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The coffee supply chain illustrates transboundary climate risks: Insights on governance pathways

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IMAGE (ABOVE): Coffee harvesting, Brazil
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Summary

- **As communities and economies become ever more interconnected in a globalizing world, they share exposure to the adverse effects of a warming world through Transboundary Climate Risk (TCR).**
- **With both producing and consuming countries sharing climate risks, there is a clear need for global governance structures for managing climate change adaptation. However, few frameworks, policies or regulations for these risks have been established as of yet.**
- **This brief examines the Brazilian-German coffee supply chain to arrive at five empirically driven governance pathways for TCR governance.**
- **It concludes that both public and private actors involved in supply chain management have important roles and responsibilities in managing adaptation activities across borders.**
- **Large supply-chain actors are well-placed to govern TCRs by developing robust adaptation strategies. However, they need countries and international organizations to provide better conceptual and legislative support.**

1. Introduction

The interconnections between countries in a globalizing world continue to deepen and are central to the modern international economy. Yet, governance efforts to build resilience to the adverse risks and impacts of climate change are highly fragmented and have not sufficiently focused on these international dimensions. Relationships between people, ecosystems and economies across borders change the scope and nature of the climate adaptation challenge and generate climate risks that are transboundary (Challinor et al., 2017). Climate impacts in one country can create risks and opportunities – and therefore may require adaptation – in other countries, due to cross-border connectivity within regions and globally (Hedlund et al., 2018).

These Transboundary Climate Risks (TCRs) may develop in one location remote from the location of their origin. This dynamic necessitates examining the governance structures for managing climate change adaptation. For example, with regard to trade and international supply chains, climate change impacts in one location can disrupt local economies and vulnerable people's livelihoods, while also affecting the price, quality and availability of goods and services on international markets (Benzie et al., 2018).

Coffee is one of the most traded commodities in the world with an immensely globalized supply chain. The global coffee sector involves more than 100 million people in over 80 countries. Coffee production and the livelihoods of smallholder coffee farmers around the world are at risk due to climate change, threatening to disrupt one of the world's largest agricultural supply chains.

The coffee supply chain represents an important arena for public and private actors to negotiate how resource flows should be governed and climate risks should be managed. Currently, neither governments nor private sector actors are sufficiently addressing TCRs (Benzie & Harris, 2020) and no clear mandates exist for actors to take ownership of this issue. Furthermore, the United Nations Framework Convention on Climate Change (UNFCCC), the main body for climate change policy and governance, does not provide any coherent recommendations on how to manage TCRs. This governance gap raises questions about what methods are likely to effectively reduce climate risk and be taken seriously by coffee market stakeholders.

This policy brief explores different ways to govern TCRs, and how public and private actors view their effectiveness and legitimacy. Focusing on the Brazilian-German coffee supply chain, the brief presents a deductive framework of five governance pathways through which TCRs could be managed. It is based on 41 semi-structured interviews with 65 Brazilian and German public and private experts, including roasters, traders, cooperatives, associations and certification schemes, as well as government ministries, international development agencies, international organizations and civil society representatives.

2. Direct and transboundary climate risk in the coffee supply chain

As a sector, agriculture is one of the most susceptible to climate change risks and impacts, both over the short term (e.g., through extreme weather) and the long term (e.g., shifts in climatic patterns including temperature and precipitation). Farmers depend on crop yields for their livelihoods and are among the most vulnerable both to increased risk and higher production costs. But all actors along the global supply chains that connect producers to far-away consumers are exposed, in various ways, to climate risks and impacts (Benzie et al., 2018).

For example, coffee is largely produced in developing countries and primarily consumed in developed ones. Coffee is highly vulnerable to climate change. It requires ideal growth conditions and is sensitive to climatic variations (Vieira & Lequieu, 2021). Climate-driven risks to coffee production will disproportionately hurt smallholder farmers who produce around 70% of the world's coffee. By the year 2050, climate change is expected to reduce the global area suitable for coffee production by about 50% (Bunn et al., 2015). The coffee sector provides employment and income directly to an estimated 25 million households, of which 80% are smallholder farmers with production areas smaller than 5 hectares. Furthermore, as coffee is a perennial crop, it requires longer lead times to adjust production practices. Decisions coffee farmers make today can take years to influence yields.

