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The business of climate change: changing sources of green capital accumulation in the coffee sector

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ABSTRACT
Climate change presents a significant challenge while also offering opportunities for businesses to benefit from a decarbonised economy. In this paper, we examine the *business of climate change* – the process of mitigating risks and seizing opportunities arising from climate-related markets. We contribute to extant discussions on the sources of *green capital accumulation* and how they are being reshaped to leverage the opportunities offered by climate change interventions. Using the coffee sector as an illustrative case study, we explore how climate change is reshaping business strategies. We focus on mitigation measures, such as carbon offsetting and insetting, and the emerging role of midstream trading companies in providing sustainability assurance and climate mitigation services. We find that while climate change costs and risks are mainly borne by farmers, companies downstream are prioritising the business opportunities related to available climate financing and client demands related to net-zero commitments. Ultimately, we suggest that climate change is providing additional sources of green capital accumulation to mid- and downstream companies in value chains, while at the same time threatening their long-term survival.

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Introduction

While it is abundantly clear that climate change creates existential risks for the global economy (Ghadge *et al.* 2020, Beckert 2025), a counternarrative has emerged that stresses the (uneven) opportunities that a decarbonised economy might bring to businesses (Hoffman 2005, Lash and Wellington 2007, Wright and Nyberg 2015, Frisch 2023), investors (Kaplan and Levy 2025) and nations (Lebdioui 2024) under a consolidating 'green spirit of capitalism' discourse (Goldstein 2018). In this paper, we explore the features and distributional effects of the 'business of climate change', defined as *the process of minimizing downside risk and maximizing potential opportunities arising from novel,*

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climate change-related markets and demands in order to enhance capital accumulation and ensure competitive advantage. Through a case study of the coffee sector, our paper illustrates how the business of climate change operates, what sources of capital accumulation it provides, who it benefits, and who it leaves out of the equation.

The international political economy of the environment and climate change (IPE-ECC) literature has long recognised that environmental sustainability concerns can be leveraged as business opportunities by large corporate players in an effort to accumulate 'green capital' (Dauvergne and Lister 2012, Dauvergne 2018, Ponte 2019). Simultaneously, such action can create hidden costs for supply chain participants and marginalised economic actors who may have to shoulder sustainability costs themselves while losing out on economic and sustainability upsides (LeBaron and Lister 2022). IPE-ECC work also highlights the entrenchment and powerful role of incumbent corporate actors (Wright and Nyberg 2015, 2024), as well as the need for more coordinated action by the state to foster inclusive green transitions (Ban and Hasselbalch 2025). One of the key insights emerging from this literature is that

> in political economy terms, responses to climate change need to be couched in terms either of *articulating a novel sort of regime of accumulation that is consistent with addressing the climate challenge (however framed)*, or an ability to imagine and produce a sort of post-capitalist transition to a form of society which is not predicated on endless accumulation as a fundamental logic and imperative. (Paterson 2021, p. 924, emphasis added)

In this paper, we chronicle the ways in which Paterson's first observation – the construction of a changing or novel sort of regime of accumulation – is proceeding in the agricultural sector. This regime, which elsewhere (Ponte 2020) has been termed one of 'green capital accumulation', started to take shape in the past two decades following first the emergence and then the consolidation of sustainability certifications in supply chains. Here, we argue that its current metamorphosis includes the capitalisation of important climate change-related initiatives, such as carbon insetting, and additional sources of financial gains. We showcase the continuous ability of capitalism to find new sources of (green) capital accumulation, while at the same time highlighting its inability to address a key threat to its existence – what Wright and Nyberg (2015) call 'creative self-destruction'.

While there are a number of powerful corporate actors in agriculture (Clapp 2018, 2025), we hone in particularly on midstream actors; that is, companies 'storing and/or transporting and/or processing a commodity' (Grabs *et al.* 2024). Such midstream actors connect agricultural production sites to manufacturers and retailers and have the potential to fulfil vital sustainability functions and translate requirements and information both up- and downstream. Yet this position of influence may also be used to further midstream companies' own interests and business models, with uncertain sustainability outcomes (Grabs and Carodenuto 2021, Grabs *et al.* 2024).

We focus on the coffee sector as an illustrative case study. Climate change-related challenges in coffee are numerous and have been widely recognised, including in the mainstream media. Some studies estimate that as much as 50 per cent of the current growing area will become unsuitable for coffee production by 2050, due to increasing temperatures and changing rainfall patterns (Bunn *et al.* 2015, Pham *et al.* 2019). More frequent climate shocks, such as droughts or extreme rainfall, may also contribute to production shortfalls and increasingly volatile prices and unstable global markets (Pham *et al.* 2019, Kweka and Ouma 2020). Smallholder producers currently relying on coffee production for their livelihoods will thus need to adapt their production practices, switch to different crops, and/or move to different locations to mitigate the risk of falling incomes (Guido *et al.* 2020, Quiroga *et al.* 2020). Simultaneously, the coffee sector is one where power relations are particularly pronounced, with roasters and trading companies exerting significant power over smallholder producers and cooperatives in an effort to maximise value capture (Grabs and Ponte 2019, Bennett and Grabs 2025). As a sector where significant climate concerns and power asymmetries overlap, it is thus a useful area to explain how the business of climate change plays out.

