapping and monitoring water surface and fire traces on a monthly basis, with data starting in 1985.

Table 1 – Documents and/or systems available for monitoring and tracking cattle production in the Amazon, their responsible parties, and characteristics.

Document or System	Issuer or Responsible Party	Information
Animal Transport Guide (GTA)	State health surveillance agencies	The GTA is the official and mandatory document for animal transportation in Brazil. It contains information about origin, destination and sanitary conditions, as well as the reason the animal is being transported. Some states already issue the GTAe (electronic GTA) through their websites and applications, which facilitates the crossing of data.
Rural Environmental Registry (CAR)	Brazilian Forest Service (SFB) and/or State Environmental Secretariats.	CAR is a nationwide electronic public registry that is mandatory for all rural properties. Its purpose is to integrate environmental information from rural properties and possessions regarding the status of Permanent Preservation Areas (APP), Legal Reserve areas, forests and native vegetation remnants, Restricted Use Areas and consolidated areas. Theses make up the database for control, monitoring, environmental and economic planning and for combating deforestation.
National Rural Property Registry (CNIR)	Federal Revenue of Brazil	The CNIR comprises a structural database on rural properties to be shared with public institutions and civil society entities that use it to inform their work processes under the most diverse thematic aspects, such as land, tax, environmental, labor, registry, business traffic control, production and other items that may be added.

4.1. Batch Tracking

Tracking by batches is currently the mechanism most widely employed by slaughterhouses and geomonitoring companies in Brazil. Its wide use is due to its low cost and ease of application because it is based on crossing information present in existing documents and mandatory emissions or records in order to learn the chain of custody for production and the conditions of the properties where the cattle have passed.

The Animal Transport Guide (GTA) must be issued for each movement of animals between ranches and from ranches to slaughterhouses. Thus, by having access to the GTA for each movement it is possible to identify from the slaughterhouse to the farm of origin of the cattle. In turn, the Rural Environmental Registry (CAR) is a strategic database for controlling, monitoring and combating deforestation in forests and other forms of native vegetation, in addition to being a tool for environmental and economic planning of properties (CNMP, 2020).

Cross-referencing the GTA and CAR information from each of the properties through which the cattle passed makes it possible to know if those animals slaughtered at the meatpacking plants were produced in areas that comply with Forest Code norms, while also accessing information about the cattle's health history. Although this is the most widely used system for socio-environmental monitoring of the properties of direct

suppliers, there are political and technical limitations to its application in the case of indirect suppliers, as explained below.

Slaughterhouses only have access to the GTA issued by their direct supplier. To identify the indirect properties, it would be necessary to have access to the GTAs of all transactions prior to slaughter. Although tools capable of collecting this information already exist in official government databases, the level of transparency of this data is generally low and varies from state to state. In addition, databases such as the GTA and CAR are generally not officially linked, because they are managed by different state agencies, which makes it difficult to cross-reference information between them. Faced with this obstacle, some tool producers and slaughterhouses have invested in partnerships with their direct suppliers so that they begin to voluntarily provide data from their suppliers to make it possible to verify these properties. However, this is a more complex and time-consuming strategy.

Furthermore, there are also technical challenges because it is a system of deliveries (batches). The farther the transaction is from the direct supplier and the more links there are in this production chain, the higher the level of uncertainty due to the mixing of batches in each transaction. In other words, from the first level indirect suppliers on it becomes increasingly difficult to establish correlations between animals and properties. In addition, it is worth noting that as with all declaratory documents the GTA is subject to forgery and errors when filling out the forms.

Although there are still limitations that need to be overcome in order for batch traceability to be effective in mitigating deforestation associated with cattle farming, it has been accepted as a first step towards tracking and monitoring the Brazilian beef production chain, and its results have been positive.

According to the survey conducted by the Working Group on Indirect Suppliers (GTFI)[6], the batch tracing systems that are based on using official documents and/or voluntary adherence by cattle ranchers are as follows:

a. Conecta
Promoter: SafeTrace
Transparency and information integration platform.
Users: cattle ranchers and slaughterhouses.

6 More information about these and other systems can be found at: <www.gtfi.org.br>.

b. Visipec
Promoter: NWF (National Wildlife Federation)
Traceability and monitoring tool that complements the systems used by slaughterhouses.
Users: slaughterhouses

c. SMGeo
Promoter: Niceplanet Geomonitoring
Batch or individual herd management platform with social and environmental analyses of the suppliers.
Users: Ranchers

d. Green Seal
Promoter: Government of the State of Pará
Government transparency platform created to support due diligence activities by the private sector, as well as the environmental regularization policy.
Users: all those interested in the livestock sector and in implementing the Brazilian Forest Code.

