



**RADAR
VERDE**

BEEF TRANSPARENCY IN THE BRAZILIAN AMAZON



**ARE BRAZILIAN BEEF
COMPANIES IN ACCORDANCE
WITH THE CHINA MEAT
ASSOCIATION SPECIFICATION
FOR MEAT INDUSTRY
GREEN TRADE?**

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1. Introduction

Between 2009 and 2022, Brazilian beef exports to China increased by 476%, reports the Brazilian Beef Exporters Association (ABIEC)⁽¹⁾. This surge in exports, coupled with the lax enforcement of environmental regulations by the domestic market and Brazilian governmental bodies, has significantly accelerated deforestation rates in the Amazon and Cerrado regions, according to studies by Barreto et al. (2023), Reis et al. (2023), and Vasconcelos et al. (2024).

This persistent deforestation poses a grave threat to Brazil's efforts to combat climate change, as land use changes contributed to nearly half of the country's emissions in 2022, as highlighted by the Observatório do Clima (2023). Furthermore, the accelerated deforestation and climate change exacerbate the risks of extreme weather events, jeopardizing Brazil's ability to sustainably increase food production (Kevin Dong et al., 2024; The Economist, 2023; Whiting, 2022) (Rattis et al., 2021; World Weather Attribution, 2022, 2024). Such challenges not only affect Brazil but also have implications for China, a nation deeply concerned about climate change and food security (Kevin Dong et al., 2024; The Economist, 2023; Whiting, 2022).

In line with China's goals regarding food security, the China Meat Association (CMA) and the World Wildlife Fund (WWF) jointly announced the Chinese Sustainable Meat Declaration in 2017 (WWF, 2017). This initiative, signed by 64 company members, aims to address deforestation linked to beef demand by promoting sustainable meat production, trade, and consumption. The declaration outlines commitments such as conserving nature and resources, avoiding illegality in animal husbandry and meat production, and improving supply chain traceability and transparency.

To operationalize these commitments, the CMA released the Specification for Meat Industry Green Trade in December 2021 (China Meat Association, 2021). This specification serves as a guideline for promoting environmentally friendly practices within the meat industry.

In our report, we assess if meatpacking companies authorized to export beef from the Brazilian Amazon to China and Hong Kong are in accordance with the Chinese meat industry's green trade specifications. We included Hong Kong in the analysis because it reexports some of the beef to mainland China (Chung, 2022). Our evaluation relies on Radar Verde 2023 results, a tool that assesses meatpacking companies' commitment to zero deforestation policies. Radar Verde seeks evidence of companies adopting zero-deforestation policies to ensure that the beef they sell is not associated either directly or indirectly with Amazon deforestation (Imazon & O Mundo Que Queremos, 2023).

(1) Barreto et al., 2023 used ABIEC's data to estimate the growth in the period.



2. The CMA Specification for Meat Industry Green Trade

The CMA document specifies the terms and definitions, basic requirements, supplier accountability, buyer accountability, green trade practice, information publicity, management, and punishment criteria associated with the meat industry green trade (China Meat Association, 2021).

Relevant definitions of China beef imports from Brazil include:

■ **ZERO DEFORESTATION.** Zero deforestation means that commodity production, procurement, supply or investment will not destroy forests; the converted forest area is less than 0.5 hectares.

■ **ZERO CONVERSION.** Zero conversion means that commodity production, sourcing or investment will not cause or lead to the conversion of natural ecosystems; the conversion of natural vegetation is less than 0.5 hectares.

■ **CUT-OFF DATE FOR DEFORESTATION.** The date by which a given company (or other commitment- or policy-setting entity) is responsible for making no-deforestation commitments is announced no later than the date of the zero-deforestation commitment.

■ **THE TARGET DATE FOR ZERO DEFORESTATION/CONVERSION.** The target date is when a given company (or other commitment- or policy-setting entity) intends to fulfill its zero deforestation commitments or policies.

■ **BUYER.** Refers to the company that purchases raw materials, processing materials or finished products from the supplier. Buyers include traders, manufacturers and retailers.

■ **SUPPLIER.** Refers to the company that provides the buyer with raw materials, processing materials, or finished products. Suppliers include feed processors, live livestock and poultry slaughtering plants, meat products processors, and packaging materials manufacturers. A company can be either a supplier or a buyer. A supplier can be either a direct supplier or an indirect supplier.

Table 1 reproduces examples of consequential specifications for beef production in Brazil. For example, companies “shall avoid supplying/purchasing products from areas with a **high risk of deforestation, such as the Amazon rainforest** and the Cerrado savanna.”

Moreover, companies “shall continuously improve transparency and traceability in supply chain management of meat industry.” The traceability should be at the level of local production (such as farms), and direct and indirect suppliers (or intermediary suppliers) should be “taken into account.” Traceability should utilize “credible assurance systems (e.g., credible certification systems) capable of linking raw and auxiliary material supplies with production units having specific compliance or performance attributes.”



The CMA specifies transparency requirements such as that “Information should be made available online in a manner that allows interested stakeholders to access, search, aggregate, and download information easily.” The CMA also states, “Companies should follow good and standard practices in data management, data formats, accessibility, and presentation to disclose their information. Moreover, “In addition to regularly reporting the progress of commitment fulfillment, companies are encouraged to disclose information relative to the participation in the green procurement plan, and actively respond to inquiries from external parties on information and events.”

Table 1. Examples of the China Meat Association specifications for Meat Industry Green Trade Issues and criteria specification items⁽²⁾

Basic requirements

- 4.6 The company shall continuously improve transparency and traceability in the supply chain management of the meat industry.
- 4.9 Company shall avoid supplying/purchasing products from areas with high risk of deforestation, such as the Amazon rainforest and the Cerrado savanna, the Congo Basin in Africa, and the Great Barrier Reef in Australia.

Planning, supplier responsibility, Zero Deforestation Commitments in the Process of Production and Operation

- 5.1.1.1 Suppliers shall commit not to convert natural forests into agricultural land, plantation land, land for animal husbandry production or other land uses in the process of production and management, and to avoid activities that may cause serious or sustained degradation of such natural forests.

Product Traceability

- 5.1.5.1 The source information of various raw and auxiliary materials and products in the supply chain shall be clear and unambiguous, based on which it shall be able to determine that the manufacturers and processors of origin comply with the commitments.
- 5.1.5.2 Suppliers shall know the origin of raw and auxiliary materials to the level of the farm, plantation, ranch, place of production or forest management unit.