In the next two sections, we briefly review the current debates on the role of business in tackling climate change and chronicle the way in which sustainability and climate change governance have been evolving in the coffee sector. We then explain the methodological basis of our findings. In the last two sections of the paper, we leverage our research material to discuss the implications of two key empirical observations:

(1) It is still unclear whether the sourcing strategies of roasters and international traders will become more place-bound, tying international coffee actors more closely to specific origins (something that could benefit farmers); we are sceptical about this possible outcome because our interview material surprisingly suggests that climate change is not yet seen as a major supply risk by coffee actors outside of producing countries, but rather as a business opportunity.
(2) The putative benefits that farmers could receive through carbon mitigation initiatives, while publicly highly touted, are privately contested; this is because the three main avenues of accessing climate-related funding by international coffee traders (donor projects, favourable financial terms by banks, and resources provided by coffee roasters in view of meeting their net-zero commitments) yield uncertain benefits for coffee smallholders.

As a result, we expect that climate change interventions will mainly translate into yet another venue of green capital accumulation for business.

Climate change and business action

The IPE-ECC literature has grown significantly in recent years, and has contributed to our understanding of why greenhouse gas emissions continue to rise; what explains the dominant approaches to climate governance and policy; which actors – including states, transnational corporations and civil society – hold the greatest influence over climate-related decisions; how they bargain with each other; and how climate change is becoming increasingly financialised, including via the introduction of carbon markets (for comprehensive reviews, see Paterson and P-Laberge 2018, Paterson 2020).

Companies have been examined as primary emitters of greenhouse gas emissions, but also as key agents shaping climate debates and enacting strategies to address climate change (Newell and Paterson 1998, Levy and Newell 2004, Meckling 2011, Wright and Nyberg 2015, 2024, Grabs 2023). Initiatives linking international emissions reduction targets to individual business goal-setting, such as net-zero goals and the Science-

Based Targets initiative (SBTi), aim to harness the power of corporations to contribute to global 'grand challenges' such as climate change (Riedel 2024). However, the literature also highlights the power of incumbent corporations in framing and shaping transitions, for instance via a strategic application of the SBTi framework (Tilsted *et al.* 2023).

Much focus has been placed on fossil fuel corporations and other carbon majors, as well as companies owning significant assets linked to fossil fuel consumption and how they are attempting to derail the possibility of a green transition (Colgan *et al.* 2021, Paterson 2021, Christophers 2024, Fressoz 2025, Malm and Carton 2025). However, there has been comparatively less emphasis on the specific ways in which other corporate actors are positioning and rearranging their business models under the threat of climate change.

Climate change is threatening the production of a wide range of agricultural commodities (Bezner Kerr *et al.* 2022), making the agricultural sector an important case to investigate. In addition to nation states, business has emerged as a major driver of climate mitigation and adaptation actions (Newell *et al.* 2018, Mikulewicz and Taylor 2020). The existing literature highlights the rise of donor-driven concepts such as climate-smart agriculture, the dominance of international organisations such as the FAO and World Bank in shaping climate-related policy agendas, and the emphasis on public-private partnerships and participation of agribusiness in rolling out climate-smart practices (Newell and Taylor 2018, Newell *et al.* 2018, Mikulewicz and Taylor 2020). Political ecology work has also challenged the political economy of climate change adaptation (Taylor 2014, Sovacool and Linnér 2016) and that there can be 'climate resilient' or 'climate compatible development' more generally (Fisher and Rai 2016, Nunan 2017).

While some authors perceive great potential in agricultural development programmes and public-private partnerships driving greenhouse gas mitigation (Khatri-Chhetri *et al.* 2022), others are more sceptical. As Mikulewicz and Taylor (2020, p. 632) assert, the 'convergence of corporate interests around climate-smart agriculture in Africa occurs in separation from an interrogation of how such business-as-usual practices intensify emissions, therein causing the very climate change to which they are subsequently conscripted to help build resilience'. Newell and Taylor (2018) map out how agribusinesses employ discursive, institutional and material power to shape climate-smart agriculture to their benefit. Newell *et al.* (2018, p. 9), in turn, illustrate how in Kenya, business-as-usual good agricultural practices are repackaged as 'climate-smart agriculture' in order to access development aid. Tilsted *et al.* (2023, p. 103229) highlight that in food companies' net-zero plans, 'they double down on existing, hitherto largely unsuccessful, initiatives to ensure mitigation in their value chains for beef, palm oil, soy, and cocoa that are set to put pressure on smallholders across the Global South.'

Our paper aims to contribute to these debates by focusing specifically on climate change-related perceptions and actions in the coffee sector. We build on the literature on the hidden costs of supply chains (Dauvergne 2022, LeBaron and Lister 2022, Ponte 2022) and more specifically that on green capital accumulation (Ponte 2020). Ponte (2020, p. 75) in particular argued that

> sustainability is … becoming mainstreamed in business conduct and operations, and is likely to remain a strategic concern as long as it can be leveraged for capital accumulation and to ensure competitive advantage. In other words, corporations are turning sustainability into a business.