The Green Seal is a tool created by a state of Pará public policy that aims to support the monitoring and evaluation of sustainable agricultural development policies and the fight against illegal deforestation. Since it has direct access to the state government databases, it can be used as an information base to support other monitoring systems, as is the case of Conecta and SMGeo, which already use it in their analyses.

4.2. Individual identification and SISBOV

Currently In Brazil the only fully operational individual cattle traceability mechanism is the System for Identification and Certification of Cattle and Buffalo (**SISBOV**). The tool was created by the Ministry of Agriculture, Livestock and Supply (MAPA) for the purpose of sanitary control, with the main objective of enabling the export of beef and buffalo meat to countries that require individual animal traceability, such as those that are part of the European Union. Although it is considered the official system, adherence by cattle ranchers is voluntary and available only to producers registered in the Agricultural Management Platform (PGA), controlled by the Agricultural Defense Secretariat - SDA / MAPA.

The system is governed by a set of norms regulated by Normative Instruction (IN) - 51 of 10/01/2018, including the one used to support the official Brazilian certification for countries that require individual traceability of cattle. It is worth noting that this standard will remain in force until there is the homologation and implementation of private protocols of voluntary adherence that meet the requirements imposed by the European Union.

As determined by IN - 51/2018, cattle must be identified on the farm of origin up to age 10 months, or before its first movement, and is done by placing SISBOV standard ear tags, containing individual numbering (SISBOV number composed of 15 numerical digits), SISBOV number barcode and management number. Some herd management tools can be added to this identification, provided they do not alter the established identification standard. This is done by incorporating electronic devices (chips) that connect to specific software for this purpose.

After placing the ear tag, the individual numbering is then entered into the National Database (BND), an official system developed and maintained by MAPA that gathers information necessary for operationalizing the system, which is provided by rural producers, certifiers, registered slaughterhouses, the Confederation of Agriculture and Livestock of Brazil (CNA) and environmental agencies linked to the Unified Agricultural Health Care System and protected by confidentiality (SDA, [n.d.].).

To become certified, properties undergo official qualification and monitoring audits conducted by the Official Veterinary Service, under MAPA's responsibility, and by certifiers approved and certified by SDA. Records of official audits are kept in files in the Electronic Information System (SEI), while records of audits conducted by certifiers are filed in summary form for a minimum period of five years in the BND (SDA, [n.d.]).

Twenty years after it was created, SISBOV has a very low rate of adherence; only about 1400 enterprises are currently registered in this system (FROEHLICH, STABILE, SOUZA, 2022). Among the causes is the low acceptance by cattle ranchers due to the lack of dialogue with these actors since its creation in 2002, their perception of SISBOV as an expensive, bureaucratic and complex mechanism, and especially the low bonus (R$ 2.00 per arroba, a unit for measuring beef, corresponding to 15 kg), which would be equivalent to the amounts invested for certification (FROEHLICH, STABILE, SOUZA, 2022).

Although IN - 51/2018 determines that the placing of ear tags to identify cattle must be done up until they are 10 months old, or before the animal's first movement, a weakness noted in this system is that this requirement is currently being made only 90 days before slaughter or transport abroad, which is ineffective in ensuring complete traceability for this chain (FROEHLICH, STABILE, SOUZA, 2022).

Studies on the adoption of SISBOV indicated that it was better accepted among properties that already adopt an intensive cattle production system and explore the complementarity between sanitary and management objectives, indicating that adoption by small and medium cattle ranchers and those who dedicate themselves to the breeding and rearing stages needs a strategy focused on these audiences. Moreover, despite its low adoption, the use of the system is associated with managerial and zootechnical gains (CÓCARO; JESUS, 2007).

5. Legal Framework for of Animal Traceability in Brazil

Since 2009, Brazil has had a legal framework that defines and directs the application of traceability in the beef and buffalo meat production chain. Law 12.097 signed on November 24 of that year defines traceability as the ability to ensure the registration and monitoring of information relating to the stages of the chain, allowing an animal or group of animals to be followed during all its stages of life, as well as to follow the respective product through all stages of production, transport, processing and distribution.

With the main objective of ensuring the health security of the Brazilian herd, the law defines the **mandatory** instruments for production chain traceability, which are: a fire brand, which allows the identification of the owner establishment; GTA, invoice, official registers of the animal inspection service at the federal, state and municipal levels; and animal and product registers made in the private sector by the economic agents of industrial transformation and distribution. The law also allows for traceability systems to be instituted on a voluntary basis that adopt additional instruments.

