SUSTAINABLE SOY AND COMMERCIAL DIPLOMACY: STRATEGIC SCENARIOS FOR BRAZIL–CHINA RELATIONS TOWARD COP30

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Abstract

This article analyzes how sustainable soy can become a strategic vector for trade and climate diplomacy between Brazil and China in the context of COP30 and beyond. We start from the recognition that agricultural interdependence shapes opportunities and vulnerabilities from the trade balance to environmental reputation. We use complexity lenses (Sensemaking/Cynefin and Estuarine Mapping) to identify fixed and negotiable constraints, map traceability pressures and climate risks, and, from there, construct three scenarios: (i) cooperation, with joint sustainability standards; (ii) dependence, with lock-in to commodities without robust governance; and (iii) climate leadership, with diversification and multilateral integration. The central argument is that soy, treated as a strategic platform (not just a commodity), can strengthen Brazil's bargaining power, reduce exposure, and convert international requirements into competitive advantage. We conclude with operational recommendations for diplomats and economic and climate policy makers.

Keywords: Sustainable soy. Climate diplomacy. Brazil–China. Global governance. Strategic scenarios.

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SOJA SUSTENTÁVEL E DIPLOMACIA COMERCIAL: CENÁRIOS ESTRATÉGICOS PARA A RELAÇÃO BRASIL – CHINA RUMO À COP30

Resumo

Este artigo analisa como a soja sustentável pode se tornar um vetor estratégico da diplomacia comercial e climática entre Brasil e China no contexto da COP30 e além. Partimos do reconhecimento de que a interdependência agrícola molda oportunidades e vulnerabilidades da balança comercial à reputação ambiental. Usamos lentes de complexidade (Sensemaking/Cynefin e Mapeamento Estuarino) para identificar restrições fixas e negociáveis, mapear pressões de rastreabilidade e riscos climáticos e, a partir daí, construir três cenários: (i) cooperação, com padrões conjuntos de sustentabilidade; (ii) dependência, com *lock-in* em *commodities* sem governança robusta; e (iii) liderança climática, com diversificação e inserção multilateral. O argumento central é que a soja, tratada como plataforma estratégica (não apenas *commodity*), pode ampliar o poder de barganha do Brasil, reduzir exposições e converter exigências internacionais em vantagem competitiva. Concluímos com recomendações operacionais para diplomatas e formuladores de política econômica e climática.

Palavras-chave: Soja sustentável. Diplomacia climática. Brasil-China. Governança global. Cenários estratégicos.

SOJA SOSTENIBLE Y DIPLOMACIA COMERCIAL: ESCENARIOS ESTRATÉGICOS PARA LA RELACIÓN ENTRE BRASIL Y CHINA DE CARA A LA COP30

Resumen

Este artículo analiza cómo la soja sostenible puede convertirse en un motor estratégico de la diplomacia comercial y climática entre Brasil y China en el contexto de la COP30 y más allá. Partimos de que la interdependencia agrícola genera oportunidades y vulnerabilidades—desde la balanza comercial hasta la reputación ambiental—. Con lentes de complejidad (Sensemaking/Cynefin y Mapeo Estuarino), distinguimos restricciones fijas y negociables, mapeamos presiones de trazabilidad y riesgos climáticos y construimos tres escenarios: (i) cooperación, con estándares conjuntos de sostenibilidad; (ii) dependencia, con lock-in en commodities sin gobernanza sólida; y (iii) liderazgo climático, con diversificación e inserción multilateral. La tesis central es que la soja, gobernada como plataforma estratégica y no solo como commodity, puede ampliar el poder de negociación de Brasil, reducir exposiciones y convertir exigencias internacionales en ventaja competitiva. Concluimos con recomendaciones operativas para diplomáticos y responsables de políticas económicas y climáticas.

Palabras clave: Soja sostenible. Diplomacia climática. Brasil–China. Gobernanza global. Escenarios estratégicos.