(2) The text in the table are excerpts of the original document (China Meat Association, 2021) with minimal edits (for example, inclusion of definite articles such as “the”).



5.1.5.3 To meet the above-stated requirement that the origins of materials in supply chains are precisely traced, buyers at any stage of the supply chain must institute adequate traceability conditions through one or more of the following methods:

- a) tracing raw and auxiliary materials back to the production or processing units of origin (Certificate of Origin);
- b) tracing raw and auxiliary materials back to an intermediate supplier that itself has effective control mechanisms in place to ensure that its supplies are traced to the production or processing units of origin and can provide sufficient evidence of this to the buyer;
- c) utilising credible assurance systems (e.g., credible certification systems) capable of linking raw and auxiliary material supplies with production units having specific compliance or performance attributes;
- d) tracing raw and auxiliary materials to administrative jurisdictions or landscapes where it has been demonstrated that performance with regard to specific social or environmental issue(s) is adequate to fulfill the buyer's commitments on the corresponding issue(s).

5.1.5.4 Suppliers shall provide documentary evidence of zero deforestation/zero conversion

Buyer responsibility

- 5.2.1 Buyers shall refuse to purchase products with deforestation impact and conversion factors and non-conforming deforestation-related products listed in this Specification.
- 5.2.2 Buyers shall strictly abide by the principle of respecting human rights to subsistence and development and refuse to accept products produced and provided without respect for human rights.
- 5.2.3 Buyers shall set a clear cutoff date for deforestation and a target date for zero deforestation.
- 5.2.4 To ensure that the goods are sourced from non-deforested areas and free from conversion circumstances, buyers have the responsibility and right to trace and monitor the purchased goods according to the committed cutoff date for deforestation.
- 5.2.5 Before purchase, buyers shall assess suppliers effectively; after purchase, buyers shall evaluate each link of the purchase and make an effective evaluation.



Suppliers Management System Establishment

- 6.2.2.2 In order to implement the procurement plan stipulated by the company's supply chain commitments, the buyers should formulate supplier requirements, including when the company can or must add, suspend, exclude or adjust the purchase terms with the suppliers.
- 6.2.2.3 According to the tracing results, the raw materials provided by the supplier can be certified for compliance:
- a) tracing materials back to the production or processing units of origin; The production and processing unit in the place of origin certifies that the meat raw materials come from low-risk areas of deforestation and conversion;
 - b) tracing materials back to an intermediate supplier that itself has effective control mechanisms in place so that its supplies are traced to the production or processing units of origin, and can provide sufficient evidence of this to the buyer;
 - c) utilising credible assurance systems (e.g., credible certification systems) capable of linking raw and material supplies with production units having specific compliance or performance attributes; or tracing raw and auxiliary materials to jurisdictions or landscapes where it has been demonstrated that performance with regard to specific social or environmental issue(s) is adequate to fulfil the buyer's commitments on the corresponding issue(s).

Requirements for the organization, management, supervision and evaluation

- 6.2.3.1 The buyer shall evaluate the supplier's progress and degree of compliance by regular information collection or review.
- 6.2.3.2 Measures shall be taken to operate supplier management systems that define policies, procedures, supplier expectations, and supplier engagement strategies at the level of the commodity-buying company or its supply chains.
- 6.2.3.3 Measures shall be adopted to regularly evaluate the satisfaction and pass rate of the supplier's products.
- 6.2.3.4 Measures shall be taken to ensure the engagement of non-compliant suppliers when environmental and social risks, negative impacts and/or non-compliance with company commitments are detected; this includes the development of supplier implementation plans to address these issues
- 6.2.3.5 Establishing a supplier elimination mechanism. The suppliers who are evaluated as unqualified or rank at the bottom shall be eliminated.



Information disclosure

- 8.1 Companies should regularly publicise the progress and results of zero deforestation/zero conversion between the trading parties in the production and operation process. (item)
- 8.2.1 In addition to regularly reporting the progress of commitment fulfillment, companies are encouraged to disclose information relative to the participation in the green procurement plan, and actively respond to inquiries from external parties on information and events.
- 8.2.2 Companies should follow good and standard practices in data management, data formats, accessibility, and presentation to disclose their information. Information should be made available online in a manner that allows interested stakeholders to easily access, search, aggregate, and download information.

3. How does the beef industry in the Amazon relate to the specifications for Meat Industry Green Trade?

3.1 The size of the beef industry in the Amazon licensed to export to China and Hong Kong

Radar Verde identified 132 megacompanies in the Legal Amazon operating under the Federal Inspection Service (SIF) and State Inspection Service (SIE). These groups had 176 slaughterhouses in the region and, according to the Brazilian Institute of Geography and Statistics (IBGE), they accounted for approximately 96% of slaughters in the Amazonian States in 2022 (Barreto et al., 2023).

Among the 176 slaughterhouses operating in the region, 72 are licensed to export to China (31) and Hong Kong (71). These companies could slaughter 71,670 head of cattle per day, corresponding to 90% of the cattle slaughtering capacity in the Amazon, considering companies with SIE and SIF registrations. Of the total slaughterhouses licensed to export to China, 14 were licensed in March 2024 (Brasil, 2024, 2024). Not all licensed companies export at a given moment because of other considerations such as production and logistics costs, competition and business strategies.

In 2023, 15 of the 17 plants qualified to export to China exported, according to data from ABIEC (2024). In 2023, the 15 slaughterhouses that exported to China had 16% of the region's slaughter capacity.



The 14 plants licensed to export to China from 2024 have added 74% of export slaughter capacity to that country.

In 2023, the 21 slaughterhouses that exported meat to Hong Kong accounted for 19% of the total slaughter capacity in the Legal Amazon.

It is important to note that regulations, inspection requirements and import procedures may vary between mainland China and Hong Kong; for these and other reasons, slaughterhouses may choose to apply for qualification with MAPA (Ministry of Agriculture, Livestock and Supply) to export only to Hong Kong, or only to China and even for both.

3.2 Performance of the beef companies concerning the China Meat Association specification for zero deforestation policies

Eighty-seven percent of the meatpackers licensed to export to China have signed a zero-deforestation agreement with federal prosecutors. They own 25 % of the region's slaughter capacity registered with state and federal agricultural sanitary agencies. By signing the agreement, these companies committed to boycotting cattle raised in areas associated with deforestation and protected areas.

