



**RADAR
VERDE**

BEEF TRANSPARENCY IN THE BRAZILIAN AMAZON

M E T H O D O L O G Y

2023



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1. THE PROBLEM

Deforestation is a systemic threat to the Brazilian economy, as it reduces rainfall, which is vital for agribusiness, energy generation, industrial supply and homes. In addition, deforestation leads to the loss of markets, the withdrawal of investment by some companies as well as the reduction of investments in the country.

Currently, the Brazilian Amazon's pastures for cattle cover about 90% of the total deforested area, and more than 90% of deforestation is illegal. Therefore, cattle ranching plays an important role in fighting against deforestation in the region⁽¹⁾.

At this stage, it is worth mentioning that companies that still do not adopt control measures or invest resources in environmental preservation end up competing unfairly with those that have such concerns. For this reason, it is important that the end consumer has access to this information.

However, currently the consumer is not aware of the effectiveness of policies and private commitments adopted by the companies that are part of the livestock value chain. For this reason, which companies have policies to fight against deforestation? What is the degree of implementation of these policies? Are the results of these policies verifiable?

Radar Verde aims to answer these concerns and provide consumers with information that guides their purchase decision, thus encouraging the production chain to implement increasingly effective measures to fight against deforestation in the Brazilian Amazon. Radar Verde is an initiative of the "O Mundo Que Queremos" Institute and "O Homem e Meio Ambiente da Amazônia" Institute (Imazon).



(1) BARRETO, Paulo. Políticas para desenvolver a pecuária na Amazônia sem desmatamento. Iniciativa Amazônia 2030. Aug. 2021

2. WHAT IS THE RADAR VERDE?

Radar Verde aims to give visibility to companies committed to reducing deforestation in the Brazilian Amazon. Radar Verde indicates, once a year, the performance of policies against deforestation of two key links in the chain that connect beef consumers to livestock farms: slaughterhouses, which buy and slaughter cattle, and supermarkets/retailers, which sell the beef to end consumers. Radar Verde has developed indicators that aim to demonstrate the existence, effectiveness and transparency of corporate policies against deforestation. The indicators, sources of information and measurement are summarized in Table 1 (slaughterhouses) and Table 2 (supermarkets).

Radar Verde's results are widely disseminated in a report on the project's online platform, through the press, social media and events. Therefore, Radar Verde provides an independent source of information for the several concerned parties interested in reducing deforestation associated with cattle ranching, including consumers, investors, beef processors and retailers, and cattle producers. The result offers the opportunity for choices that value companies with better performance. Then, we will present the Radar Verde's universe of research and the methodologies and means of presenting the results.

Table 1. Indicators and Radar Verde's methods of verification for the slaughterhouse industry

INDICATORS	METHODS OF VERIFICATION AND DATA SOURCES
<p>Level of Exposure of Slaughterhouses to deforestation in their respective potential cattle purchase zones (hectares). The indicator demonstrates the extent of the area at risk of deforestation in cattle supply zones</p>	<p>Assessment of the sum of hectares at risk of deforestation estimated in the potential area for the purchase of cattle by the company. The indicator includes:</p> <ul style="list-style-type: none"> ■ Deforested area between 2008 and 2021, revealed by the Project for Monitoring Deforestation in the Brazilian Amazon by Satellite ("Prodes"); ■ Areas embargoed by "Ibama" for illegal deforestation up to September 2021; ■ Area under risk of deforestation between 2023 and 2025 , estimated by "O Homem e o Meio Ambiente da Amazônia" Institute (Imazon). <p>The method of estimating the level of exposure of slaughterhouses to the risks of deforestation is in Appendix 1.</p>

INDICATORS

METHODS OF VERIFICATION AND DATA SOURCES

Level of Chain Control:

It considers the features of policies against deforestation and performance indicators. Companies with a high level of chain control do not buy and demonstrate through documents issued by an external audit, and also do not make transactions with farms associated with deforestation, either directly or indirectly. Score from 0 to 100

Assessment of responses to the **Radar Verde’s questionnaire**, which considers the features of policies and indicators of their effective implementation, verified through external audits hired by the assessed companies

Level of Public Transparency of Chain Control.