Decree 7.623, of November 22, 2011, which regulates law 12.097, establishes that the Confederation of Agriculture and Livestock of Brazil - CNA is responsible for managing voluntary adherence protocols. The voluntary adherence traceability systems may be used in the Brazilian official certification (export) provided their protocols are evaluated and approved by the Ministry of Agriculture, Livestock and Supply (MAPA) and meet the minimum requirements established by the Decree, such as ensuring collective or individual cattle identification.

In order to improve the quality and access to information for the entire agricultural sector, through Normative Instruction 23/2015, MAPA established the Agricultural Management Platform - PGA, a public and computerized system composed of a single database (BDU) and information management modules of interest to the agricultural protection and Brazilian agribusiness. It includes transport and animal traceability and inspection and surveillance of products of animal origin. The PGA interconnects the different links in the production chain and allows direct access to producers and rural

establishments and other members of agribusiness, in addition to providing information reports of public interest.

Within the traceability module the PGA houses the Central Cattle Identification Database, established by MAPA Normative Instruction 5/2018, whose goal is to provide and control the distribution of official cattle identification codes for public or private agencies and entities throughout the national territory. Adherence to the database is optional for producers who wish to have their animals individually identified according to international requirements.

As previously mentioned, Brazil has an **official** individual identification system for cattle and buffaloes (SISBOV), created by MAPA in 2002. Normative instructions 01/2002 and 17/2006, which respectively provided for its creation and rules were revoked and currently IN 51/2018 is in force. Adherence to SISBOV is **voluntary** for rural producers, but compulsory for trading with countries that require this type of traceability, such as European Union member countries.

Based on the existing legislation, we can conclude in Brazil only the collective identification of cattle is currently mandatory (information about the properties) and focuses on the domestic market and sanitary programs. Individual traceability is considered an additional instrument and depends on voluntary adherence to the traceability systems. That means that at present it is a requirement demanded only in specific cases, as mentioned before.

The extensive cattle raising system, as done in the Amazon and in a large part of the rest of Brazil has received attention from some sectors in the federal government, so much so that the Preliminary Diagnosis Report, prepared by the transition government team at the Ministry of Environment (MMA), points out that the MMA itself should develop a system to control the origin of livestock animals that, by cross-referencing documents and systems that already exist today, this system could indicate where the cattle are being raised and the environmental conditions of the properties.

Deforestation and environmental degradation were a constant theme in the campaign of the current president of Brazil, who, on his first day in office, signed 10 presidential decrees, 5 of them related to environmental issues. One example is the decree that resumes the National Plan for Prevention and Control of Deforestation in the Amazon, the PPCDAm. Among its actions, it highlights monitoring of the agriculture and cattle-raising production chains, which will receive significant attention from the government.

As will be shown in the following sections, the transparency of information generated by public agencies is essential for ensuring feasibility in cattle traceability. Fortunately, Brazil already has laws and policies that ensure the fundamental right of access to information. Federal Law No. 12,527 of November 18, 2011, also known as the Access to Information Law (LAI), establishes that transparency should be the general rule and secrecy the exception, and that public agencies and entities must disclose information of public interest in an easily accessible place, regardless of requests. The Open Data Policy of the Federal Executive Branch, instituted by Decree No. 8777 of May 11, 2016, seeks, among other objectives, to promote the publication of data contained in databases of federal public agencies and entities in an open data format.

6. The solution through document integration and the EUDR

As seen previously, one of the biggest obstacles to the implementation of traceability on a large scale is the low transparency of the official data that allows the identification of the cattle's routes and the social and environmental situation of the properties through which they have passed. Furthermore, the data is dispersed among different bases that do not necessarily communicate with each other, which makes cross-referencing the information difficult.

The solution to overcome this challenge should involve the establishment of a single database that gathers, organizes and makes available to all the actors of the chain interested in the documents and data related to the movement and location of animals during all their life stages, from birth to sale to the slaughterhouse, as well as information on individual identification of the animals, when applicable. Information security technologies must also be employed to allow the proper treatment of personal and commercial data, in order to exclude all those not necessary for the exclusive purpose of traceability.

A recent study conducted by Coalizão Brasil (2020) pointed out that with the exception of Brazil and the US, the other countries with official traceability systems require public data to be open. In addition, most have a centralized database. Traceability systems are totally or partially computerized and their management can be public or public-private. In the case of public-private partnerships, it is usually the public sector that is in charge of the regulations and guidelines, while private entities perform the system implementation and operation.