In this paper, we unpack how business is continuing to pursue and expand this broad strategy by adding a series of climate change-related levers. Building upon insights from previous literature (Hoffman 2005, Lash and Wellington 2007, Wright and Nyberg 2015), we focus on the delicate balance that business is seeking between managing potential risks – both supply-related and regulatory risks linked to climate legislation – and the business opportunities that might arise from climate-related actions. Taking advantage of the business opportunities of climate change allows companies to continue accumulating green capital in the same vein as they did with other sustainability-related criteria in the past two decades or so – with uncertain benefits for smallholder coffee farmers.

Sustainability and climate change governance in the coffee sector

To situate our analysis, we first provide a general introduction to sustainability-related trends in the coffee sector over the past decade or so, including those related to climate change mitigation and adaptation. While the 1990s and 2000s were dominated by the rise of voluntary sustainability standards and their adoption across the sector, from the 2010s onward we observe an increasing internalisation of sustainability criteria, especially by the largest roasters who now prefer the higher control and flexibility afforded by company-internal sourcing guidelines (Grabs and Ponte 2019, Grabs 2020). Subsequently, multinational trading companies also started to offer their own sustainability programmes and verifications to roasters, often at a lower price point than third-party certifications (Grabs and Carodenuto 2021; Grabs, 2025). The development of such programmes also entailed the enhancement of supply chain traceability, the collection of large amounts of producer-level information and sustainability-linked indicators, and the strengthening of farmer-buyer ties in an effort to increase producer loyalty. Simultaneously, pre-competitive collective action platforms such as the Global Coffee Platform, the Sustainable Coffee Challenge and the International Coffee Organization's Public-Private Task Force for a Sustainable Coffee Sector began to focus their efforts on coordinating company action and encouraging collaboration in specific sourcing locations. The Global Coffee Platform furthermore established an equivalence mechanism for sustainability schemes which categorised third-party certifications, roaster-led schemes and trader-led programmes all as purveyors of 'sustainably sourced' coffee (Global Coffee Platform 2025). Overall, private sustainability governance thus became more company-dominated and fragmented over the last fifteen years (Grabs 2020).

In addition, public policy changes also created a new context for the coffee sector. The EU Green Deal policy package, launched in 2019, included several regulations and directives that increased corporate accountability for companies' supply chains. The EU Deforestation Regulation directly aims to contribute to climate change mitigation by reducing import-driven deforestation, including by the coffee sector (Berning and Sotirov 2023). The Corporate Sustainability Reporting Directive increases requirements for environmental, social and governance-related reporting for large EU-based companies, and obliges them to evaluate the compatibility of their business model with the goals of the Paris Agreement to limit global warming to 1.5 degrees Celsius above pre-industrial levels (Poulle *et al.* 2024). The Corporate Sustainability Due Diligence Directive asks very large companies to comprehensively map, assess, mitigate and remediate adverse human rights and environmental impacts in their supply chains (McCullagh 2024). Understanding, implementing and complying with these legislative changes has dominated the attention of sustainability professionals in the (EU-based) coffee industry since 2020. However, at the time of writing the EU was considering the final configuration of the so-called 'Omnibus package' on the possible simplification of these regulations, which are likely to loosen some of their key demands.

Finally, a third component of a shifting sustainability landscape is the rapidly developing arena of carbon mitigation actions. In 2020, the United Nations launched its 'Race to Zero' campaign which encouraged businesses around the globe to align their company goals with the Paris Agreement and aim to reach net-zero emissions by 2050 (Sevil *et al.* 2022). Organisations such as the Science-Based Targets Network developed methodologies to ensure that corporate commitments are aligned with the best available science, and a number of large food and beverage companies made such net-zero commitments, including via the SBTi (Ko and Prakash 2024). As SBTi requires companies to include their Scope 3 emissions if these are a substantial part of their overall carbon footprint, food and beverage companies are increasingly interested in measuring on-farm carbon emissions and identifying mitigation opportunities (Liu *et al.* 2023).

In addition, the concept of carbon insetting has gained prominence as an ostensibly more legitimate way of compensating for greenhouse gas emissions than for offsets (Banerjee *et al.* 2013). Carbon *offsetting* involves acquiring 'carbon credits' from projects dedicated to mitigating future carbon dioxide emissions or capturing carbon dioxide from the atmosphere (Hyams and Fawcett 2013). Carbon *insetting* focuses on generating carbon credits within the company's own supply chain, for instance via coffee farmers planting trees on their farms, rather than purchasing offsets from far-flung locations. Yet, critics highlight that insetting schemes are likely to suffer from similar limitations as offsetting approaches – including providing a distraction from real greenhouse gas reductions, suffering from ecological and credibility problems, and generating real risks and uncertain benefits for local communities and peoples (Mardirossian and Arnold 2023). In the agricultural space, climate change mitigation and adaptation actions more generally, including efforts to support farmers to adapt to increasingly difficult climatic conditions, have become a further integral part of the sustainability discourse over the last decade (Swinnen *et al.* 2024).