Twenty-five of the 31 companies licensed to export to China operated in regions with more than 300,000 hectares of exposure to deforestation risks (Table 2). However, no beef company responded to the Radar Verde questionnaire to demonstrate that they control their beef supply chain. Therefore, all of them were not compliant with the China Meat Association specifications regarding information disclosure and sourcing from high deforestation risk areas:

“8.2.1 In addition to regularly reporting the progress of commitment fulfillment, companies are encouraged to disclose information relative to the participation in the green procurement plan, and actively respond to inquiries from external parties on information and events.”

“4.9 Company shall avoid supplying/purchasing products from areas with a high risk of deforestation, such as the Amazon rainforest and the Cerrado savanna...”

Even though companies were irresponsive to the questionnaire, Radar Verde evaluated the level of transparency of the beef companies regarding deforestation policies by collecting data from the company's websites.



None of the companies demonstrated a high level of transparency about their policies (Figures 1, 2 and 3). These companies must fulfill the China Meat Association's call for control of all direct and intermediary suppliers of raw materials (in these cases, cattle)

Of the companies licensed to export to China, only three owning nearly 10% of the slaughter capacity displayed an intermediary level of zero deforestation policy transparency on their website. These companies showed some level of control over the direct suppliers of cattle. However, they fail to fulfill the China Meat Association's call for controlling intermediary suppliers of raw materials (in these cases, cattle).

No company has published policies to control indirect suppliers or has not publicized independent audited results of robust control of indirect cattle suppliers. By not showing control of indirect suppliers, they may be contributing to deforestation because ranches responsible for calving and hearing have deforestation in the beef supply chain.

Ninety per cent of the companies had low or very low transparency of their policies. They accounted for 93% of the slaughter capacity of the companies licensed to export to China. Such companies fail because they have no policy or implement policies poorly and have not demonstrated their results.

Most companies licensed to export to Hong Kong also operate in high-risk deforestation areas (Table 2). These companies also perform poorly in terms of the environmental specifications of the China Meat Association. None responded to the questionnaire regarding their zero deforestation policies. Radar Verde analysis revealed that 94 % of the companies (accounting for 93% of the slaughter capacity) had low or no transparency on such policies (Figure 2). Fifty-three per cent of the slaughterhouses (owning 63% of slaughter capacity demonstrated very high or high control of direct suppliers. However, none demonstrated control of indirect suppliers. Therefore, the Hong Kong companies that import beef from the Brazilian Amazon and reexport it to mainland China are unlikely to follow the China Meat Association environmental specifications that require traceability of direct and indirect suppliers.

Tables 3 and 4 show the Radar Verde results aggregated at the company level. The aggregation consisted of adding the slaughter capacity and the area exposed to deforestation risk for the companies that own multiple meatpacking units in the region. For example, JBS which in 2021 owned 21 operating plants in the region is by far the most exposed to deforestation risk.



Table 2. Radar Verde results for beef companies licensed to export to China and Hong Kong

Table with 17 columns: FEDERAL SANITARY INSPECTION NUMBER (SIF), SLAUGHTERHOUSES, MUNICIPALITY, STATE, SLAUGHTER CAPACITY (HEADS/DAY), MAXIMUM PURCHASE DISTANCE (KM), LEVEL OF EXPOSURE TO DEFORESTATION RISK (HECTARES), LEVEL OF SUPPLY CHAIN CONTROL, LEVEL OF TRANSPARENCY (Direct suppliers, Indirect suppliers, Overall score), CHINA (Licensed to export to China in 2023, Exported to China in 2023, Licensed to export to China beginning in 2024), HONG KONG (Licensed to export to Hong Kong in 2023, Exported to Hong Kong in 2023), and SIGNATORY OF THE FEDERAL PROSECUTORS SETTLEMENT AGREEMENT AGAINST DEFORESTATION (TAC)?



Table 3. Supply chain level of transparency by companies licensed to export to China according to Radar Verde

COMPANIES	SLAUGHTER CAPACITY (HEADS/DAY)	LEVEL OF EXPOSURE TO DEFORESTATION RISK (HECTARES)	LEVEL OF SUPPLY CHAIN CONTROL	LEVEL OF TRANSPARENCY			SIGNATORY OF THE FEDERAL PROSECUTORS SETTLEMENT AGREEMENT AGAINST DEFORESTATION (TAC)?
				Direct suppliers	Indirect suppliers	Overall score	
JBS S/A	8,680	7,285,269					YES
MERCURIO ALIMENTOS S/A	2,100	3,066,594					YES
RIO BEEF FRIGORÍFICO	700	3,063,956					NO
MINERVA	1,180	2,596,945					YES
FRIGORIFICO REDENTOR S/A	650	2,585,693					YES
DISTRIBOI	100	2,387,390					NO
VALE GRANDE INDUSTRIA E COMERCIO DE ALIMENTOS S/A(FRIALTO)	400	2,002,368					YES
FRIGOL S. A.	1,200	1,548,951					YES
IRMÃOS GONÇALVES, COMÉRCIO E INDÚSTRIA LTDA	1,800	1,353,352					NO
FRIBEV - FRIGORÍFICO BELA VISTA	600	1,340,958					YES
MASTERBOI LTDA	1,100	838,458					YES
PLENA ALIMENTOS LTDA	420	608,543					YES
MARFRIG GLOBAL FOODS S.A	1,650	491,694					YES
INDÚSTRIA FRIGORÍFICA BOA CARNE LTDA	850	446,000					NO
FRIGORÍFICO RIO MARIA	400	369,692					YES
AGRA AGROINDUSTRIAL DE ALIMENTOS S/A	320	259,201					YES
COOPERFRIGU	400	149,920					YES
PANTANEIRA INDÚSTRIA E COMÉRCIO DE CARNES E DERI	500	138,862					YES
NATURAFRIG ALIMENTOS LTDA	500	112,589					YES



Table 4. Supply chain level of transparency by companies licensed to export to Hong Kong according to Radar Verde