Having overcome the challenge of access to data, it is necessary to establish guidelines to regulate the production of cattle free of deforestation and other socio-environmental irregularities, which could be done, for example, through developing a normative instruction containing principles, rules and practices that must be observed in the regulated cattle production in Brazil.

The centralized database and guidelines for producing deforestation-free cattle would create the conditions for establishing a national beef traceability system, based on tools

that allow tracking of the entire production chain, including indirect suppliers. Until it is possible to implement individual traceability with 100% of the Brazilian herd, the different traceability approaches, batch and individual, could be used in a complementary way.

At a first stage, traceability by batch could be accepted for sale of deforestation-free beef and leather in the domestic market, as already happens under the Beef TAC, the main agreement for control of illegal deforestation in the supply chain. With large-scale feasibility of individual identification in the medium and long term, traceability by batch could gradually be replaced or restricted to biomes and regions less critical for conservation, as previously suggested by several initiatives and authors.

As a way to meet demands from specific markets, the national beef traceability system should also cover the voluntary adherence protocols managed by CNA, which should go through independent verification systems to obtain seals and certificates. It is in this context that individual traceability should be implemented with a greater sense of urgency.

In April 2023, the new EU Deforestation Regulation (EUDR) was approved, which will come into full operation in October 2025, 18 months after its approval. According to its text, everything indicates that only individual identification would present a solution with reliable results for meeting this regulation. The US is also about to pass a law similar to the EUDR, called the "Forest Act," which is currently being discussed in congress.

As a way to anticipate what seems to be a global trend and facilitate access to markets such as those in Europe and North America, individual traceability needs to become an indispensable requirement for exporting deforestation-free beef and leather to the overseas markets. However, a short-term adaptation plan would be necessary, since the individual identification performed today for export (SISBOV) does not cover indirect suppliers and the number of accredited ranches is still quite small (FROEHLICH, STABILE, SOUZA, 2022).

During the initial adaptation phase, and during bilateral negotiations between countries, individual traceability could be accepted, as required by SISBOV (application of ear tags ninety days before slaughter or shipment abroad), associated with traceability by batch to reach indirect suppliers. In addition, full cycle ranches (raising, rearing and fattening) could be prioritized at this time.

As we will see in the following chapter, it is important that the creation and establishment of this system be regulated by a national animal traceability policy, which will be responsible for defining the people in charge of managing and operating the system and providing mechanisms for its implementation in a phased and scalable manner. Such a system must consider the opportunities and limitations of each of the currently existing traceability approaches, the particularities of the biomes and regions, and the different market requirements.

7. National Traceability Plan

The complexity inherent to the cattle production chain in a country with such diverse geographic and cultural characteristics as Brazil can lead to the creation of multiple traceability systems that are quite different from each other, which could make it difficult to control the quality of these systems and standardize results. The document from the National Plan to Combat Deforestation in the Amazon (PPCDAm), available for consultation in 2023, points to the fact that there is no national traceability system, which benefits actions by deforesters in both the beef and soy production chains.

In this sense, the most effective option would be to establish a "National Traceability Plan" capable of articulating the different government bodies and instances around a collaborative and coordinated system to enable implementation of animal traceability rapidly and efficiently, and, mainly, without burdening the animal breeder. The Plan would have the role of organizing the responsibilities for the traceability system to operate by distributing functions among municipalities, subnational governments (states), and the federal government, and establishing how these three spheres of government should work together to achieve the same goal. The states could continue with their decentralized systems but would be supported by strong federal coordination and management that allows them to level the playing field.

Another fundamental role of the Plan would be to organize a unified and updated database with key information for animal traceability. Currently, traceability for sanitary purposes is organized between the states and the PGA, a platform managed by MAPA. Each state has its own system for control and issuing the GTA. Some have already managed to migrate to a fully digital format, while others still use paper forms. How to centralize in the PGA is a focus of constant discussion, since there is a gap that varies from 6 months to 1 year between what the states issue and the records in their databases.

The plan should also promote improvements in the sanitary traceability systems that currently exist. The fact that there have been few cases of sanitary crises in recent years, such as foot-and-mouth disease and "mad cow" disease, does not mean that the animal origin identification system does not need improvement. One example of improvement would be to link the CAR to the GTAs issued so that the properties can be identified more easily and quickly, as already happens in state of Pará. This measure could avoid

cases such as the one in the state of Minas Gerais, where there was an occurrence of "mad cow" and the local health defense agency took more than 10 days to identify the origin and place of birth of that particular animal.