In addition to climate change's direct effects on coffee production, the globalized nature of the coffee trade creates spillover effects throughout the supply chain. Coffee is the second-most traded commodity in the world, after oil, with roughly 7.4 million metric tons exported in 2018 (ICO, 2019). Climate-induced price and yield shocks will affect coffee cooperatives, traders, roasters, retailers and, ultimately, consumers. For example, cooperatives often purchase coffee from several local farmers, acting as a bridge between smallholder producers and larger coffee traders. In the event of climate-related extreme weather events, which can be highly geographically specific, cooperatives may struggle to source sufficient quality product to do business. Additionally, longer-term downward pressure on coffee production due to hotter temperatures and less precipitation can indirectly affect the full supply chain; prices may increase as coffee becomes more challenging to produce and those costs may extend to roasters, retailers and consumers.

The increasingly high likelihood of adverse and severe climate change impacts on agriculture will reduce the ability for actors to diversify income, substitute crops and hedge trade risks. For most agricultural products, and coffee particularly, the strategy to replace high-risk

suppliers with more resilient ones will not be plausible, as the risks to agricultural production far outpace the opportunities to increase production elsewhere (Adams et al., 2021).

TCRs, as an element of climate change adaptation, underscore the shared interest of producers and consumers, as well as public and private actors, to collectively manage climate risks and adaptation to them. Therefore, governments need to invest in growing the adaptive capacity of the global agricultural system. In parallel, coffee supply chain actors urgently need to reduce their climate risks by building resilience and improving the livelihoods of smallholder coffee farmers.

3. Governing Transboundary Climate Risks

Because TCRs threaten the economies of both producer and consumer countries, both should take interest in governing natural resources across borders. At the same time, public and private supply chain actors may prefer different methods of risk management in practice. There are, however, no internationally agreed frameworks, policies or regulations for governing TCRs, nor is there consensus about which policy regimes or actors should be tasked with developing and implementing them.

One relevant policy forum for addressing TCRs is the UNFCCC, which, through the 2015 Paris Agreement, acknowledged that adaptation is a global challenge with international dimensions (Article 7.2). The Paris Agreement also created a Global Goal on Adaptation (GGA), aiming to enhance adaptive capacity, strengthening resilience and reducing vulnerability to climate change (Article 7.1) (UNFCCC, 2015). However, it remains unclear if or how the UNFCCC will enhance elements of the GGA related to TCRs. Ownership of TCR governance continues to remain unclear and ends up being “no one’s job” (Benzie & Harris, 2020).

In this policy brief, we present five possible governance pathways for TCRs (Table 1). These were derived from the interviews and were explored, negotiated and contested by key actors in the Brazilian-German coffee supply chain. They are listed in order of how often they were legitimized by interviewees. While the proposed pathways are not exhaustive nor mutually exclusive, they provide an empirical starting point for a governance framework of an emerging issue area of global environmental governance.

Transnational Governance

The pathway that most interviewees cited, both in positive and negative terms, is the transnational governance pathway. Governance by transnational actors serves to compensate for reduced state capacity or failing policies and institutions at the national or international levels (Hoffmann, 2011). Actors promoting this pathway argue that global supply chains are effective for tracking and labelling of products and services from environmentally and socially responsible businesses. This occurs usually through market logic and incentives, or in response to advocacy, where consumers apply power to achieve norms and standards to which other actors and institutions can commit. In this pathway, the private sector holds a central role for governing TCRs, and, to a lesser extent, public-private partnerships.

This pathway often includes market-driven private sustainability initiatives, such as certification standards, and Corporate Social Responsibility initiatives. Other types of arrangements include insurance and credit schemes. Large traders and roasters, together with coffee cooperatives, are considered key actors in this governance landscape, given their significant size, their role as intermediaries between the markets of producing and consuming countries, and their ability to alter incentive structures to incorporate TCR management.