It measures the availability of public information on policies against deforestation and performance indicators. Score from 0 to 100

Data collection from public data platforms of the assessed companies (websites) regarding the Level of Chain Control, considering the information collected by the Radar Verde’s questionnaire (exposed in the item above)

Table 2. Indicators and Radar Verde’s methods of verification for retailers

INDICATORS

METHODS OF VERIFICATION AND DATA SOURCES

Level of Chain Control: It considers the features of policies against deforestation and performance indicators. Companies with a high level of chain control do not buy and demonstrate through documents issued by an external audit, and also do not make transactions with slaughterhouses without an effective level of chain control. Score from 0 to 100

Assessment of responses to the **Radar Verde’s questionnaire**, which considers the features of policies and indicators of their effective implementation, verified through external audits hired by the assessed companies

Level of Public Transparency of Chain Control.

It measures the availability of public information on policies against deforestation and performance indicators. Score from 0 to 100

Data collection from public data platforms of the assessed companies (websites) regarding the Level of Chain Control, considering the information collected by the Radar Verde’s questionnaire (above)

2.1. ASSESSMENT OF THE LEVEL OF CHAIN CONTROL

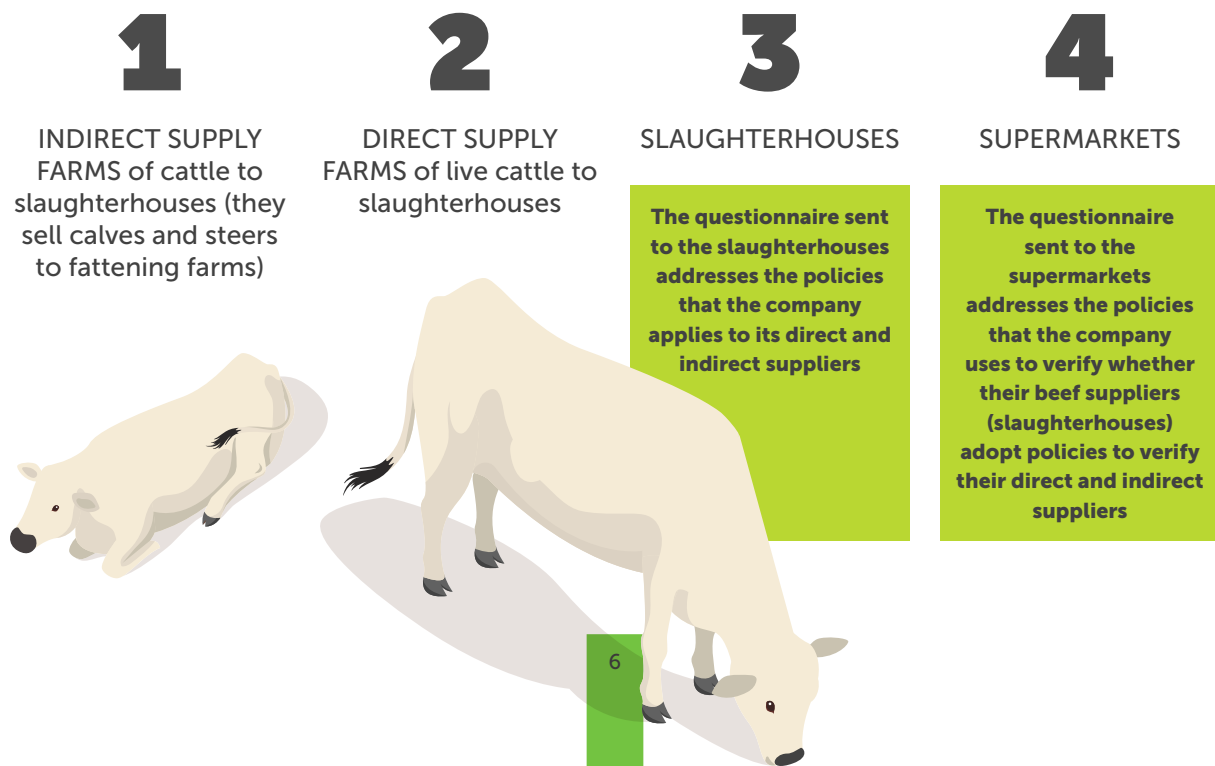
Radar Verde evaluates the level of chain control on deforestation through questionnaires sent to slaughterhouses and supermarkets.

The questionnaire sent to the slaughterhouses addresses the policies that the company applies to verify its direct and indirect cattle suppliers. **Direct suppliers are those that sell cattle directly to slaughterhouses.** Company policies to ensure compliance with socioenvironmental legislation are usually limited to direct cattle suppliers. **Indirect suppliers are farms that do not sell cattle directly to slaughterhouses, that is, they do not sell cattle for slaughter.** These farms are part of other stages of the animal's life cycle. From birth to slaughter, during its breeding, rearing and fattening phases, the cattle pass through at least three farms.