COMPANIES	SLAUGHTER CAPACITY (HEADS/DAY)	LEVEL OF EXPOSURE TO DEFORESTATION RISK (HECTARES)	LEVEL OF SUPPLY CHAIN CONTROL	LEVEL OF TRANSPARENCY			SIGNATORY OF THE FEDERAL PROSECUTORS SETTLEMENT AGREEMENT AGAINST DEFORESTATION (TAC)?
				Direct suppliers	Indirect suppliers	Overall score	
JBS S/A	16,660	9,430,226					YES
VALE GRANDE INDUSTRIA E COMERCIO DE ALIMENTOS S/A(FRIALTO)	3,150	4,251,170					YES
MASTERBOI LTDA	1,860	3,553,139					YES
MINERVA	2,580	3,219,797					YES
RIO BEEF FRIGORÍFICO	700	3,063,956					NO
DISTRIBOI	520	2,398,251					NO
ATIVO ALIMENTOS EXPORTADORA E IMPORTADORA EIRELI (MAFRINORTE)	700	2,043,435					YES
FRIGOL S. A.	1,650	1,861,007					YES
FRIGORIFICO REDENTOR S/A	650	1,729,414					YES
TOTAL S. A.	300	1,637,868					NO
FRIGORÍFICO RIO MARIA	700	1,564,952					YES
BOI BRASIL	1,180	1,460,602					NO
LKJ - FRIGORÍFICO LTDA	800	1,452,623					YES
IRMÃOS GONÇALVES, COMÉRCIO E INDÚSTRIA LTDA	1,800	1,353,352					NO
FRIBEV - FRIGORÍFICO BELA VISTA	600	1,340,958					YES
FRIGORIFICO VALENCIO LTDA	240	1,238,368					NO
R C MOREIRA COSTA - FRICAL	180	1,212,169					NO
GOLDEN IMEX EIRELI (BMG FOOD'S)	800	1,111,033					NO
MERCURIO ALIMENTOS S/A	2,100	1,065,717					YES
COMCARNE COMERCIAL DE CARNE LTDA(FRIBAL)	960	881,398					NO
ABATEDOURO DE BOVINOS SAMPAIO LTDA - ME	180	782,193					YES
MARFRIG GLOBAL FOODS S.A	3,150	778,094					YES
AGROPAM - AGRICULTURA E PECUARIA AMAZONAS S/A	300	713,172					YES
FRIGORIFICO FORTEFRIGO LTDA	420	685,832					YES
FRIGORÍFICO PARAÍSO	400	629,305					NO
PLENA ALIMENTOS LTDA	420	608,543					YES
163 BEEF (FRIGOMARCA)	500	582,041					NO
FRISACRE	660	511,138					NO
FRIGO 10 LTDA	700	401,468					NO
AGRA AGROINDUSTRIAL DE ALIMENTOS S/A	320	259,201					YES
FRIGOESTRELA S/A	420	255,077					NO
COOPERFRIGU	400	149,920					YES
PANTANEIRA INDÚSTRIA E COMÉRCIO DE CARNES E DERIVADOS	500	138,862					YES
FRIGORIFICO PANTANAL	700	119,198					NO
NATURAFRIG ALIMENTOS LTDA	500	112,589					YES



Figure 1. Supply chain level of transparency by slaughterhouses licensed to export to China (number of companies and slaughter capacity) according to Radar Verde