Supportive arguments for this pathway note the ability of the private sector to solve problems in its own supply chain. The private sector is understood to be the most effective actor to govern TCRs, relying on their superior knowledge of the coffee sector and the

Table 1 Summary of governance pathways

	Transnational Governance	Development Cooperation	International Diplomacy	Global Markets	Domestic Policy
Description	Public and private actors cooperate to incentivize behavioral change	Donor countries support the self-determined development priorities of recipient countries	Sovereign states negotiate as equals and jointly agree on rules or regulations intended to benefit both parties	Global markets respond to consumer preferences	Governments are wholly responsible for the governance of resources and risks within their borders
Key Policy Mechanisms	Certification schemes Private finance, insurance and credit schemes Public-private partnerships	Development assistance Capacity-building and technology transfer	Bi/multilateral engagement International agreements	Market signals Consumer behavior	Domestic law Domestic strategies and plans
Key Actors Engaged	States Private companies CSOs/NGOs	States Development agencies and banks CSOs/NGOs	States International organizations and clubs	Consumers Private companies	States Local/regional governments
Ambition for International Cooperation	High	High	High	Low	Low

challenges businesses face working to maintain profitability. However, many interviewees also implied that while the private sector may be well-equipped to resolve its own problems, they are not believed to produce wider benefits for society. It was also noted that coffee is perceived as a more sustainable sector than other agricultural products (e.g., soy and palm oil), and the large conglomerates would rather direct their sustainability efforts to other products in their business.

Interviewees also mentioned the limited effectiveness of certification schemes in improving sustainability, either because competition among the numerous schemes leads to reducing requirements for producers to participate, or because producers see certification as a short-term opportunity to supply coffee to niche markets where it is most in-demand, such as northern Europe, rather than a long-term investment in sustainability. Moreover, there is an oversupply of certified coffee, reducing its economic benefit to producers (Grabs, 2020).

Development Cooperation

The second-most relevant pathway is the development cooperation pathway. The logic of this pathway is the nature of the donor-recipient relationship, usually between developed and developing countries. TCR governance can include providing resources to assist governmental institutions and civil society organizations. It can also be achieved through support for institutional capacity-building and mainstreaming climate risk, or climate-proofing, in domestic decision-making. These efforts can help shift the balance of power in domestic policy processes by, for example, providing support to politically marginalized or disempowered organizations. However, democracy, transparency, openness and accountability are required for the success of this strategy (Bernstein & Cashore, 2012).

For this pathway, interviewees emphasized the ability of development actors to bring all the relevant players to the table, referring to the private sector in addition to a specific focus on the inclusion of smallholder coffee farmers and local governments. Furthermore, given the unequal terms of trade in the coffee sector, where most profit is made in developed countries where the coffee is roasted and sold, interviewees argued that the German government has a duty to support the Brazilian coffee producers who grow the raw product. German development agencies are also believed to have a high capacity to share relevant knowledge about climate risk management in agricultural systems, provide technology to producers and help build the resilience of smallholder farmers.

Indeed, the German International Development Agency (GIZ) created the initiative for coffee&climate in 2010, focusing on adaptation in the coffee sector, together with the Neumann Kaffee Gruppe, a large German trader and roaster. However, German development agencies on the whole say they are instead prioritizing Brazilian deforestation initiatives to reduce fossil fuel emissions generated through land use change, while coffee is not part

BOX 1. BRAZIL AND GERMANY: TWO GIANTS IN THE COFFEE SECTOR

Brazil is the world's largest coffee producer, representing nearly 29% of total exports, while Germany is the second-largest importer in the world, importing US$3.2 billion in 2019. Germany is a large importer of Brazilian coffee in particular and an important re-exporter of roasted coffee (Barros, 2019).