Methods

From 2023 to 2024, the first author conducted 61 interviews with 58 coffee sector experts at the global level, including representatives of trading companies, roasters, service providers, international organisations and non-governmental organisations (see Table 1). Company representatives and experts were primarily but not exclusively located in Europe and generally had a broad expertise in both European and North American markets and sourcing regions across Latin America, Africa and Asia. Interview topics included risks perceived from climate change; climate change mitigation and adaptation actions in which they engage; their perceptions of such action at an organisational and sectoral level; their views on upcoming regulations (for example, the EU Deforestation Regulation); and their outlook for the sector more generally. Interviewees were informed about the study purpose and gave informed consent, including about being audio-recorded, in accordance with the requirements of the first author's university ethics committee. Each interview lasted between 45 and 90 min. All interviews were audio-recorded and transcribed by the first author. Our second source of data was public-facing information from major coffee roasters and trading companies. Based on global coffee volumes traded or sold, we selected the dominant mainstream (14) and specialty roasters (7) as well as trading companies (10) and downloaded their websites and all available information (for example annual reports, sustainability reports; Table 1).

We imported all data (interview transcripts, interview notes and coffee company documents) into NVivo and did a first round of coding in line with a deductive framework focused on climate change-related risks, opportunities and related corporate actions. During the first round of coding, we additionally introduced inductive codes when appropriate. We then revised our coding framework and thematic storyline based on the inductive insights and pursued a second round of coding to achieve a comprehensive analysis of our data.

The business of climate change in coffee

Supply risk vs. business opportunities: sourcing strategies are unlikely to become more place-bound

Contrary to our expectations, at the time of our interviews climate change and resulting supply risks were not yet issues that caused major concerns or true strategic challenges for international coffee traders and roasters. While all interviewees acknowledged climate change as a global and sectoral challenge and pointed out projects or niche initiatives that they were involved in, climate change adaptation was still mainly framed as a Corporate Social Responsibility issue rather than a risk mitigation approach.

As one interviewee explained, companies approach climate change like individuals approach health:

> 'For most of us, [the importance of health] is in the top quintile, at least, and as you get older, it approaches number one very rapidly. But what do we do? The first 80 per cent of our life is nothing. And I think that's the appropriate metaphor. For climate change and coffee, every reasonable person in coffee thinks about it, and assigns it a high level of priority. Almost no one does anything about it' (EXP-01).

Table 1. Overview of interviews and documents analysed alongside their codes.

Overview of interviews and their respective codes		
Code	Description	Number of interviews
BUS	Business and industry association	10
DEV	Development organisation	2
EXP	Independent expert and/or consultant	8
GOV	Government representative	3
IGO	International organisation	5
NGO	Non-governmental organisation	9
RST	Roaster	4
SER	Service provider	3
TRA	Trading company	17
Overview of documents analysed and their respective codes		
Code	Description	Number of organisations
D-MR	Documents of mainstream roasters	14
D-SR	Documents of specialty roasters	7
D-TR	Documents of trading companies	10

As a trading company representative described, talking from my company, it's not a big concern. … are traders really afraid that one day they will have no coffee to trade? I don't think that awareness is there' (TRA-03). As an NGO representative explained, 'the private sector [has] the choice of origin. For them, the risk is manageable. Publicly, they don't admit that. But [they think] "I can buy my coffee from anywhere". (NGO-03).

Indeed, coffee is grown in over 50 countries, though the top three origins (Brazil, Vietnam and Colombia) make up over 60 per cent of total volumes (ICO 2023). Managing supply shortfalls in one region by sourcing from another is thus already an important part of trading companies' business models: 'Buyers already doing all of this planning and projections based more on production variability and volatility. So, mostly weather and price, and they have redundancies within their purchasing practices and risk mitigation mechanisms to address them' (EXP-04).

This type of supply flexibility is likely to be expanded further in the face of climate-related supply chain risks, even as some companies conduct climate-risk mapping (D-MR-04-9; D-TR-04-2):

> I think it's more the macro business issue for them; of how much it costs them to change where they're sourcing from and to move out [of particular areas]. What does that mean practically? I don't think it really is so much a concern of "how are we going to protect these farmers". (EXP-02)

For instance, a major roaster has a stated aim to 'create new growth opportunities as part of our ambition to help deliver regenerative food systems at scale, for instance, by exploring new sourcing origins. This is due to our broad geographic scope [and] supply chain flexibility' (D-MR-09-1). Another trading company representative explained:

> Some people say in 2050, we will face a huge decline of production, but some other people say, that is actually not true. What we will see is huge differences in weather patterns and thereby in yields. I think the second scenario is a little more realistic. But I do believe that it's also realistic to think that people will start thinking about alternative areas for growing coffee, for instance, expanding coffee production in China. (TRA-03)

Ironically, many sectoral experts and company representatives simultaneously expect a greater concentration of production in the current leading countries of Brazil and Vietnam, due to their higher productivity and lower production costs than other origins (BUS-01, BUS-02, BUS-03, BUS-04, BUS-06, EXP-01, TRA-04, TRA-07, TRA-12, TRA-13). One trading company representative commented:

> The coffee sector has always been threatened by a consolidation of [production]. Brazil keeps increasing the production, … a country like Vietnam will still continue to catch up, and so on. So it's a polarisation of the supply, which is dangerous. And besides the 10 major origins, you have over 30 smaller origins. These small origins already fight on a daily basis to remain relevant for the sector. (TRA-04)

The overreliance on a few origins came into stark relief two years after data collection, when international coffee prices spiked in 2025 due to climate change-related production challenges in Brazil and Vietnam (Goodman 2025, Kopack and Sharma 2025).