Besides the necessary improvements, it is becoming increasingly essential to definitively expand the scope of traceability. Sanitary traceability played a fundamental role in placing products from the Brazilian meat industry on the main world markets. Today, however, some markets are already beginning to demand traceability requirements that are no longer restricted only to the sanitary issue and the last stages of the animal's life, but also the absence of deforestation on all the ranches through which the animal passed. It is thus up to the National Plan to definitively expand the traceability concept, including socioenvironmental as well as sanitary requirements in all the properties involved in the beef production chain, which can be done by establishing guidelines to regulate the nationwide production of cattle free of deforestation and other irregularities, as suggested above.

Briefly, the National Plan would have the following tasks:

1. Articulate the different government bodies and instances and organize the responsibilities around a collaborative and coordinated system to enable the rapid implementation of animal traceability, including preparation of guidelines to regulate the production of deforestation-free cattle and other socio-environmental irregularities.
2. Organize a unified and updated database with key information for cattle traceability.
3. Promote improvements in the current sanitary traceability systems.

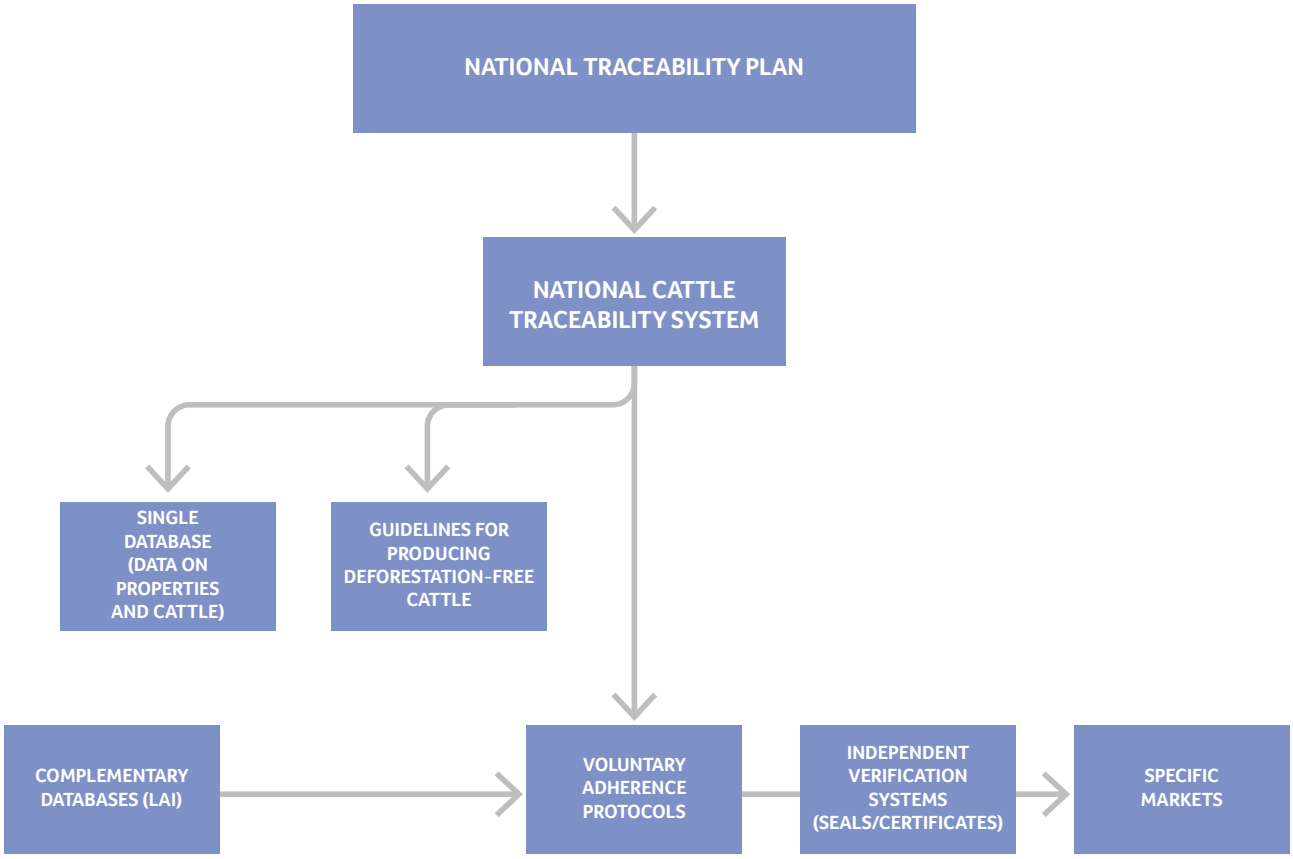
Brazil already has official documents and systems, described in Annex 1, that if integrated and organized by a national plan can deliver satisfactory results for establishing of a National Cattle Traceability system and the guidelines for producing deforestation-free cattle. However, some factors can determine the success of such an integrative initiative and need to be observed, with greater or lesser urgency, in the strategy for implementing the National Plan. They are:

a. Participation of MAPA and state sanitary defense agencies from the beginning of the activities and conception of ideas.
  i. Ensure access to GTAs and implement improvements to the document, such as making it mandatory to insert the CAR number.
  ii. Promote the acceptance and promotion of deforestation-free livestock production guidelines within the PGA (CNA).
b. Engagement with the MPF to explore synergies with the beef TAC.