The questionnaire sent to the supermarkets addresses the policies that the company uses to verify whether their beef suppliers (slaughterhouses) adopt policies for verifying farms, both direct and indirect cattle suppliers.

In both cases, the questionnaires seek for evidence of a policy against deforestation and its performance. Questionnaire components and scoring are in Appendices 1 (slaughterhouses) and 2 (supermarkets).

Image 1. Slaughterhouses and supermarkets will be invited to answer a questionnaire on the level of control of the beef production chain, starting from cattle farms (both direct and indirect suppliers)



3. WHO IS INVITED TO TAKE PART IN THE RADAR VERDE?

Radar Verde aims to reach a significant representation of two key links in the beef production chain, inviting slaughterhouses with facilities in the Brazilian Amazon and supermarkets that are potential buyers of beef to take part in the survey (Table 3). Should the company not operate in the Brazilian Amazon and has been contacted by the Radar Verde team, it can provide further clarifications through the email contato@radarverde.org.br.

Table 3. Group of companies subject to Radar Verde assessment in every beef production chain link

CHAIN LINK	OBJECT OF ANALYSIS	INFORMATION SOURCES ON THE CHAIN LINKS AND REPRESENTATION OF SLAUGHTERHOUSES
SLAUGHTERHOUSES	133 slaughterhouses located in the Brazilian Amazon by December 2022	Data collected by the “O Homem e o Meio Ambiente da Amazônia” Institute (Imazon) from federal inspection systems (SIFs) ⁽²⁾ and state inspection systems (SIEs) ⁽³⁾ . According to the Brazilian Institute of Geography and Statistics (“IBGE”), these companies corresponded to approximately 96% of slaughter in the Brazilian Amazon in 2022 ⁽⁴⁾
SUPERMARKETS	69 largest retailers in terms of revenues, including the 50 largest nationwide and the 19 largest in the nine states of the Brazilian Amazon ⁽⁵⁾	Data collected by “O Mundo Que Queremos” Institute, based on the 2022 revenue ranking of the Brazilian’s Supermarkets Association (Abrás) ⁽⁶⁾

(2) Ministry of Agriculture, Livestock and Supply (*Ministério da Agricultura, Pecuária e Abastecimento* - MAPA)

(3) Registration data in the Brazilian System of Inspection of Products of Animal Origin (*Sistema Brasileiro de Inspeção de Produtos de Origem Animal* - Sisbi-POA) of state agencies for agricultural defense

(4) Quarterly Animal Slaughter Survey, Table 1092, available through the link: <https://sidra.ibge.gov.br/tabela/1092>

(5) We considered up to three of the largest regional groups in each Amazonian state, excluding those that were already included in the top 50 nationwide. We found eight regional companies on the top 50 regional list. Therefore, we included 19 of the largest companies in addition to those that were already on the list of the largest nationwide

(6) Ranking Abrás 2022, May 2022, Year 48, no. 547











4. PRESENTATION OF RESULTS

4.1. SLAUGHTERHOUSES

Radar Verde results of **each slaughterhouse** will be presented in a list with four columns (Image 2):

1. Company name in alphabetical order.
2. Level of exposure to the risk of deforestation (hectares). In case of companies with several slaughterhouse facilities in the region, the level will be the sum of the areas at risk of deforestation.
3. Score categories of the level of chain control of companies that replied to Radar Verde and the situation of non-participants, which will be classified as: **did not answer the questionnaire or did not authorize the disclosure of its result**.
4. Level of transparency of chain control.






Image 2. Radar Verde's presentation of results format for slaughterhouses

COMPANY NAME	LEVEL OF EXPOSURE OF SLAUGHTERHOUSES TO DEFORESTATION IN THEIR RESPECTIVE POTENTIAL CATTLE PURCHASE ZONES (HECTARES)	LEVEL OF CONTROL OF THE BEEF PRODUCTION CHAIN	LEVEL OF PUBLIC TRANSPARENCY OF CHAIN CONTROL
COMPANY A	9,000		
COMPANY B	200		
COMPANY C	9,000,000		
COMPANY D	1,200		
COMPANY E	50,000		

LEGEND OF RESULTS CATEGORIES IN REGARDS TO THE LEVEL OF CHAIN CONTROL OR PARTICIPATION IN THE RADAR VERDE

>90		Policy effectiveness would be very high
70-89		Policy effectiveness would be high
50-69		Policy effectiveness would be intermediate
30-49		Policy effectiveness would be low
0-29		Policy effectiveness would be very low
		Did not authorize the disclosure of its results
		Did not reply