In this context, the relative lack of climate-related risk considerations and efforts to collectively support origin diversity appear to be highly problematic. There are few voices that are concerned about an overall lack of future supply, but they are in the minority

(BUS-06). Even when recognising the danger of supply concentration and resulting price volatility, actors perceived that these were trends that companies themselves were largely unable to control:

> I'm not saying we should just accept it. On the other hand, I also feel like there's sometimes an overstating or overreaching when I think [about statements like] "we, this small group of dedicated buyers, are going to change the course of history. We're going to be the ones to save coffee in Central America." I'm not really sure that a group of buyers can do that. There are a lot of other things that play into that. (BUS-02)

The few interventions that were mentioned that focused on maintaining future supply in specific regions were focused on specialty coffee that is distinct and of such high quality that investing in maintaining those origins has a financial payoff:

> I do have a client who is asking for a project in Mexico just because they really want to maintain that origin. They know they're paying a price above market. Because they see the production decreasing there. And they really … want to keep that origin for diversification of supply and flavour. (TRA-09)

Ultimately, to date, climate risk mitigation for supply in the coffee sector thus appears to be a focus on flexibly sourcing from existing coffee origins (including ensuring flexibility across regions within larger origins), but rarely extends to investing strategically to strengthen specific origins or strengthen sourcing relationships to share climate-related risks.

If climate change is not yet a core risk concern of coffee companies, why are they pursuing mitigation or adaptation actions at all? Our data indicate that rather than being pushed by risk, companies are attracted by opportunities to benefit from third-party funding (see next section) or to build out their core business models. As a consequence, though coffee origins are keenly affected by ongoing climate change and require adaptation support, multiple interviewees perceived that greater focus was being placed on mitigation actions – in particular, carbon footprinting, carbon reductions and carbon insetting in the context of net-zero commitments – due to the broader financial incentives surrounding these (NGO-06, TRA-13).

A trading company representative noted that 'it's been indirect, not really a very tailored [approach] in terms of adaptation, right now we're trying to get the carbon footprints well done' (TRA-11). Another highlighted:

> It's one to nine, I would say. It's really marginal, the attention that is paid to adaptation. … I mean, everybody will speak about it indirectly, about ensuring the resilience, the wellbeing, the livelihood of the farmers, I think this is baked into that aspect. But no one is coming to see me and say, "Please help me make sure that farmers are adapting". (TRA-09)

Some interviewees speculated that since companies with net-zero commitments need to showcase carbon reductions over time, roasters pursuing climate mitigation and insetting strategies could become increasingly locked into specific sourcing regions and sourcing partnerships with trading companies. One trader stated that:

> With a carbon footprint, we're seeing a shift [towards committing] to a specific supply origin … They have to commit longer term, [so they] can track the baseline and the reduction over time and demonstrate that they are reducing the footprint through the Scope 3 intervention. (TRA-04)

Another trader explained:

> What we think is happening … is a de-commoditization, it means that you no longer have optionality … then the power dynamic has changed as well towards the smaller farmers and it's good for them. And God knows they should have a bit more power and a bit more share of the global coffee profits overall. (TRA-09)

An outside observer indicated that this lock-in effect, along with the higher cost of carbon insetting compared to offsetting projects, might be a reason why large-scale carbon insetting projects in coffee have not materialised yet:

> Many companies are really trying to move, especially in agricultural products, to insetting. But it does tie them then to working with the products in the place they took their baselines from. … If I show up as a Nestlé in a brand-new geography that has horrible production practices, and then I finance a project that takes up agroforestry, who gets to claim that carbon sequestration? And if I don't buy that product, who gets it, so it's a matter of ownership. So where do you draw the line? When was the baseline? What is the end line? How much carbon is there even to sequester? And I think the reason we haven't seen more significantly large programs in coffee is because of those inherent challenges versus a massive plantation of thousands of hectares of some tree that sequesters X carbon, that's a much more straightforward offset. (EXP-04)

Still, other interviewees questioned this notion of place-boundedness, arguing that country- or region-level information at best would be enough to showcase emission reductions (SER-03). One expert pointed to the fact that these definitions are still essentially open for discussion and negotiation in some of the major carbon standards:

> The draft [of the Greenhouse Gas Protocol for land use and removals hinted that] if you claim removals from this particular plot of land then you need to show year over year that … you're sourcing the coffee there. There is a strong push away from that in a sense to allow for flexibility, so [that supply is aggregated at the level of] a region … I don't think it's going to lock companies into some supply chains. (NGO-06)

On balance, the trends in climate risk reduction and mitigation practices indicate that sourcing practices are unlikely to become more place-bound in a way where supply chain actors would share the emerging climate risk with farmers. Rather, companies aim to maintain or increase their sourcing flexibility in order to reduce supply shortfalls.