c. Modernization of the systems operated by IBAMA and State Environmental Agencies for inspection and embargo of properties and establishment of channels to ensure data transparency.
d. Involvement of the Federal Revenue Service of Brazil (RFB) and/or the Ministry of Finance (MF) from the beginning of the Plan's conception to explore the possibilities of using the electronic invoice issuing systems and the national rural property registry (CNIR).
e. Participation of the cattle ranchers in drawing up the Plan and its System, which can be done through their state associations and municipal producer associations.
f. Participation of slaughterhouses and retail chains, and their monitoring service providers, in the drawing up of the Plan and its System.
g. Participation of the governments of the main producing states in drawing up of the Plan, in order to ensure access to documents that are the responsibility of the states.

Specifically regarding participation of cattle ranchers, this will be crucial not only in constructing the plan, but also in defining strategies to encourage the adherence of this public to the National Cattle Traceability system and, therefore, contribute to accelerating its implementation. Some types of incentives that could be considered are technical assistance, support for environmental regularization, bonuses and opportunities to access markets.

Finally, it is important to highlight that the National Cattle Traceability Plan should be developed in a favorable scenario of resumption of the PPCDAm, in which the Brazilian government gives signs that it will adopt a definitive attitude in solving the traceability problem in all links of the production chain, including the "indirect suppliers." Among the actions listed in its action plan, which at the time of writing this report was still open for "public consultation," are actions 5.2.1 and 5.2.2, whose objectives are, respectively, to develop traceability systems for agricultural and ranching products in the Amazon, with the participation of the MMA, MAPA and the Ministry of Science and Technology (MCTI), and integration of databases and official documents such as the CAR, the GTA, the Forest Origin Document (DOF) and tax documents, with participation by the MMA, MAPA and the Ministry of Finance.


NATIONAL TRACEABILITY PLAN
NATIONAL CATTLE TRACEABILITY SYSTEM
SINGLE DATABASE (DATA ON PROPERTIES AND CATTLE)
GUIDELINES FOR PRODUCING DEFORESTATION-FREE CATTLE
COMPLEMENTARY DATABASES (LAI)
VOLUNTARY ADHERENCE PROTOCOLS
INDEPENDENT VERIFICATION SYSTEMS (SEALS/CERTIFICATES)
SPECIFIC MARKETS

8. Recommendations

Implementing a National Traceability Plan and a National Cattle Traceability System can not only modernize the sanitary traceability systems that currently exist, but also position Brazil at the forefront of animal traceability and sustainable beef production, providing conditions for national companies to export beef to foreign markets with a guarantee of origin and free of deforestation.

The main recommendations for the plan and system to be established and implemented quickly and efficiently are presented below, considering that in a brief period of time Brazil will need to be able to respond to international demands for products free of deforestation and other socio-environmental irregularities, in addition to the already usual sanitary requirements.

8.1. For the Brazilian Government

Accelerate the implementation of the data integrator system called for in the PPCDAm action plan.
The data integrator system called for in the PPCDAm action plan should be implemented as soon as possible, with its operation preferably starting at the same time that the government announces the creation of a Working Group to manage it.

Create an inter-ministerial work group to enable the preparation and implementation of the National Traceability Plan.
With respect to the preparation of the chapter dedicated to beef cattle, a subgroup could be created with the same composition as the "Working Group for the Control of Deforestation in the Cattle Production Chain," established by Ordinance 491, of December 29, 2017, in which the main segments of the chain were represented and whose objective was to identify the bottlenecks so that the sector could be more effective in its actions to reduce deforestation.

As a strategy for the beginning of the implementation of the National Traceability Plan, the following should be prioritized: the cattle production chain, the states in which this activity is most relevant, and the Amazon and Cerrado biomes.