1. Introduction

Soy trade between Brazil and China represents one of the most significant bilateral commodity relationships in contemporary geopolitics, reshaping agricultural supply chains and diplomatic priorities. China's sustained demand has positioned Brazil as the world's largest soybean exporter, consolidating what Tixiliski (2024) characterizes as an integration in which Chinese investments serve as a practical representation of a broader economic strategy in global agriculture. However, this trade interdependence exists within a growing tension between commercial imperatives and climate diplomacy, particularly as Brazil approaches its role as a host of COP30. We use COP30 merely as a temporal anchor; our focus extends to the medium- and long-term trajectories of this relationship beyond the conference itself.

Interdependence combines scale and stability with ambiguous effects on trade balance and environmental reputation. Brazil supplies 76% of China's soybean imports while generating US$ 67.3 billion annually from the soy complex, representing 40% of Brazil's total export revenue (USDA-ERS 2019; Zhang 2021). Still, this concentration creates dual pressures: growing international demands for sustainable production, particularly from EU deforestation regulations; and asymmetric traceability requirements among destination markets, which expose governance gaps. Chinese imports face a 97% exposure to deforestation risks, contrasting sharply with the EU's stricter standards, while Brazilian NDC commitments remain threatened by continued carbon intensity in soybean-producing regions (Trase/SEI 2025; dos Reis and Meyfroidt 2023).

This article addresses the overarching research question: How can sustainable soy become a strategic driver of trade and climate diplomacy between Brazil and China, and what future scenarios may emerge from this relationship beyond COP30? The analysis pursues a general objective of examining how sustainable soy integrates into bilateral trade and climate diplomacy, mapping strategic scenarios while offering actionable recommendations for Brazilian foreign policy. We pursue three specific objectives: first, to diagnose the current role of soy within trade and climate diplomacy frameworks; second, to apply complexity-science frameworks to identify constraints and drivers of possible futures; third, to construct strategic scenarios encompassing cooperation, dependence, and diversification while discussing implications for Brazil's bilateral and multilateral negotiations.

We treat this problem as complex rather than merely complicated, requiring *probe-sense-respond* methods rather than linear planning (Snowden and Boone 2007). The Cynefin framework guides our recognition that patterns emerge only through safe-to-fail experiments and rapid signal detection. We employ estuarine mapping to identify constraints—governing, enabling, and volatile—and assess energy/time requirements for change, distinguishing fixed elements (China's food security imperative) from modifiable actants amenable to diplomatic intervention (The Cynefin Co. 2021; 2022). We integrate traceability asymmetries and climate risks as key drivers shaping scenario trajectories, recognizing that supply-chain adherence moderates both agricultural impacts and intervention pathways. This methodological combination allows us to map the "thick present" containing provisions that shape future possibilities without predetermining outcomes.

The analysis positions sustainable soy as Brazil's platform for trade and climate diplomacy, converting commodity dependence into strategic leverage. We deliver three scenarios with operational recommendations addressing constraints, risks, and opportunities within the current trade architecture. Section 2 examines strategic partnership and agricultural interdependence; Section 3 analyzes soy as a strategic asset; Section 4 addresses traceability and climate risks; Section 5 develops scenarios using complexity frameworks; Section 6 synthesizes implications for Brazilian diplomacy. Through this framework, we provide policymakers and negotiators with analytical tools to navigate the intricate intersection of climate diplomacy and trade relations in the era of climate urgency.

2. Brazil and China: Strategic Partnership and Agricultural Interdependence

Agricultural interdependence between Brazil and China combines scale and stability with ambiguous effects on the trade balance and environmental reputation. What began as a commodity-driven exchange has evolved into a form of structural complementarity in which Brazil supplies land-intensive products—particularly soy—while China imports these materials for domestic processing and consumption. This configuration has generated mutual dependence marked by clear asymmetries in bargaining power and exposure to risk (USDA-ERS 2019; Zhang 2021; Aguirre et al. 2021).

Three mechanisms underpin this interdependence: concentration, in which Brazil channels most of its soybean exports to China, while China

obtains most of its imports from Brazil; sensitivity to geopolitical and regulatory shocks, exemplified by the 2018 U.S.–China trade war, which temporarily increased Brazil's market share; and vulnerability reflected in the costs of adaptation and time required when market conditions change. China's accession to the WTO in 2001 established a tariff structure favoring imports of unprocessed soybeans, accelerating bilateral flows that now exceed historical patterns observed during previous trade disruptions (USDA-ERS 2019; farmdoc daily 2024).