● Very high ● High ● Intermediary ● Low ● Very low

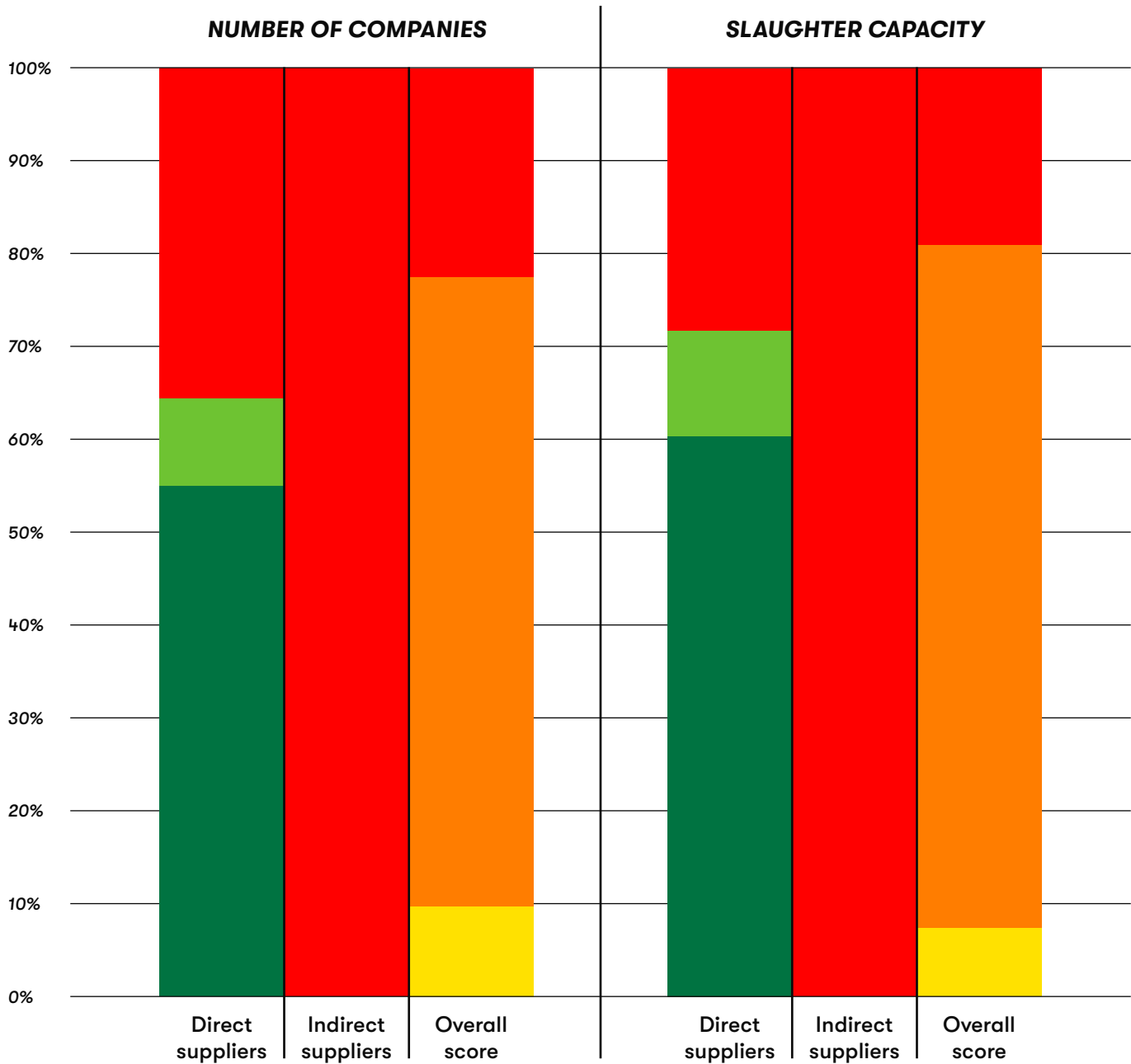
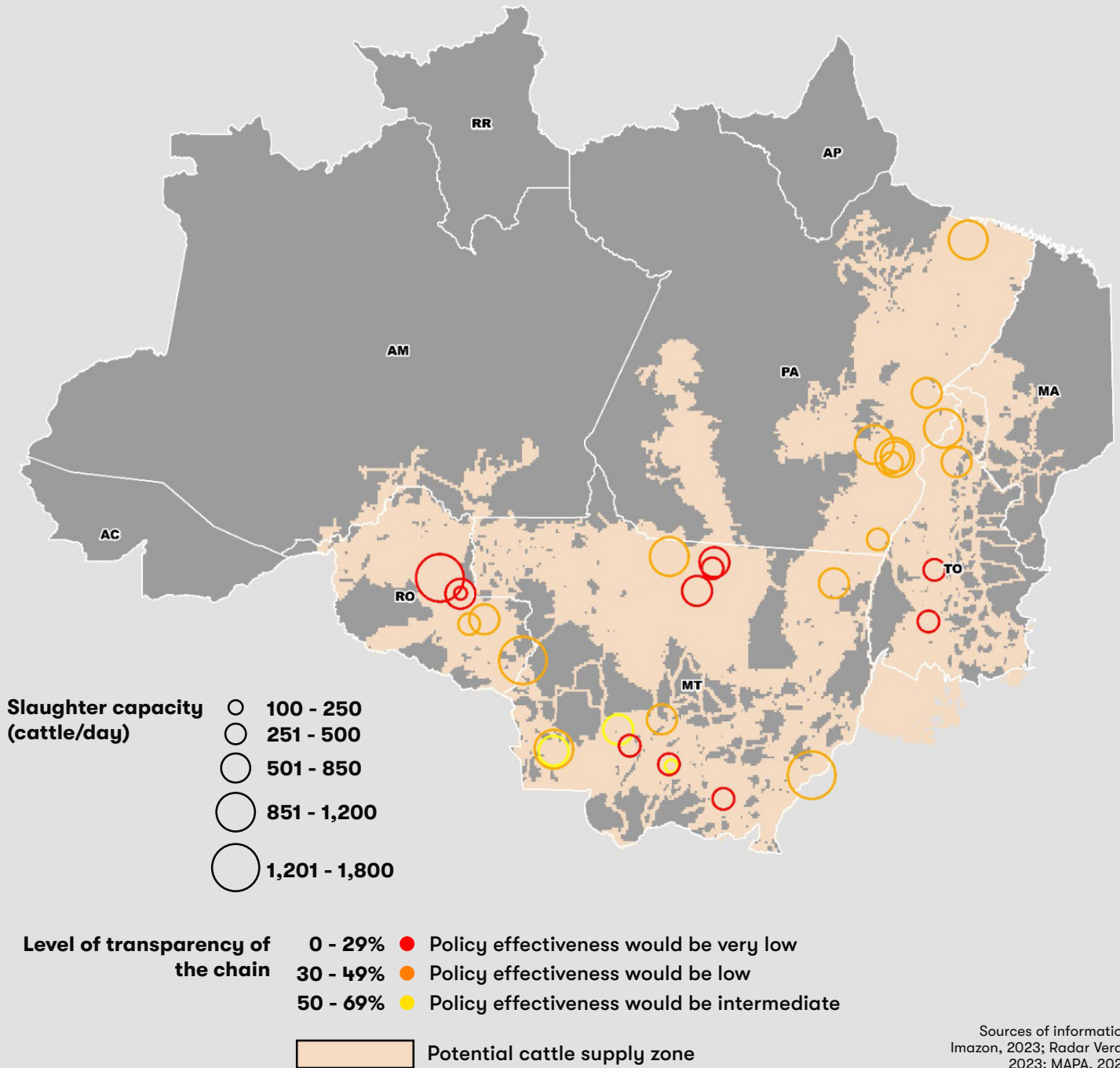


Figure 2. Slaughterhouses licensed to export to China: slaughter capacity, potential cattle purchase zones and the supply chain level of transparency



Sources of information: Amazon, 2023; Radar Verde, 2023; MAPA, 2023.

Figure 3. Slaughterhouses licensed to export to China: level of exposure to deforestation, potential cattle purchase zones and the degree of exposure to deforestation risk