Due to its relevance in the context of deforestation and climate change, as soon as the Plan comes into effect the beef cattle production chain should receive priority attention. Moreover, considering that the challenge of implementing any plan at a national level is proportional to the extension of the territory of the country in which it is to be implemented, in the case of Brazil it is recommended that its territory should be divided into priority service zones, according to the importance of beef cattle raising in the producing states. As the biomes most threatened by new deforestation and conversion of natural areas the Amazon and Cerrado biomes should be the focus of the first actions.

The National Traceability Plan should contemplate the following stages:
i. Establishment of a unified database that is updated and accessible to all stakeholders in the supply chain, containing the main health and environmental data necessary to make animal traceability feasible.

The reduction of new deforestation and the environmental suitability of rural properties necessarily requires data transparency. The productive sector, industry, retailers, and inspection agencies will only be able to fulfill their role in fighting deforestation in production chains if the main information and databases that allow for their identification and monitoring are gathered into a single online environment, accessible from a friendly graphic interface. In addition, it is extremely important that modules are made available for access by the general public and stakeholders of the production chains, in order to enable the exercise of social control. In any of the above situations, the General Law for Protection of Personal Data (LGPD) must be observed and due care must be taken not to expose commercial date. Technologies for this purpose are already available.

To ensure that interested audiences are able to use the databases effectively, it is recommended that some criteria commonly used in "open government" agendas be followed. From the report "Open data in climate, forest, and agriculture: an analysis of the openness of federal databases (2017-2020)," published by Imaflora in 2020, it is possible to conclude that in order to offer a satisfactory degree of transparency a database must, at a minimum: be available online; come accompanied by metadata that facilitates its understanding; be updated frequently; be as complete as possible, with data presented in a disaggregated way; be understandable by machines to enable automated processing; present non-proprietary formats (for free and open source software); allow the data to be downloaded at once; and be free of charge. In addition to these requirements, for the modules open to the general public, the databases should ideally be accessible without the need for registration or any access requirement and have an open license that allows their reuse.

ii. Establishment of guidelines to regulate the domestic production of cattle free of deforestation and other socioenvironmental irregularities.
Subsequently, the guidelines established by the plan may serve as a basis for the preparation of legal regulations in the form of normative instructions, for example, containing the principles, rules and practices for the regulated production of cattle in Brazil, and whose compliance must be monitored by the appropriate government agencies.

iii. Modernization of the sanitary traceability systems, e.g., making it compulsory to insert the CAR number in the GTA and, in the future, the animal's individual identification number.
If it is not possible to use the GTA, it is recommended that a new, modern document be created, which would start off already integrated into an environmental, land and fiscal data management environment.

iv. Creation of the National Cattle Traceability System focused on sanitary and socio-environmental attributes.
The plan should define those parties responsible for managing and operating the system and provide the mechanisms for its implementation in a phased and scalable manner, with a view to establishing a robust, dependable, and, most importantly, monitorable system.

v. As a strategy for accelerating implementation of the National Traceability Plan, incentives should be provided for producers to sign on to it.
It may be difficult for individual identification to become widely accepted as a traceability tool in its own right, but if it comes to be seen as a cost-effective tool for the business, with the potential for improving farm management and increasing earnings through sustainable livestock intensification techniques, ranchers may begin to view it more positively.

8.2. For Subnational Governments

As participants of the system that supplies information to the Agricultural Management Platform (PGA) and is responsible for managing animal health in their territories, subnational governments should invest in modernizing the processes for issuing and controlling GTAs, by installing procedures to verify the ability of properties to receive, generate and maintain cattle. That will enable them to avoid the conditions that can serve to circumvent the system and allow properties to be used as "generators" of documents, weakening the health defense of the states. The existence of the GTA alone does not guarantee that these agencies can track cattle and their origins.

Some states with better equipped sanitary defense agencies could consider developing their own individual identification systems with their cattle breeders and/or producer associations, if the National Plan allows it. This would be a way to speed up implementation of individual traceability in Brazil, while offering better assistance to breeders in meeting the guidelines established by the national government and accessing voluntary adherence protocols.

8.3. For Foreign Governments

There is an assumed rule among some governments of the purchasing countries (mainly from the European Union), that under the new deforestation-free products purchasing policy the only acceptable tool for beef traceability is to individually identify the animal. However, in some cases and areas, control by "batches" with the application of land use analysis systems can confirm that such beef was produced in landscapes free of deforestation.

The EUDR is very recent and one should not try to change its rules before they are even applied, but a working group could already be set up so that other guarantee systems can be better understood and, explored in the future. That would be an important measure for those countries that may not be able to meet the regulations as they are now but can also contribute to the reduction of LULUCF emissions.