LEGEND OF SCORE CATEGORIES IN REGARDS TO THE TRANSPARENCY OF THE LEVEL OF CHAIN CONTROL AVAILABLE ON THE COMPANY'S PUBLIC PLATFORM











>90		Public transparency indicates very high level of control
70-89		Public transparency indicates high level of control
50-69		Public transparency indicates intermediate level of control
30-49		Public transparency indicates low level of control
0-29		Public transparency indicates very low level of control

4.2. RETAIL








The supermarket results will be presented in a list with three columns (Image 3):

1. Company name in alphabetical order.
2. Score categories of the level of chain control of companies that replied to Radar Verde and the situation of non-participants, which will be classified as: **did not answer the questionnaire or did not authorize the disclosure of its result**.
3. Level of transparency of chain control.






Image 3. Radar Verde's presentation of results format for supermarkets

COMPANY NAME	LEVEL OF CONTROL OF THE BEEF PRODUCTION CHAIN	LEVEL OF PUBLIC TRANSPARENCY OF CHAIN CONTROL
COMPANY A		
COMPANY B		
COMPANY C		
COMPANY D		
COMPANY E		

LEGEND OF RESULTS CATEGORIES IN REGARDS TO THE LEVEL OF CHAIN CONTROL OR PARTICIPATION IN THE RADAR VERDE

- >90**  Policy effectiveness would be very high
- 70-89**  Policy effectiveness would be high
- 50-69**  Policy effectiveness would be intermediate
- 30-49**  Policy effectiveness would be low
- 0-29**  Policy effectiveness would be very low
-  Did not authorize the disclosure of its results
-  Did not reply

LEGEND OF SCORE CATEGORIES IN REGARDS TO THE TRANSPARENCY OF THE LEVEL OF CHAIN CONTROL AVAILABLE ON THE COMPANY'S PUBLIC PLATFORM

- >90**  Public transparency indicates very high level of control
- 70-89**  Public transparency indicates high level of control
- 50-69**  Public transparency indicates intermediate level of control
- 30-49**  Public transparency indicates low level of control
- 0-29**  Public transparency indicates very low level of control

PARTICIPATION OF THE COMPANIES

Both slaughterhouses and retailers are mapped and invited to reply voluntarily to questionnaires to demonstrate the level of control of their suppliers, thus avoiding deforestation in the Brazilian Amazon's beef production chain.

Radar Verde contacts companies through emails and/or telephone numbers available on their institutional websites. If there is no contact information available, the companies will be listed as non-respondents. Companies that are invited and do not answer within the deadline will also be considered non-respondents.

Companies that sign the term of consent and reply to the questionnaires within the deadline will receive a report with their performance at the end of the assessment. Companies will have seven (07) consecutive days to assess whether they accept their performance results being published, as a sign of transparency. If they do not answer within the deadline or do not authorize the disclosure of their performance, they will appear in the final list as "The company replied to the questionnaires but did not authorize the disclosure of its result".



The list of companies that operate actively in the Brazilian Amazon, according to the indicated methodology, but did not take part in the survey, will also be disclosed at the end of the survey. Companies that join Radar Verde and do not send answers with evidence or clear descriptions for certain queries will have no score related to that question. Not answering it will also result in a no score at all (zero).

5. EVALUATION STEPS

For a better understanding of the stages of the Radar Verde survey, the schedule of activities is available in Table 2 and the companies' assessment flow in Figure 4.

The adoption and release of external audits by companies will have a relevant score in the policy and performance item. The performance will be measured by the percentage of purchases in compliance with policies, based on external audits. The following table shows the Radar Verde's research process.

Table 4. Radar Verde's assessment steps in 2023

JULY	Questionnaires submission to mapped companies
JULY	Companies reply window period (The deadline will be informed when sending the questionnaires)
30 CONSECUTIVE DAYS AFTER SUBMITTING THE QUESTIONNAIRE AND TERM OF CONSENT	Deadline for questionnaires responses
AUGUST AND SEPTEMBER	Assessment of questionnaires, analysis and organization of collected data
SEPTEMBER	Feedback and considerations for companies involved (Note: only for applicant companies)
OCTOBER	Deadline for the authorization to disclose the results
NOVEMBER	Disclosure of results

Image 4. Steps for collecting and analyzing the level of chain control for slaughterhouses



Note: The Level of Control score and the ranking obtained by the Level of exposure to the risk of deforestation will be obtained and presented independently in the same report. Therefore, the Level of Control score will not impact the Level of Exposure to the Risk of Deforestation, or vice versa.