Corporate vs. farmer benefits: climate-related funding brings clear advantages to companies, while benefits to farmers remain uncertain

We identified three main sources of financial benefit that coffee companies leverage when engaging in the business of climate change: First, tapping into grants from development organisations; second, taking advantage of preferential loan conditions from banks; and third, selling climate change mitigation (and, to a lesser extent, adaptation) services to downstream buyers.

First, companies working in coffee-producing countries can tap into public capital available from climate change mitigation and adaptation projects carried out by development organisations and development banks – by offering to become the implementation partner on the ground. One interviewee highlighted that 'having some public money as a carrot does get industry actors to the table … And even if it's really not that much money, it's still somehow the idea of risk sharing, or not taking it on individually' (BUS-02).

In our interviews and in their public-facing sustainability reports, the coffee companies we analysed reported working with a broad range of donors – bilateral, multilateral and foundations. The projects they outlined referred to producer trainings in climate-smart agriculture, implementing Farmer Business School programmes, the estimation of carbon storage and greenhouse gas emissions in supplier farms, improvements to traders' sustainability programmes, and introducing traders' sustainability programmes to farmers.

While trading companies are arguably well-placed for such implementation, they are also able to build out their own local networks and edge out other competitors when accessing farmer communities (Ponte et al., 2026). In particular, public funding that subsidises the roll-out of their own sustainability programmes helps trading companies establish themselves for further opportunities without having to invest their own capital. An industry expert explained:

> I know [trader X] has made an entire business model out of leveraging public sector investment in sustainability work into a competitive advantage in the trade. The implementing partner on [many big scale projects on coffee in Mesoamerica] is always [trader X] … I understand that they have boots on the ground, but the idea of letting that particular fox guard that particular hen house was so appalling to me, I couldn't grasp it. And yet it has persisted … A lot of public sector money has been driven into the hands of the traders as implementers and in a relatively unquestioned way. (EXP-01)

Second, some companies have been able to draw on sustainability-linked capital to raise funds. Given the need to pre-finance commodity sales, trading companies generally rely extensively on credit to finance their daily operations. Indeed, as one trading company representative mentioned, 'we depend wholeheartedly on banks. I mean, without buying financing, we have no business. So actually, I get a lot of the insight of what we should be doing as a corporation … from banks' (TRA-14).

In that context, interviewees noted that banks offered advantageous loans to trading companies to build out traceability systems and other sustainable supply chain activities, which they expected to later translate into additional sales to roasters, allowing them to repay their loans (RST-04, BUS-06, TRA-07, D-TR-01-1). As one expert explained:

> The roasters will pay for this [farm-level] data, but the [traders] need credit to install the system. And they can reimburse it in two to three years, cheap credits, and the banks are happy with that. … It's also Swiss banks, apparently, who jumped on the opportunity, because they need a certain percentage of green products and investments. So that's what I've heard in Switzerland, that it's very easy to get cheap loans to install a traceability [system]. And that also explains apparently the enormous [share] of traders that do it. (EXP-07)

Banks with a focus on commodity trade finance have also started offering sustainability-linked trade credit loans where the fulfilment of certain environmental, social and governance (ESG) criteria – including those linked to climate change – led to lower interest rates. This was considered by one interviewee as 'one of the best transformations we had in the industry … If you put the carrot in front of the trader, they're going to go for it' (BUS-06).

Another actor with experience in the sector explained:

> We've already done the sustainability-linked borrowing basis, where we have KPIs [key performance indicators] that we have to hit, then we get a small discount on our loans. Over

> large quantities of money … [a discount of] 20 basis points finances a lot of activities. So, we actually spend the money of the discount that we get to hit the KPI. (TRA-06)

We can also see that such preferential loans are being used to strategically build the sourcing networks and programmes of trading companies. As an example, one coffee trading company received a total of US$ 950 million in two successive revolving credit facilities linked to their sustainability activities. In its announcement, the company made it clear that, as part of the loan, it was scaling up its in-house sustainability programme – which includes training, technical assistance and access to capital (D-TR-04-3, D-TR-04-8).

Access to large-scale rolling credit lines of this kind tends to be restricted to the larger players in the market. Such financing, therefore, also indirectly drives concentration in the midstream sector:

> The banks, having had their own scrutiny and tightening of their own credit lines with the central banks, became more restrictive in funding commodity companies. So, what do they do? They have an ABCD level and they say "okay, the A's and the B's, they're getting the credit lines; the rest - I'm terribly sorry". For small and medium sized companies … financing is an issue. And if you are in the second-tier group, also your financing cost is going up versus tier one … [As a result], the bigger ones are getting bigger. (BUS-06)

Third, because of prior investments in supply chain traceability, farmer outreach and producer-level data access, leading trading companies are well-positioned to become key supply chain partners for companies that made net-zero commitments and now require assistance in mitigating their Scope 3 emissions. For instance, in 2022, a major roaster reported that:

> In recent years, many of the largest international coffee traders from which [MR-06] buys the raw material have developed systems for tracking and monitoring the supply chain's sustainability performance. … These platforms allow roasting companies to collaborate with their own suppliers to make the coffee supply chain increasingly more transparent. (D-MR-06-3)

While some actors in the value chain think that the increased dependency of roasters on trading companies could dampen the power of the former over the latter, the largest trading companies are still competing fiercely to become the go-to provider of such commitment implementation:

> What happens if you go out in the world and you say, I promise I will do something. But then you have zero way of making it happen in the field, and the person in between you and that impact is the trader? I believe there is a power dynamic that is changing a little bit because they made that commitment before they secured the supply … And so, we feel that there's an opportunity here for the traders. But of course, we're still competing … So as far as we're concerned, we are basically very busy mapping and collecting primary data on carbon … and trying to put in place some large-scale program … to try to deliver some low carbon coffee. (TRA-09)

In the same vein, another company reported on establishing a 'new, dedicated business unit focused on offering high-quality carbon credits. Using existing tools and refined data collection processes, we offer a one-stop shop to clients and partners to access the Voluntary Carbon Market' (D-TR-02-1). Another company created a 'carbon scenario planner' to 'help [its] customers tackle the complex and challenging issue of Scope 3 emissions which occur in a company's value chain and make up the bulk of the food and beverage industry's carbon footprint' (D-TR-06-1).

This perceived potential of an upcoming carbon mitigation service boom was highly pronounced during the data collection period (2023). Some companies had already experienced funding flows from their buyers (TRA-06, D-TR-01-1, NGO-07), while others were preparing to provide carbon reductions although little demand had yet materialised (BUS-04, EXP-04):

> We don't have a roaster that has been expressing a real interest of paying for carbon or for paying for having this footprint. This is a matter of our own initiative. It's preparation in order to [be ready for] the new market. (TRA-11)

Overall, interviewees agreed that

> [Scope 3 emissions mitigation and insetting] is where the money is. We're seeing budgets changing that way … we are feeling at the moment a lot of pressure to act on clients' reduction targets … It's being built into every single thing we do with clients, for clients. (TRA-10)

Some trading companies were also trying to nudge roasters to co-invest with them on climate change projects:

> As the worm on the hook, we can go fishing for a roaster [to] help them reach their carbon credit goals on an insetting basis, so they need to do less offsetting … I feel like that if you can inspire the roasting community, that's the best way to try [to create] change, because a lot of them are big-hearted. They just don't know what to do. (TRA-06)

As the Scope 3 emissions of trading companies overlap with their downstream buyers, convincing buyers to fund emissions reductions may allow trading companies to meet their own carbon reduction targets as well (TRA-11):

> 99 per cent of our emissions are in Scope 3, linked to agriculture, and 92 per cent come from land use. For several years now we have been committed to reducing this footprint, notably through programmes implemented in the field by our sustainability teams for our customers. (D-TR-09-1)

The same overlap exists in the downstream supply chain as leading roasters also position themselves as delivering carbon reductions to their clients, such as retailers (for example D-MR-03-7).

However, major challenges in upscaling carbon insetting include a lack of universal methodologies, ongoing uncertainty about the carbon absorption potential of on-farm practices, the lack of specific markets for insetting credits, and a lack of buyers' willingness to pay (TRA-05, EXP-06). As one trading company representative explained:

> We don't have any market mechanisms around low carbon or lower carbon [coffee]. … when it comes to our contracting, I don't see a lot of transformative and disruptive [changes]. So we do projects more and more. A project in Nicaragua with 500 farmers, and here with 1000 farmers … And of course, we are pleased with these projects. And we do quite a lot of work now in actual greenhouse gas measurements and try to validate and calibrate some of the models and assumptions because there is an enormous weakness in this calculation tools. It's just ridiculous. (TRA-01)

Another expert described:

> I'm working on an agro-forestry [project] in coffee in Chiapas. … they were trying to monetise that carbon capture and it just didn't make sense, the economics didn't work out. So now

> they're just trying to convince the actual [coffee] buyers to pay a premium for this. It was one of the big multinationals that was the buyer and it didn't work. They weren't, no one was willing to pay for it. (EXP-05)

One emergent example that held a lot of purported promise was an agroforestry credit scheme developed by a bank which overcame some of these hurdles:

> [Agroforestry carbon removal projects] are complex projects that require a lot of scale and competencies inside the organization. They require efficiency and a lot of investment costs for the certification, so … you need to find a marketplace for that. I think [the scheme] was smart in that because they first created the marketplace. And then the marketplace did reach out to projects. So they are more efficient because you don't have different projects and managers, but you have one. The marketplace itself generates these removal units, which are third party certified. And there is a payment in advance, which is another advantage. … They trigger the ability to make the investment on planting. And then after a few years, we'll start again to repay even more. So it generates immediately a market. (TRA-05)

A major argument used in favour of carbon insetting is its potential to generate additional incomes for coffee farmers, as seen in the example of public communication by a trading company representative:

> Reducing emissions is our responsibility but also an opportunity to change how we do business, how coffee is farmed and produced. It's an opportunity to find new economic benefits for producers and smallholders to be compensated for the climate and receive access to a premium market to sell net zero coffee. (D-TR-02-2)

Similarly, a roaster noted that 'maybe the market will not pay for biodiversity but for sure it will pay for carbon insetting and carbon sequestering – an emerging market that will add value to farmers' (D-MR-01-10).