This working group could also provide input for regulations that may be instituted in the future by other countries, such as China. At this point, Brazil could more easily implement individual traceability in premium markets, which give preference to quality over quantity. For markets such as China, which demand large volumes, it would be necessary, at least at as initial stage, to accept other systems of guarantee of origin, in order to avoid a major crisis in the sector.

8.4. For the Meatpackers

Beef product companies need to find ways to access the GTA and CAR for their indirect suppliers, under the control of the federal and state governments, in order to be able to monitor their supply chains effectively and completely. For this, there will need to be a coordinated movement involving the main representatives of this segment with the common objective of opening a dialogue about access to data with the appropriate agencies.

Final considerations

Implementation of the National Traceability Plan and of a National Cattle Traceability System along the lines proposed in this document can represent a potential revolution in the livestock production chain. It can create favorable conditions for technical assistance agencies to improve their rural extension programs, for governments to improve their sanitary and environmental control systems, and for the pharmaceutical and veterinary industries to program their medicines distribution strategies more effectively. Finally, it can enable producers to begin to manage their herds in a consistent manner and the meat industry to identify their indirect suppliers and suppliers with a track record of providing better quality carcasses.

The development of productive chains in Brazil, such as the livestock and grain supply chains, will not occur only through the search for greater productivity, but mainly by ensuring that production is sustainable and that it successfully addresses new attributes of interest to consumers, such as environmental and social issues. In that regard, the consolidation of a national framework that can ensure the socioenvironmental traceability of the beef production chain is the first step towards opening new markets and consolidating Brazil's position within a new global economic context.

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Appendix 1

Documents and/or systems available for monitoring and tracking cattle production in the Amazon, their responsible parties and characteristics.

Document or System	Sender or Responsible	Information
GTA	State sanitary surveillance agencies	The Animal Transport Guide (GTA) is an official and mandatory document for animal transportation in Brazil. It contains information about the origin and destination and sanitary conditions, as well as the purpose in transporting the animal. Some states already issue the GTAe (electronic GTA) through their websites and applications, which facilitates the crossing of data.
CAR	Brazilian Forest Service (SFB) and/ or State Environmental Secretariats.	The Rural Environmental Registry (CAR) is a nationwide electronic public registry, mandatory for all rural properties. Its purpose is to integrate environmental information from rural properties and possessions regarding the status of Permanent Preservation Areas (APP), Legal Reserve areas, forests and native vegetation remnants, Restricted Use Areas and consolidated areas. These will make up the database for control, monitoring, environmental and economic planning and combating deforestation.
CNIR	Federal Revenue of Brazil	The National Rural Property Registry (CNIR) comprises a structural database on rural properties to be shared with public institutions and civil society entities that produce and consume cadastral information. It will be used to inform their work processes under the most diverse thematic aspects, such as land, fiscal, environmental, labor, registry, business traffic control, production and others that may be added.
Embargoed Areas	IBAMA	A public list, available on the internet, of areas under some type of embargo due to crimes against the environment. It is maintained and updated by the Brazilian Institute for the Environment and Natural Resources (IBAMA).
Federal Conservation Units	ICMBio	On the website of the Chico Mendes Institute for Biodiversity Conservation (ICMBio) one can find the list of federal conservation units and their boundaries.
State Conservation Units	Environmental Secretariats	The state secretariats provide information about the state conservation units under their administration.
CNUC	MMA	The Ministry of the Environment (MMA) maintains the National Registry of Conservation Units (CNUC) with consolidated information on the units managed by IBAMA and by the States and Municipalities.
Indigenous Lands	FUNAI	The National Foundation for Indigenous Peoples (FUNAI) provides information about the existing Indigenous Lands and those in the process of being created / approved.
PRODES	INPE	The PRODES project, operated by the National Institute for Space Research (INPE), provides satellite monitoring of deforestation by clearcutting in the Brazilian Amazon and has been providing the annual deforestation rates in the region since 1988.
DETER	INPE	The Real-Time Deforestation Detection System (DETER) is a rapid alert survey of evidence of alteration of the forest cover in the Amazon, conducted by INPE since May 2004. It was developed as an alert system to support the inspection and control of illegal deforestation and forest degradation by IBAMA.
Burned areas	INPE	The Burn Program has the objective of monitoring the occurrence of fires and hotspots in the Amazon. It provides maps of fire risk alerts, hotspots, and burned areas.
Slave Labor	MTE	Public list, maintained and updated by the Ministry of Labor and Employment (MTE), with the companies and employers that have submitted employees to conditions analogous to slavery.
State Public Prosecutor's Office Notices	MEP	The State Public Prosecutors' Offices (MPEs) make information available on their websites about their activities in general, which can be related to socio-environmental issues.

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