Agriculture functions as the backbone of the bilateral relationship, with recent diversification beyond soy to include corn oil, peanuts, dried distillers' grains, and beef exports. This expansion reflects both Brazil's productive adaptability and the evolving preferences of Chinese consumers, supported by sustained improvements in quality control, sanitary standards, and certification processes that enhance traceability and market access. Formal mechanisms of cooperation—such as BRICS platforms and sectoral dialogues like the Brazil–China Food Security Dialogue—prioritize the stability of agricultural trade while addressing technological exchange and data-sharing (Brazilian Farmers 2025; CEBC 2024).

Soy simultaneously operates as Brazil's primary strategic asset and the channel through which traceability requirements, deforestation pressures, and carbon-intensity constraints enter the bilateral relationship. Brazil's dominant position as a supplier generates diplomatic leverage in food-security negotiations, yet this concentration exposes the country to regulatory asymmetries across destination markets—particularly the gap between Chinese import standards and the EU's stricter deforestation regulations. These governance disparities create reputational risks that threaten long-term market access and complicate Brazil's climate commitments, dynamics explored in detail in Section 4 (Trase/SEI 2022; 2025; ABOVE/WWF/USDA-FAS 2025).

The diplomatic implication is the need to treat this interdependence as strategic infrastructure requiring coordinated regulatory frameworks, supply-chain transparency, and safe-to-fail pilot projects to reduce transition costs. Rather than viewing concentration as a permanent advantage or an insurmountable vulnerability, policymakers should develop adaptive mechanisms that leverage current scale while building resilience through diversification, value-added processing, and multilateral partnerships that buffer against single-market dependence (Aguirre et al. 2021; Zhang 2021).

Table 1. Key Indicators of Brazil-China Interdependence (2019–2024)

Indicator	Synthetic Evidence	Diplomatic Implication	Main source
China's share in the flow of Brazilian soybean exports	China maintains a structurally high share of Brazilian soybean purchases, with pro-Brazil spikes during shocks (e.g., 2018).	High concentration of export destinations → heightened sensitivity to external shocks..	USDA-ERS (2019); farmdoc daily (2024)
Brazil's share in China's soybean supply	Brazil holds a consolidated leadership position in China's soybean supply, with fluctuations driven by price dynamics and geopolitical shifts.	Leverage for regulatory and logistical coordination.	USDA-ERS (2019); Zhang (2021)
Weight of the soy complex in Brazil's total exports	A high and persistent share of soy in Brazil's total export value.	External benefits vs. the risk of commodity dependence.	farmdoc daily (2024); CEBC (2024)
Diversification of Brazil's agricultural export portfolio	Growing presence of corn, meats, and inputs; sanitary and logistical adjustments underway.	Opportunity to spread risk and negotiate standards.	Brazilian Farmers (2025); CEBC (2024)
Sustainability and due-diligence pressures	Strengthening of traceability and deforestation-free requirements in third-country markets (EUDR).	Need for regulatory convergence and verifiable compliance mechanisms.	Trase/SEI (2022; 2025)
Reputation and sustainable finance	ESG metrics increasingly affecting credit, insurance, and market access.	Compliance costs today vs. competitive advantage tomorrow.	CEBC (2024)
Soy Moratorium (scope and lessons)	Demonstrated results in the Amazon; ongoing debates around the Cerrado and sectoral governance.	Foundation for bilateral arrangements and certification pilot projects.	ABIOVE; WWF; USDA-FAS (2025)

Source: Prepared by the authors based on Trase/SEI (2022; 2025); ABIOVE/WWF/USDA-FAS (2025).

3. Strategic Soy, Traceability, and Climate Risks

Soy functions as a strategic platform for Brazil, combining trade-balance stability, diplomatic leverage, and vulnerability to sustainability pressures. The soy complex generated US$ 67.3 billion in 2023, representing 40% of Brazil's total export revenue and establishing soy as infrastructure rather

than a simple commodity (farmdoc daily 2024). This transformation goes beyond economic metrics to encompass foreign direct investment flows and supply-chain control, where segments protected by patents create dependencies that limit Brazil's technological autonomy in critical agricultural inputs (Cruz, Medina, and Oliveira Júnior 2022).