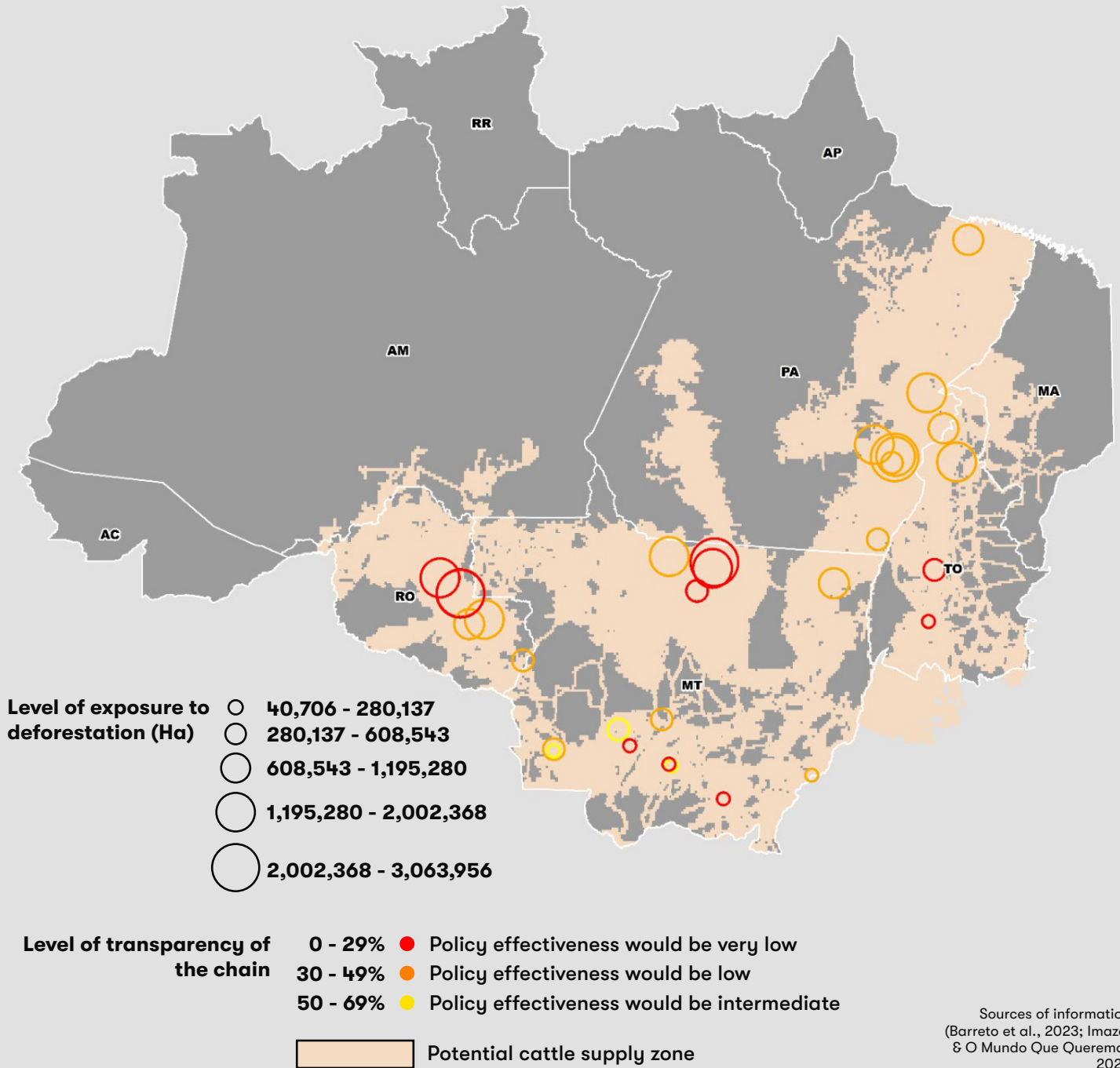




Figure 4. Supply chain level of transparency by slaughterhouses licensed to export to Hong Kong (number of companies and slaughter capacity) according to Radar Verde