Yet, in private, some actors are doubtful about whether carbon mitigation efforts will be a net-positive for coffee farmers. The two major strategies to date have been either the reduction of carbon emissions linked to coffee farming (especially via the reduction of fertilisers, which account for up to 90 per cent of total farm-level coffee emissions (Kilian *et al.* 2013)), or the planting of shade trees in an effort to absorb carbon. Both strategies may have real yield implications for farmers. As one interviewee noted:

> If you reduce fertiliser use, you're going to reduce yields … [In situations where] smallholders are using the correct amount of fertiliser, reducing use will disadvantage them. So, then you are paying your carbon debt by reducing the income of coffee farmers who are already in poverty, which doesn't sound like a good idea. (SER-03)

Another observer stated that

> One of the risks of agroforestry … is that the yields go down … It's important [that] farmers should know that risk because maybe people think it's all rosy and win-win and it might not be … And a lot of people say [that] farmers should be paid for the carbon and for the fact that they capture it. But I haven't seen a single project that really does that in a big scale that people benefit. It just seems like something people talk about a lot. But I don't see it happening. (IGO-02)

Furthermore, trading companies are positioning themselves as intermediaries that can translate the (abstract) carbon reduction demands into (concrete) farm-level measures that can be understood by farmers. One trading company representative explained:

> Not once have I seen a farmer in Indonesia come and say, "please, can you help me, you know, make my production low carbon." But what our role as intermediary here is to ensure that the needs of the client are translated in such a way that makes sense and is considered a business opportunity by the farmer. And so, I would never approach a farmer by saying, "hey, shall we do low carbon coffee together"? What I say is, "are you interested in diversifying your income by planting shade trees that will provide you with avocados so that in a bad coffee year, you have a local crop that you can sell?" (TRA-09)

While these strategies may indeed increase farmer buy-in, they may also limit producers' understanding of the new climate-related market demands themselves and how to take advantage of them. Ultimately, if intermediaries act as gatekeepers between farmers and carbon markets, the added value that is passed down to farmers is likely to rely on companies' values and related business models, rather than on more equal bargaining between farmers and their buyers.

In sum, the business of climate change is good … for business. Accessing climate-related funding is key for international coffee traders – an additional source of green capital accumulation that allows them to consolidate and survive in an extremely competitive environment. The putative benefits for farmers are highly uncertain, but their hypothetical materialisation serves as a justification for receiving donor funding, better terms of trade finance, and for becoming preferential supply chain partners for downstream companies that made net-zero commitments.

Conclusion: the new shape of green capital accumulation

Climate change is reshaping the functionality and sustainability governance of key economic sectors, including in agriculture. Major corporations, such as retailers, food processors and international traders, are mobilising resources to support climate adaptation initiatives and to reduce emissions along their supply chains via climate mitigation measures – including carbon offsetting and insetting. This is happening in response to emerging due diligence regulation (especially in the EU) and to pressures from sustainability-linked finance, but also in view of generating new business opportunities for large midstream companies. These companies play a key role because they can leverage their infrastructure, human resources and supply networks to trade not only physical commodities in the long run, but also the necessary producer-level data, sustainability assurance and carbon removal units necessary for supply chain carbon insetting.

In this paper, we showed how these dynamics, collectively termed 'the business of climate change', are evolving in one of the most valuable agricultural commodities, coffee. We find that, although some companies are conducting risk mapping and recognising the threat of future origin concentration and associated climate shocks, most do not (yet) perceive climate change as a significant supply risk. Rather, they are myopically focused on the (shorter-term) financial and business opportunities arising from climate change-related efforts by development organisations, financial institutions and downstream actors. In turn, there are strong doubts about whether climate change-related activities (for example, carbon insetting or greenhouse gas reductions in agriculture) will be beneficial to smallholder farmers. In fact, they may even harm their livelihoods.

We are not suggesting that international coffee traders are unaware of – or in denial about – climate change. Rather, our findings indicate that they exhibit confidence in their continued ability to source the coffee required by their buyers – from some origin, by some means. In this context, the perceived opportunities for green capital accumulation appear to outweigh concerns about long-term supply risks, at least for the time being.

Climate change actions might realign the power dynamics between downstream companies (such as retailers or coffee roasters) who have made ambitious net-zero pledges and midstream actors (such as international traders) who are needed to fulfil these ambitions. At the same time, power asymmetries between farmers and other supply chain actors are likely to be further consolidated – following similar dynamics to those brought about by shifts towards sustainability certification in the coffee sector that took place in the past two decades. As downstream supply chain actors find new sources of 'green capital accumulation', farmers are likely to bear the brunt of climate change risks and will have to absorb the hidden costs of 'sustainable' and 'climate-smart' supply chain management.

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Ethics approval

The research design for the semi-structured interviews was reviewed and ethics approval was granted by ESADE Business School's Committee for the Use of Human Subjects in Research (CUHSR) (approval number: 005/2023_rev1).

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