Brazil's dominant position as a supplier creates substantial diplomatic leverage with China through network effects that reinforce food-security resilience. Wang et al. (2023), using comprehensive network analysis, demonstrate that Brazil plays a positive role in strengthening China's anti-interference capacity in soybean trade flows, whereas the United States does not—making Brazil strategically valuable for China's food-security objectives. This positioning has been consolidated by the concentration of exports reaching 73% from 2019 to 2023, with peaks of 82% during the 2018 U.S.–China trade war illustrating how geopolitical disruptions amplify Brazil's strategic relevance (farmdoc daily, 2024). However, such concentration generates both opportunity—enhancing Brazil's bargaining power in bilateral discussions—and exposure to Chinese diversification strategies, policy shifts, or economic slowdowns that could rapidly overturn established trade patterns.

International sustainability pressures increasingly challenge traditional commodity-trade practices through multiple channels. The European Union's due-diligence requirements, particularly the Deforestation Regulation (EUDR) entering mandatory enforcement in December 2025, establish traceability obligations for imports of soy grown on land converted after December 2020. Consumer demand for sustainable products and financial-market expectations for ESG compliance add further layers of pressure, affecting access to credit, insurance costs, and market premiums. These external pressures manifest asymmetrically across destination markets, compelling both Brazil and China to adjust production and export strategies while creating opportunities for bilateral cooperation in establishing alternative sustainability standards aligned with Chinese priorities without replicating European regulatory models (Cruz, Medina, and Oliveira Júnior 2022; Trase/SEI 2025).

Traceability challenges expose fundamental governance gaps, threatening long-term market access and diplomatic credibility. Deforestation linked to soy expansion reached 794,000 hectares in 2022, generating 121 million tons of CO_2 emissions—representing 9% of Brazil's total land-use-change emissions—with only 370 municipalities accounting for 95% of all soy-related deforestation while producing 58% of national output (Trase/SEI, 2025). Supply-chain transparency limitations mean that 15–18% of traded soy—approximately 20 million tons—cannot be linked to specific producing municipalities due to

missing data on ownership of silos and crushing facilities. The Amazon Soy Moratorium has demonstrated governance effectiveness within covered regions but leaves the Cerrado without equivalent protection, creating regulatory asymmetries across biomes. Market-exposure analysis reveals stark contrasts: China faces 97% exposure to deforestation in its soybean imports compared to 58% for EU imports, generating differentiated competitive dynamics in which Brazilian exporters benefit from less stringent Chinese standards while facing reputational risks in European markets (Trase/SEI 2025; ABIOVE/WWF/USDA-FAS 2025).

These dynamics transform sustainability challenges into diplomatic opportunities by positioning traceability and ESG compliance as platforms for Brazil-China joint development of standards. Rather than viewing international pressures as constraints, policymakers can leverage sustainability requirements to negotiate bilateral certification systems, technology-transfer arrangements, and safe-to-fail pilot projects in selected municipalities that demonstrate feasibility without imposing immediate systemic costs. Three strategic scenarios emerge from this analysis: cooperation, in which both countries co-create standards that serve mutual interests; dependence, in which Brazil remains locked into commodity exports without governance improvements; and diversification, in which Brazil employs sustainable production as a platform for multilateral engagement beyond bilateral concentration. These scenarios, examined in Section 5, will determine whether Brazil converts commodity dependence into climate leadership while maintaining competitive advantages in the post-COP30 era.

4. Strategic Scenarios beyond COP30: complexity Science and Estuarine Mapping

Given the interdependence examined in previous sections and the intensifying traceability and climate pressures, we construct three strategic scenarios for Brazil–China soy diplomacy in the post-COP30 landscape. These scenarios function as sensemaking tools rather than forecasts, enabling policymakers to understand the evolutionary potential embedded within current constraints and to identify safe-to-fail experiments that generate beneficial emergent properties without catastrophic downside risk (David Snowden and Boone 2007; The Cynefin Co-Snowden. 2021; 2022).

The key constraints and vectors of change are synthesized in Table 2—Estuarine Mapping: Energy/Time Matrix of Actants for Sustainable

Soy Diplomacy—which guides the prioritization of safe-to-fail interventions. This framework distinguishes between fixed elements that require indirect action and modifiable actors that are amenable to direct diplomatic intervention, enabling the strategic allocation of resources across different time horizons and energy requirements for systemic change.