Image 5. Steps for collection and analyzing the level of chain control for retailers



Note: The Level of Control score and the ranking obtained by the Level of Transparency for retailers will be obtained and presented independently in the same report. Therefore, the Level of Control score will not impact the Level of Transparency, or vice versa.

6. APPENDIX 1. METHODOLOGY APPLIED FOR SLAUGHTERHOUSES

We present below the methodology for the three components of the Radar Verde for slaughterhouses: Level of Exposure to Deforestation, Level of Chain Control and Level of Public Transparency. The Level of Control is obtained from the companies' replies to the Radar Verde questionnaire, which is sent along with the term of consent to take part in the survey. By the time the deadline for sending the questionnaires and evidence comes to a close (30 days), Radar Verde's team assesses and ranks the companies involved.

6.1. LEVEL OF EXPOSURE OF SLAUGHTERHOUSES TO DEFORESTATION

The first step in estimating the level of exposure is to find out the location of each slaughterhouse facility in the Brazilian Amazon and its potential cattle purchase zone, that is, the territory in which the company potentially buys cattle, based on the estimated maximum purchase distance, as described later.

The estimated potential purchase zone for slaughterhouses was obtained through their location in relation to the maximum cattle purchase distance, applying "Cost Distance" (ArcGIS 10.5 Software tool) to calculate all possible paths that the slaughterhouse can travel to obtain the cattle, taking into account the transport routes (official roads – IBGE 2017; unofficial roads – Imazon 2020; navigable rivers – ANA 2018; pasture areas – Lapig 2021).

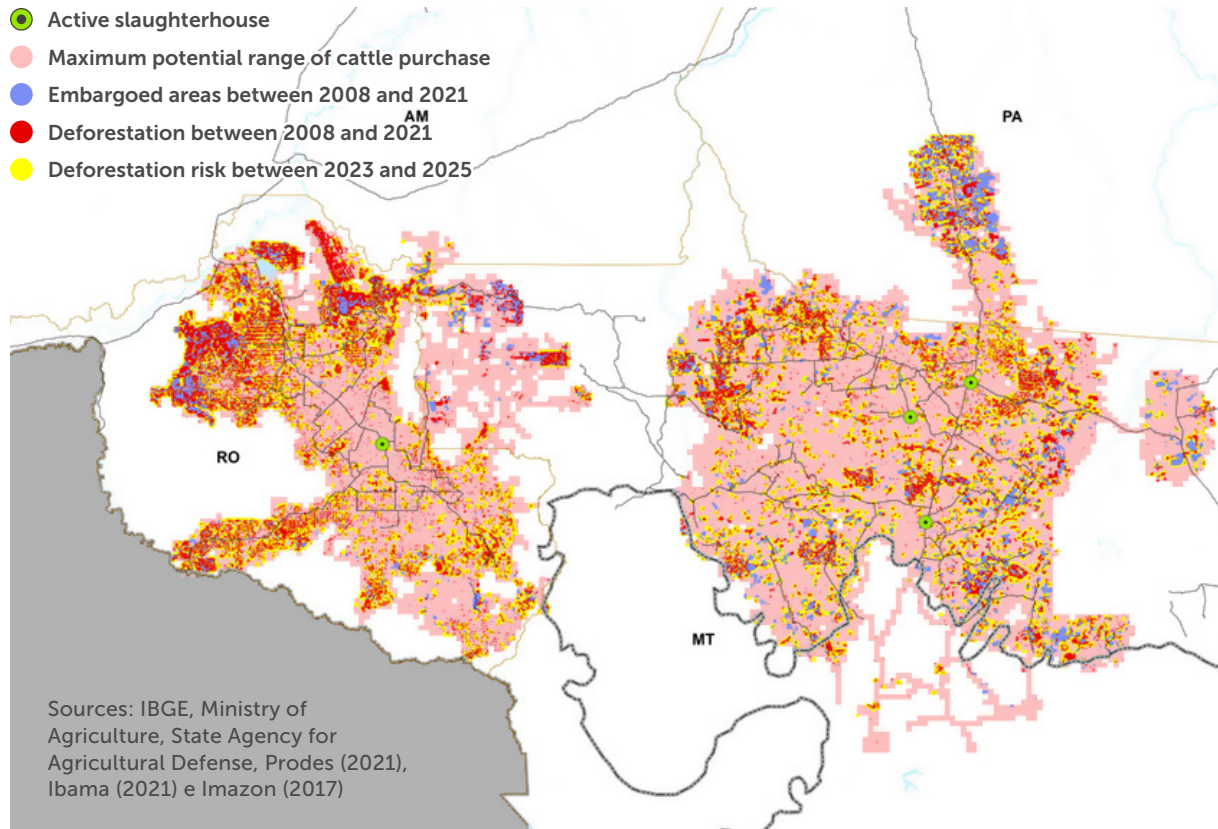
In order to obtain maximum purchase distance data, a sampling of slaughterhouses were contacted by phone by the Imazon team. For the remaining ones, the value was estimated through an average obtained from the three closest slaughterhouses, with known data, or through a state average according to the type of inspection (state or federal) to which they are submitted. Afterwards, Imazon overlaps the estimated purchase zone of each facility to the risk variables (Image 5) to calculate the exposure. The total risk exposure is the sum of hectares in the following areas:

- **Deforested area between 2008 and 2021, disclosed by the Deforestation Monitoring in the Brazilian Amazon by Satellite Project (Monitoramento do Desmatamento da Floresta Amazônica Brasileira por Satélite – "Prodes");**
- **Embargoed areas by Ibama due to illegal deforestation, up to September 2021.**

- Area with potential risk of deforestation between 2023 and 2025, forecasted by Imazon. The estimate of the risk of future deforestation considers the average deforestation rates that occurred between 2013 and 2019. A study carried out by Imazon shows that all slaughterhouse facilities registered in both federal and state inspection systems (SIF and SIE) in the Brazilian Amazon operate in regions at risk. According to Imazon, companies' exposure to risk ranged from 2,000 to 9.7 million hectares in 2022. In the case of companies with more than one slaughterhouse facility, the level of exposure is the sum of the risks contained in all the company's purchasing zones.

It is important to emphasize that both deforested and embargoed areas used for the calculation are already consolidated values of deforestation that help to gather information about the observed areas in order to determine data that provide a simulation/predictability of new deforestation. In other words, knowing the history of deforestation it is possible to plan (or model) what may happen in terms of deforestation in the future.

Image 6. Example of deforestation exposure of slaughterhouses in their potential zone of cattle purchase in Rondônia, Mato Grosso and Pará





6.2. LEVEL OF CHAIN CONTROL FOR SLAUGHTERHOUSES

The score regarding the level of chain control considers the features of policies against deforestation and their performance indicators. Companies with a high level of chain control do not buy cattle from farms associated with deforestation. The description below summarizes the score components, which correspond to the items in Image 4.

1. **The total score for the level of control** is the weighted sum of the assessment on the policy and the applied implementation on the direct and indirect supplier farms. Half of the score will be due to the level of control of direct suppliers and the other half to the control of indirect suppliers. This weighting is based on the fact that about half of the cattle suppliers to slaughterhouses purchase cattle from other farms (indirect suppliers).
2. **The score for the level of control for each chain link** (both direct and indirect ones) will be calculated by the sum of the control policy features and its performance, considering key aspects from each one.

2.1. **The score of control policy features** will be calculated by multiplying the following components:

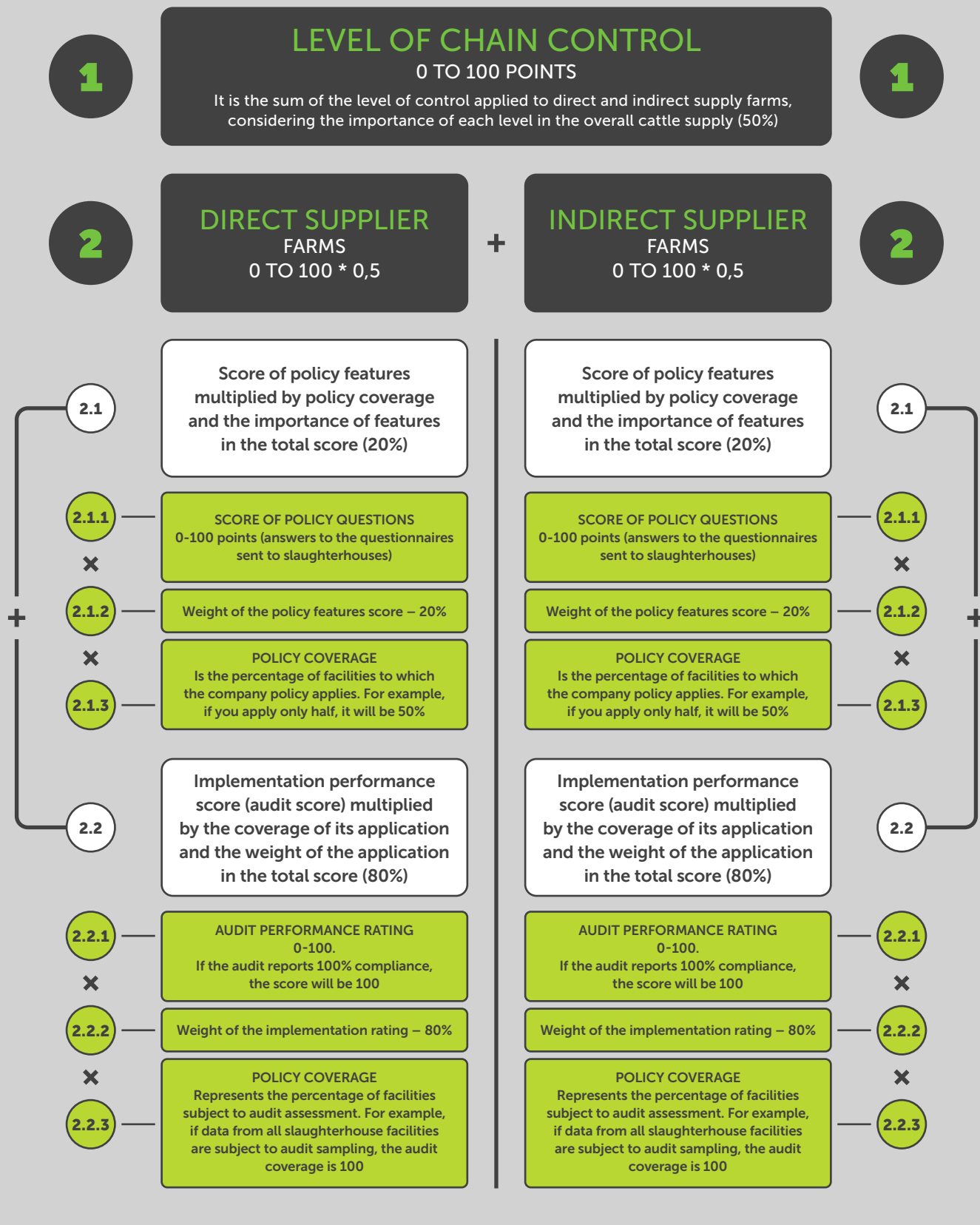
- 2.1.1. **The score of policy features** will be based on the Radar Verde's questionnaire responses.
- 2.1.2. The level of **policy coverage**. It represents the extent of the policy's application in relation to the company's total operations. For example, if a company applies the policy to its four slaughterhouse facilities in the region, the coverage is 100%. If it adopts only two, it will be 50%. This information is obtained through the Radar Verde's questionnaire.
- 2.1.3. **The importance of the policy's features in the whole chain control**. Radar Verde considers that the existence of a powerful control policy is worth 20% of the total value of the control and that the demonstration of its implementation is worth 80%. Therefore, the total value of policy features is multiplied by 20%. This premise is based on the Pareto Principle, or 80-20 rule, which states that roughly 80% of consequences come from 20% of causes⁽⁷⁾.

2.2. The score of chain control implementation results from the multiplication of the following factors:

- 2.2.1. The external audit rating on the policy implementation. For example, if every purchase follows the policy, the score will be 100%.
- 2.2.2. The importance of audit coverage. It represents the percentage of facilities subject to audit assessment. For example, if data from all facilities from a slaughterhouse are subject to audit, the audit coverage is 100%.
- 2.2.3. The importance of policy implementation in the whole level of chain control. Radar Verde considers that the performance of the policy implementation is worth 80% of the total value of the level of control. For this reason, the policy performance value is multiplied by 80%, as explained in item 2.1.3.

(7) https://pt.wikipedia.org/wiki/Princ%C3%ADpio_de_Pareto

Image 7. Calculation aspects of the level of chain control



6.3. QUESTIONNAIRE ON THE LEVEL OF CHAIN CONTROL FOR SLAUGHTERHOUSES

The questionnaire for verifying the Level of Chain Control is divided into two large blocks: one on the policy features and another on its implementation performance.

Slaughterhouses are asked about the application of these policies to direct and indirect supplier farms.