● Very high ● High ● Intermediary ● Low ● Very low

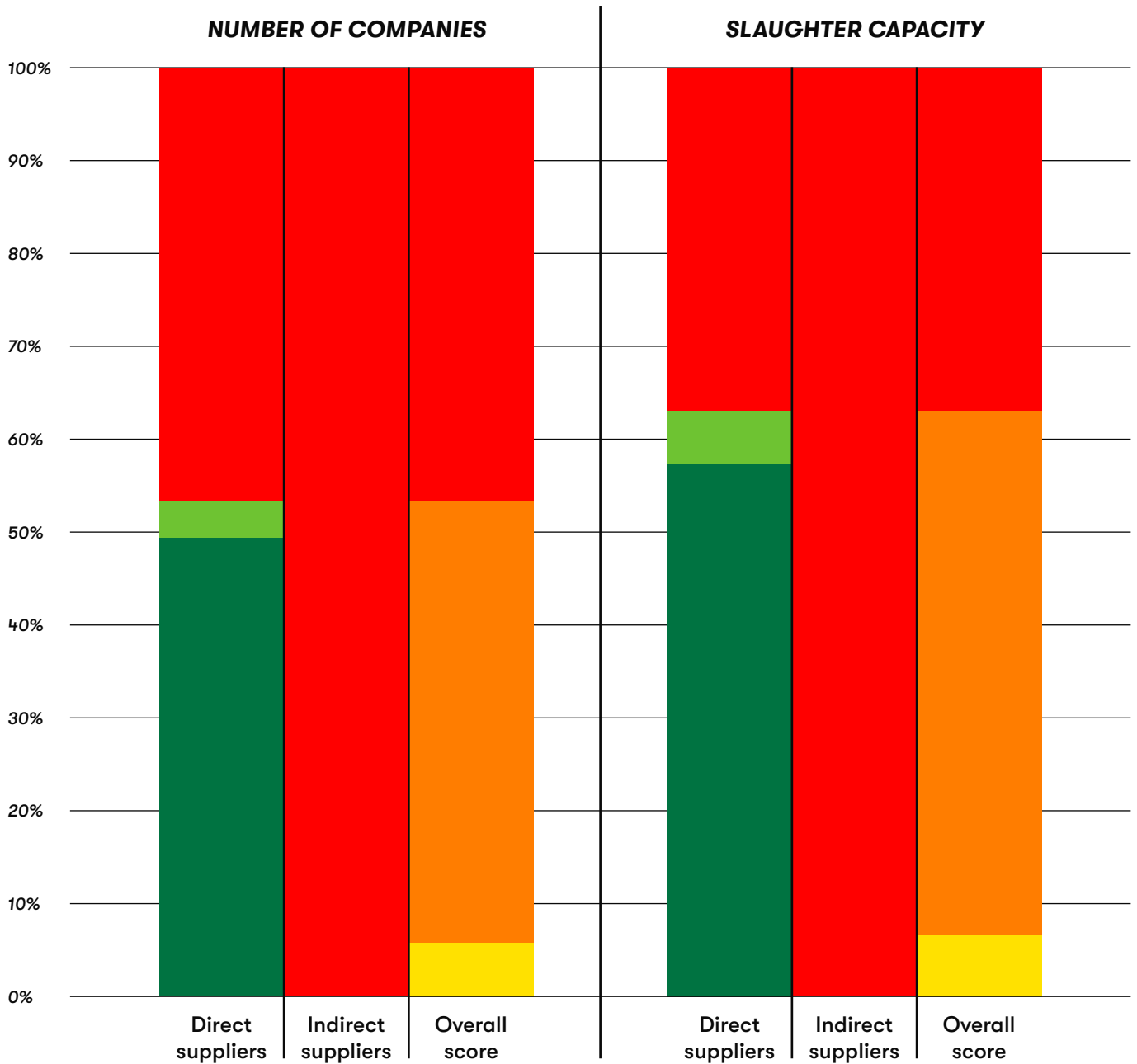
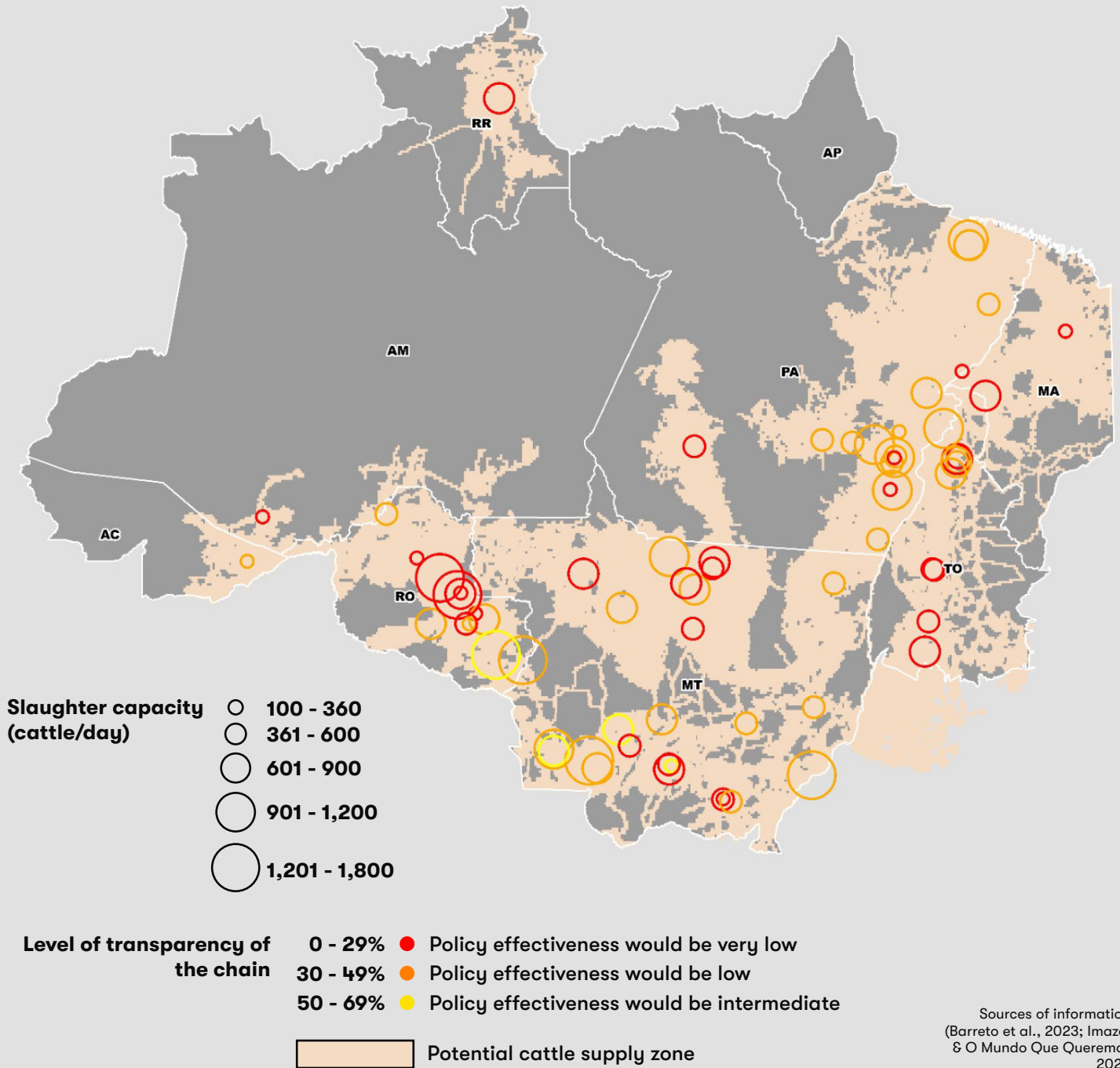
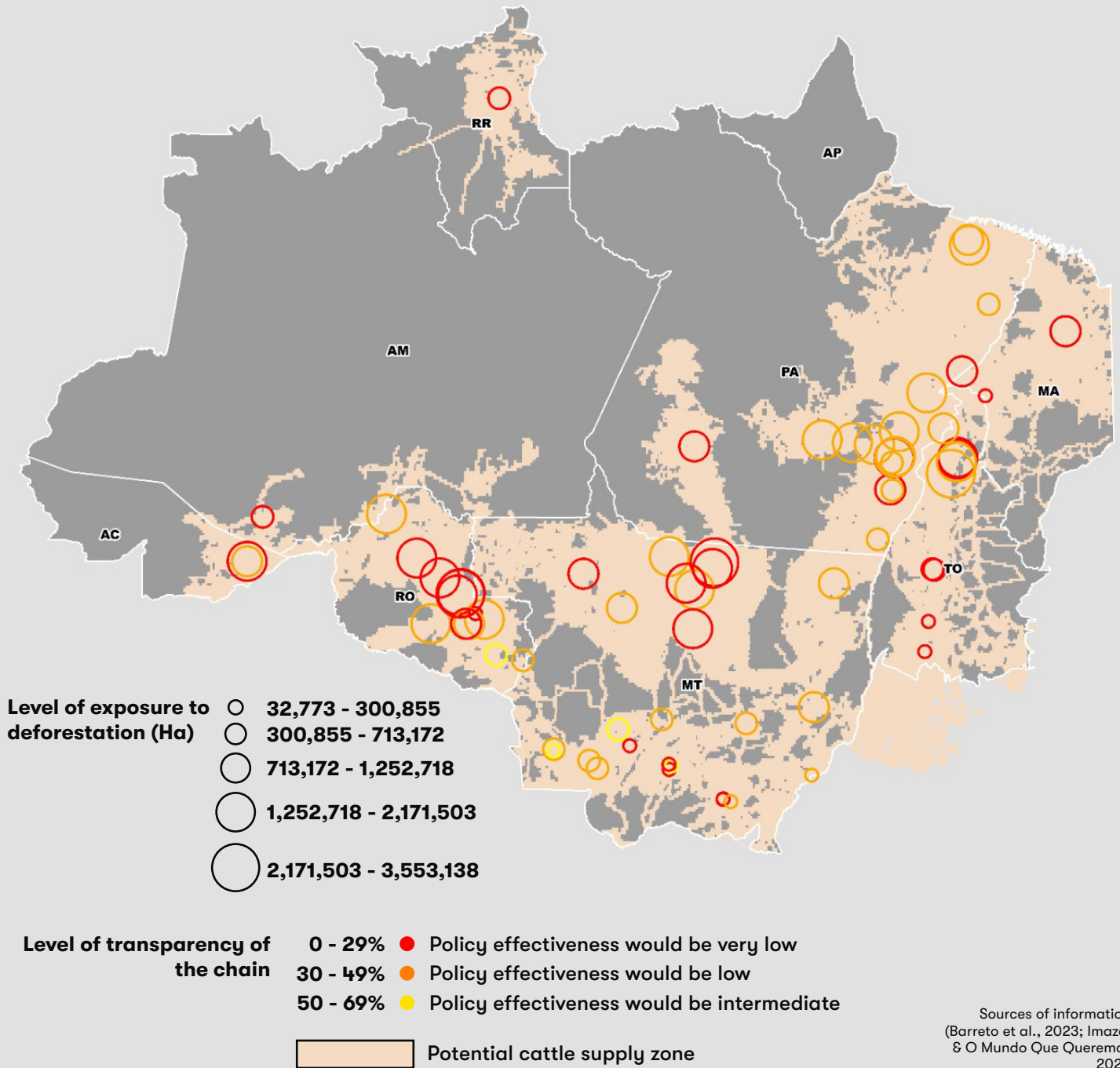