The two countries have shared a strategic partnership since 2008, which includes a high-level consultation mechanism covering a broad set of topics including the environment and climate change (Bastos et al., 2014). Brazil and Germany have also been engaged in deliberations around the EU-MERCOSUR (Brazil, Argentina, Paraguay and Uruguay) Free Trade Agreement, which would be the largest trade agreement for both of the participating blocs (Brunsden et al., 2019). The Brazilian Coffee Exporters Council (CeCafé) expects Brazilian coffee exports will grow considerably thanks to the agreement (CeCafé, 2019).

While the parties have come to an agreement in principle after 20 years of negotiations, final texts have not yet been produced or signed, in part because the deal has been heavily criticized throughout the EU. Key reasons for this include Brazil's management of the Amazon rainforest and recent increases in deforestation under the Bolsonaro Administration. Consequently, several EU countries have threatened to not sign the deal (Colli, 2019). The trade agreement includes a chapter on trade and sustainable development, which emphasizes environmental and climate change issues by promoting more sustainable trade as a pathway towards lower greenhouse gas emissions and climate-resilient development (EC, 2019).

of its agenda. Instead, adaptation efforts are seen as better targeted to Least Developed Countries with more acute climate risks than Brazil.

International Diplomacy

The international diplomacy pathway, the third-most invoked in the Brazilian-German coffee supply chain, emphasizes the role of foreign policy and is premised on the equal engagement of countries in bilateral and multilateral settings, through negotiations in the UNFCCC and the World Trade Organization, for example. In theory, international diplomacy is believed to be highly effective, particularly for providing common goods. Impartiality is critical to international diplomacy, where the aim is for countries to jointly and voluntarily agree to the establishment of rules which benefit both parties and are applied equally for all involved. However, consensus can be, and often is, triggered by threats or other coercive practices, such as non-compliance and persuasion, which can leave minor actors, particularly developing countries, facing a high cost for resistance (Steffek, 2007).

As a mechanism for TCR governance, Free Trade Agreements (FTAs) were described as an important avenue, as the role of sustainability in FTAs has become a bigger focus in recent years (Jinnah & Morin, 2020). In the Brazilian-German coffee supply chain, one of the most relevant diplomatic processes is the ongoing EU-MERCOSUR FTA negotiation, where Germany and Brazil are engaged as members of their respective trading blocs in constructing the architecture for future trade between the countries (See Box 1).

However, as several interviewees noted, FTAs are very broad and coarse tools. High-level rules and regulations may have little practical effect on the everyday circumstances for many coffee producers. Several representatives of traders and cooperatives, for example, dismissed the EU-MERCOSUR trade agreement as irrelevant for the governance of TCRs in the coffee supply chain. Additionally, coffee is barely mentioned in the agreement text (EC, 2019). Furthermore, interviewees cast doubt on the efficiency of FTAs, remarking that negotiations were slow and cumbersome, and depended heavily on the relationship between the ever-changing administrations in power.

Global Markets

In contrast to the three pathways above, the next two pathways both imply that active governance across borders is not necessary, or even efficient, for dealing with TCRs. Proponents of the global markets pathway portray markets as the central agent for handling most issues, TCRs included. Interviewees stressed the importance of non-intervention and minimizing any effort to influence consumer behavior through market manipulation.

While less prominent in the Brazilian-German coffee supply chain than other pathways, the laissez-faire global markets approach still holds sway among a number of actors, particularly multinational companies. Supported for many of the same reasons as the transnational governance pathway, proponents emphasize the private sector's ability to innovate and solve problems, their high level of expertise and experience in the coffee business, and the ability of the market to act as an impartial distributor of goods and services across society.

In contrast, arguments against non-intervention point to the failures of private sector to effectively solve the problems of smallholder farmer poverty and building climate resilience. Furthermore, interviewees noted that markets were very poor at capturing externalities, such as climate change risks and impacts. Lastly, interviewees noted frequently and critically that the fluctuation in the price of coffee, which is set on financial markets, can perpetuate smallholder poverty.

Domestic Policy

The last and least-invoked pathway is grounded in the notion that national governments are responsible for the management of resources and risks within their borders, contending that

Germany and Brazil should deal with their respective sides of the supply chain separately. Addressing TCRs should be done through national legislation and climate and sustainable development policies and strategies, proponents say.