1. The questionnaire on the chain control features includes questions about what the company requires from its suppliers aiming at:

- **Ensuring that cattle suppliers have not practiced deforestation from a specified date;**
- **Ensuring that the supplier farms are not on the lists of embargoed areas disclosed by *Ibama*, *ICMbio* and state environmental agencies;**
- **Ensuring that farms do not overlap with Indigenous Lands recognized by declaratory orders from the Ministry of Justice or established by Funai;**
- **Ensuring that farms are not overlapping with Protected Areas at the federal, state and municipal levels;**
- **Ensuring that suppliers do not have a first-degree judicial conviction at any instance by higher courts, invasion of Indigenous Lands, agricultural violation, illegal occupation of public land and/or for deforestation and other correlated conflicts;**
- **Ensuring the supplier's participation in the Environmental Regularization Program.**

The questionnaire also approaches information about policy coverage.

2. The performance questionnaire requests the demonstration of performance evaluation through an external audit that certifies the percentage of compliance with the policies. Furthermore, information on the coverage of external audits is also approached.

The complete questionnaire can be found attached in the email sent to the companies invited to participate.

6.4. LEVEL OF PUBLIC TRANSPARENCY FOR SLAUGHTERHOUSES

The Level of Transparency of public data considers whether the information available on the company's website presents the policy to control deforestation in the beef production chain and its effectiveness, identified through external audits.

All companies mapped by Radar Verde will be assessed in this indicator according to the public data available on their institutional websites. We followed the same Radar Verde questionnaire to verify whether, based on the data provided by the company, it is possible to ensure the existence and implementation of powerful socioenvironmental policies against deforestation in the beef production chain.

We used the same calculation method and weight distribution between the policy features and implementation, 20% and 80% of the total score, respectively.



7. APPENDIX 2. METHODOLOGY APPLIED TO RETAILERS

7.1. LEVEL OF CHAIN CONTROL FOR RETAILERS

The Level of Control is obtained from the companies' replies to the Radar Verde questionnaire, which is sent along with the term of consent to take part in the survey. By the time the deadline for sending the questionnaires and evidence comes to a close (30 days), Radar Verde's team assesses and ranks the companies involved.

For direct and indirect supplier farms, the retailer is requested to answer questions about the existence of a policy to control deforestation in the beef production chain, what are the policy features and its implementation.

Likewise the methodology applied to slaughterhouses, the total chain control score obtained by retailers is a weighted sum of the policy assessment and its implementation on the direct and indirect supplier farms.

1. **The score of control policy features** will be calculated by multiplying the following components:
 - 1.1. **The score of policy features** will be based on the Radar Verde's questionnaire responses.
 - 1.2. The level of **policy coverage**. It represents the extent of the policy's application in relation to the company's total operations. For example, if a company applies the policy in all facilities, the coverage is 100%. If it adopts the policy against deforestation in half of them, it will be 50%. This information is obtained through the Radar Verde's questionnaire.
 - 1.3. **The importance of the policy's features in the whole chain control**. Radar Verde considers that the existence of a powerful control policy is worth 20% of the total value of the control and that the demonstration of its implementation is worth 80%. Therefore, the total value of policy features is multiplied by 20%.
 - 1.4. **The score of chain control implementation results from the multiplication of the following factors:**
 - 1.4.1. The external audit rating on the policy implementation. For example, if every purchase follows the policy, the score will be 100%.

- 1.4.2. The importance of audit coverage. It represents the percentage of facilities subject to audit assessment. For example, if data from all retail facilities are subject to audit, the audit coverage is 100%.
- 1.4.3. The importance of policy implementation in the whole level of chain control. Radar Verde considers that the performance of the policy implementation is worth 80% of the total value of the level of control. For this reason, the policy performance value is multiplied by 80%. This premise is based on the Pareto Principle, as explained in item 2.1.3.

7.2. LEVEL OF PUBLIC TRANSPARENCY FOR RETAILERS

The Level of Transparency of public data considers whether the information available on the company's website presents the policy to control deforestation in the beef production chain and its effectiveness, identified through external audits.

All companies mapped by Radar Verde will be assessed in this indicator according to the public data available on their institutional websites. We followed the same Radar Verde questionnaire to verify whether, based on the data provided by the company, it is possible to ensure the existence and implementation of powerful socioenvironmental policies against deforestation in the beef production chain.

We used the same calculation method and weight distribution between the policy features and implementation, 20% and 80% of the total score, respectively.





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