Figure 5. Slaughterhouses licensed to export to Hong Kong: slaughter capacity, potential cattle purchase zones and the level of supply chain transparency



Sources of information:
(Barreto et al., 2023; Imazon & O Mundo Que Queremos, 2023)

Figure 6. Slaughterhouses licensed to export to Hong Kong: Level of exposure to deforestation, potential cattle purchase zones and the degree of exposure to deforestation risk



Sources of information:
(Barreto et al., 2023; Imazon & O Mundo Que Queremos, 2023)



4. Discussion

Amidst the pressing challenge of food security in the face of climate change, the partnership between China and Brazil offers a profound opportunity to foster meaningful change in the beef industry. As a key importer of Brazilian beef, China could play a pivotal role in influencing the practices shaping Brazil's beef sector. Embracing the environmentally friendly trade specifications outlined by the China Meat Association (CMA) can lead to a crucial shift towards sustainability and food security.

The China Meat Association Specification for Meat Industry Green Trade encapsulates several promising avenues aimed at avoiding Amazon deforestation, a pivotal concern in sustainable beef production. Our assessment, conducted through Radar Verde, sheds light on the performance of Brazilian beef companies concerning these specifications.

Radar Verde discerns a spectrum of responses among beef companies, with some initiating zero-deforestation policies while others lag. Notably, even among those with policies in place, the focus remains primarily on direct suppliers (fattening ranches), overlooking the crucial aspect of monitoring and reporting zero-deforestation compliance by indirect suppliers (in this case, calving ranches), as emphasized by the CMA Specification. This is particularly significant given the documented correlation between significant deforestation and the operations of indirect suppliers (Barreto et al. 2023).

Furthermore, our findings unveil a concerning situation among beef companies authorized to export to China and Hong Kong, with many sourcing cattle from regions at high risk of deforestation, contrary to the CMA's directive to avoid such areas, especially the Amazon rainforest.

Moreover, a lack of transparency prevails among most beef companies regarding their zero-deforestation policies and outcomes, posing challenges to accountability and trust-building within the industry.

To realize the green trade specifications potential, the CMA would need to establish a clear cut-off date for zero-deforestation policies and collaborate with partners to enforce specification requirements and foster cooperation.

For instance, Chinese beef importers could immediately opt to procure exclusively from top-performing companies in terms of zero deforestation policies—those demonstrating control over the entire supply chain, including both direct and indirect suppliers, and sourcing cattle from low-deforestation risk zones. Radar Verde remains committed to providing updated information on the best-performing companies.



Furthermore, importers could promptly advocate government authorities for the disclosure of data on cattle transportation (GTA)⁽³⁾ for exports to China. This data, coupled with deforestation and ranch maps, would enable beef companies to enhance the enforcement of their zero-deforestation policies, while governmental efforts focus on implementing a more robust individual animal traceability system.

The CMA could also collaborate with private and public financial institutions and federal state agencies to design incentives for ranchers to adopt the best productive and environmental practices. For instance, prioritizing municipalities and states with the highest environmental compliance rates could be instrumental in this endeavor. The environmental compliance indicators could include lower deforestation rates and a high percentage of illegally deforested areas under environmental regularization programs (as mandated by the forest code). The performance of state governments in terms of enforcement of the forest code varies considerably throughout Brazil and the Amazon region (Lopes et al., 2023).

These initiatives could be developed within the framework of recent collaborations, such as the memorandum of understanding signed between Banco do Brasil⁽⁴⁾ and the Cooperation Industrial and Commercial Bank of China in 2023, addressing climate change, sustainable development, and social equity (Brasil, 2023a). Additionally, the Federal Government's institution of the National Program for the Conversion of Degraded Pastures in 2023, aiming to recover and convert up to 40 million hectares of low-productivity pastures into arable areas over ten years (Brasil, 2023b) provides a foundation for further collaborative efforts towards sustainable practices in the beef industry. The Brazilian government is searching for international investors to fund this program (Brasil, 2024a, 2024b; Walendorff, 2023).

Together, China and Brazil can chart a course toward a more sustainable future for the beef industry. Through partnership, innovation, and collective action, public and private institutions can ensure forest protection which is critical for food security in both countries.

(3) The GTA, or "Guia de Trânsito Animal," is a form required by the government for tracking cattle transportation. Whenever loads of cattle are transported, whether between ranches or from ranches to slaughterhouses, this form must accompany them. Ranchers are legally required to complete the GTA, providing details such as the number and age range of the cattle being transported, the reason for the transportation (such as moving from a birthing or calving farm to a fattening farm, or from a fattening farm to the slaughterhouse), and the names and identification of both the ranchers and the companies involved

(4) Banco do Brasil is the main bank managing rural credit in Brazil



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