Table 2. Estuarine Mapping: Energy/Time Matrix of Actants for Sustainable Soy Diplomacy

Actants	Energy required to change	Time required to change	Position within the domain	Safe-to-fail experiments
China's food security imperative	Very high	Very long	Counterfactual	Monitor and/or request partnerships
Brazil's export dependence (73% directed to China)	High	Medium	Area of action	Diversify markets and develop value-added processing
EU deforestation regulations (EUDR)	Medium	Short	Area of action	Pilot certification systems
Amazon Soy Moratorium	Medium	Medium	Area of action	Expand to the Cerrado
Carbon intensity (794,000 hectares/ year)	High	Long	Liminal	Research regenerative agriculture
Deforestation (121 Mt CO_2)	High	Medium	Action zone	Pilot blockchain-based traceability systems

Source: Authors' own work based on The Cynefin Co-David Snowden (2022–2023).

Scenario 1—Cooperation: Co-Creating Sustainable Standards

Brazil and China recognize mutual vulnerability and convert bilateral dependence into collaborative leadership by establishing joint sustainability standards. Two key vectors drive this scenario: the development of bilateral certification systems, including municipal-level traceability linked to export documentation; and green-finance mechanisms that reward regenerative agricultural practices through carbon-credit arrangements. Safe-to-fail experiments include pilot certification initiatives in selected municipalities with high deforestation rates and technology-transfer programs for precision agriculture aimed at reducing land-conversion pressure. Joint Brazil–China verification protocols create enabling constraints for innovation while addressing international pressures without replicating European regulatory approaches. Primary risks include potential lock-in effects limiting future

flexibility and the possibility that jointly developed standards could become trade-barrier triggers in disputes with third parties. Trigger events requiring scenario adjustment include a sudden expansion of the EUDR to additional commodities or domestic political shifts in China toward import-substitution strategies (Trase/SEI 2022; 2025; Wang et al. 2023).

Scenario 2—Dependence: Commodity Lock-in without Robust Governance

Brazil remains trapped in commodity exports without developing governance mechanisms consistent with emerging sustainability requirements, resulting in rising vulnerability to external shocks and reputational harm. Two vectors characterize this trajectory: continued concentration without improvements in traceability and reactive responses to international pressure, producing compliance gaps across destination markets. The absence of proactive governance transforms deforestation metrics into volatile constraints, triggering sudden regulatory shifts when thresholds are exceeded. Safe-to-fail experiments remain limited to defensive measures aimed at preserving existing market access, rather than creating competitive advantages through sustainability-based differentiation. Primary risks include EU trade restrictions under EUDR enforcement, reputational damage affecting access to premium markets, and vulnerability to Chinese diversification strategies or policy changes. Trigger events include climate-related shocks to production, intensified international advocacy campaigns, or geopolitical disruptions similar to the 2018 U.S.–China trade tensions redirecting trade flows (USDA-FAS 2025; CEBC 2024).

Scenario 3—Diversification via Multilateral Climate Governance

Brazil positions itself as a leader in climate diplomacy by leveraging sustainable soy as a platform for multilateral engagement while strategically diversifying export bases beyond bilateral concentration. Two vectors enable this scenario: the COP30 momentum, establishing South–South cooperation frameworks for sustainable agriculture; and multilateral partnerships through BRICS+ and alternative financing mechanisms, reducing dependence on a single market. Safe-to-fail experiments include partnerships with African soy-producing nations, the development of regional sustainability standards aligned with Global South priorities, and public-private coalitions that create alternative certification systems. This approach requires research-intensive and interaction-based interventions that modify connections between actants rather than the actants themselves. Primary risks involve potential tensions

with China if diversification signals a strategic decrease in commitment, the complexity of managing multiple simultaneous relationships, and the coordination costs associated with disparate institutional frameworks. Trigger events include successful COP30 outcomes generating new governance architectures or competing sustainability initiatives that fragment global standards (Trase/SEI 2025; Wang et al. 2023).