Interviewees who spoke in support of this approach underscored the idea that national governments would know best what was needed for their particular contexts and therefore be better able to solve problems and produce collective gains. Most importantly, however, interviewees argued that it was a national responsibility to coordinate and govern domestic affairs, accountable to all citizens. Some noted that Brazil already strongly regulates both environment and agriculture, in some cases more strictly than several coffee certification systems require. In addition, the national coffee fund, Funcafé, funds various initiatives in the coffee sector, as well as the low-carbon agriculture (ABC) plans under implementation throughout the country. Lastly, several interviewees emphasized the work of the National Service for Rural Learning (SENAR), which provides training and education opportunities for farmers. In Germany, several interviewees argued that the best opportunity for Germany to address TCRs in the coffee supply chain was to abolish the national tax on certified and sustainable coffee, which would increase the consumer demand for sustainable coffee (Molenaar & Short, 2018).

At the same time, many interviewees also challenged these lines of argument. For example, while there are strong environmental regulations in Brazil, very few laws address climate change, and the enforcement of environmental policy in Brazil leaves much to be desired. At the same time, critics of this pathway question government's accountability or ability to effectively pursue environmental protection or climate action.

Conclusion

Building climate-resilient trade and production systems in agricultural supply chains is imperative for achieving global and national climate goals. Public and private actors involved in global supply chains have important roles in TCR management and governance, both within and across borders.

These findings indicate that a dominant discourse exists, contending that transnational governance, operated by private sector actors in service of market logics or response to market externalities, bears primary responsibility for managing risk. However, this pathway is closest to business-as-usual for the sector, and the certification schemes on which it heavily relies are insufficient to produce effective sustainability outcomes.

Second, this specific supply chain considered development cooperation only marginally. More importantly, a wealth of literature in development studies and development aid would call into question (Baranovskii, 2016; Carbone, 2007) the persistent assumption that development cooperation is a benevolent exercise.

Third, the international diplomacy pathway holds the strongest argument for both effectiveness and legitimacy. But negotiations at the high level are far from certain to build real resilience of smallholder farmers. Furthermore, decades of research on international political economy, power imbalances and the various forms of coercion which are commonplace in global environmental governance and foreign affairs (Ciplet et al., 2015) indicate that international diplomacy does not necessarily occur between truly equal states.

Lastly, neither global markets nor domestic policy have so far made any efforts to govern TCRs across borders.

The proposed pathways in this brief are neither necessarily exhaustive nor mutually exclusive. The balance between them is contextually specific and case-driven. Other

countries and other supply chains in which actors operate in different historical and political economic contexts may well differ from the case examined here. Nevertheless, the pathways may apply generally to TCR governance in other supply chains, issues in global environmental governance or for foreign affairs more broadly. Systematic inquiry is needed to explore precisely how differences exist across these contexts.

POLICY RECOMMENDATIONS

- **International coffee traders are the intermediaries between producers and consumers therefore well-placed to take leadership in incorporating TCRs in supply-chain governance. They need robust adaptation strategies that incorporate climate risk along the whole supply chain.**
- **The international community should better account for TCRs and establish a coherent approach to TCR governance that includes both national governments and private supply-chain actors.**
- **The UNFCCC should assume leadership by operationalizing Article 7 of the Paris Agreement, framing adaptation as a global challenge, to include propositions on TCR governance. It should also seize the opportunity if incorporating TCRs into the adaptation agenda that is offered by the 2-year Glasgow–Sharm el-Sheikh work programme on the global goal on adaptation launched at COP26.**
- **Importing countries and the broader international community should enhance their financial and technical support for adaptation, including to TCRs, because many developing countries lack the capacity to deal with climate change risks and impacts in their agricultural supply chains,**
- **Efforts to govern TCRs need to go beyond the traditional tools of climate adaptation. Actors, public and private, should consider how other relevant policies (e.g., free trade agreements and tariffs) can incentivize investment in global resilience for the benefit of producers and consumers.**

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