In Table 3, each scenario is summarized through its enabling constraint, two operational vectors, and the recommended diplomatic posture. This synthesis supports comparative analysis across scenarios while identifying which constraints can be amplified to generate beneficial emergent patterns and which must be dampened to prevent systemic disruptions in bilateral and multilateral negotiations.

Table 3. Strategic Scenarios: Complex Adaptive System Analysis

Scenario	Enabling Constraints	Emergent Properties	Vector Actions	Diplomatic Posture
Cooperation	Joint sustainability standards, technology sharing, bilateral climate fund	Brazil as China's premium sustainable supplier, institutional innovation	Stabilize the partnership and trigger innovation	Strategic alliance leader
Dependence	Current trade standards, regulatory gaps, short-term profitability	Vulnerability to external shocks, governance deficits	Monitor risks and pursue compass-rose diversification	Reactive commodity supplier
Climate leadership	COP30 momentum, South-South cooperation, multilateral frameworks	Brazil as a global sustainability model; formation of new coalitions	Research alternatives, interact with multiple partners	Proactive multilateral leader

Source: Authors' own elaboration based on The Cynefin Co-David Snowden (2022–2023).

5. Implications for Brazil's Commercial and Climate Diplomacy and Conclusion

Brazil–China soy diplomacy is shaped by a dense web of interdependence, competing constraints, and emerging opportunities across trade, climate, and domestic governance. Rather than a mere commodity partnership, it has

evolved into a system characterized by supply-chain stickiness and network lock-ins that generate both leverage and exposure. The political challenge is to convert this structure into strategic advantage while reducing reputational and transition risks in the post-COP30 trajectory (Tixiliski 2024; Zhang 2021; dos Reis and Meyfroidt 2023).

In complex domains, leaders advance through probe-sense-respond, not predict-and-control. In practice, this means executing safe-to-fail experiments and scaling what works. Moreover, estuarine mapping helps disentangle fixed constraints (e.g., China's food-security imperative) from negotiable constraints (e.g., verification pathways, financing terms), guiding where to intervene with lower energy/time costs. Two immediate probes therefore stand out: joint certification pilots in priority corridors, and finance/insurance windows linked to verifiable traceability (Snowden and Boone 2007; The Cynefin Co. 2021; 2022). Additionally, we explore three Post-COP30 scenarios:

> Scenario 1—Cooperation (Co-creating Sustainable Standards): Brazil and China co-design robust, interoperable standards; launch municipal certification pilots and a bilateral investment window; and manage EU due-diligence spillovers through rapid data-sharing protocols.
>
> Scenario 2—Dependency (Commodity Lock-in without Robust Governance): Recognize exposure to price/regulatory shocks; diversify markets and premium segments; monitor energy/time signals to avoid reinforcing lock-ins.
>
> Scenario 3—Diversification via Multilateral Climate Governance: Combine BR–CN coordination with South–South coalitions; align climate-finance and traceability protocols to accelerate compliance at scale (Trase/SEI 2022; 2025; USDA-FAS 2025; CEBC 2024; dos Reis and Meyfroidt 2023).

Table 1—Estuarine Mapping: Energy/Time and *Table 2—Strategic Scenarios* operationalize these choices, linking constraints, enabling vectors, and recommended diplomatic postures for each scenario.

For negotiators, the shift is from transactional agreements to a compass-guided strategy that triggers and stabilizes directional change in the trade-and-climate system. Priorities include building public-private coalitions for traceability, embedding minimum-compliance clauses in BR–CN contracts, and using real-time monitoring to dampen adverse patterns and amplify positive ones. This approach protects market access in third-country

jurisdictions and strengthens Brazil's position in bilateral negotiations (Zhang 2021; Trase/SEI 2025; CEBC 2024).

Ultimately, the strategic bottom line is to treat sustainable soy as a platform for international integration, not as a passive commodity. Governing the chain through co-certification, interoperable data systems (CAR/invoice/export systems), and climate-finance alignment transforms external requirements into competitive advantage. With disciplined experimentation and estuarine navigation, Brazil can expand bargaining power, reduce transition costs, and co-lead climate-trade norms with China in the post-COP30 era and beyond (The Cynefin Co. 2021; dos Reis and Meyfroidt 2023; Snowden and Boone 2007).

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