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ORIGINAL PAPER

The global economic system and access and allocation in earth system governance

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Abstract
Ensuring sustainability of earth systems is intrinsically dependent on the incorporation of equity and fairness in the regimes and institutions that govern the global economy. Accordingly, to design effective and just earth system governance (ESG), it is crucial to understand how the global economic system affects access to and allocation of environmental benefits and burdens among people and countries around the world and what are the relevant causal mechanisms. By focusing on trade and investment as two predominant elements of today's global economic system, this paper reviews the literature developed within the ESG project in 2008–2017 to explore the relationships between the global economic system and access to and allocation of environmental benefits and burdens. Our review shows that ESG scholarship has begun to highlight the dynamics of unfair access and allocation deriving from the global economic system, ranging from the direct impacts of trade and investment on environmental inequality and socioeconomic opportunities to the indirect equity implications of certification schemes, environmental decision-making processes and environmentally motivated restrictions in international trade and investment regimes. However, it also notes that critical questions about the identity of vulnerable groups and the potential pathways for more equitable sharing of benefits and burdens remain understudied by ESG scholars. Hence, we call for more critical analysis of the role of the global economic system in perpetuating unsustainable patterns of access and allocation in ESG, as well as research about the local impacts of the global economic system on environmental access and allocation.

Keywords Trade · Investment · Access · Allocation · Earth system governance · Equity · Fairness

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1 Introduction

Since its inception in 2008, the earth system governance (ESG) project defines earth system governance as "the intention to prevent, mitigate and adapt to earth system transformation with harmful effects for human societies" (Biermann et al. 2009: 23). Despite focusing on arrangements directly governing environmental issues, the ESG project has also given attention to governance systems in other issue domains, especially to the extent that they interact with, and impact upon, critical earth system processes. In particular, the global economic system, which encompasses trade and investment regimes at all scales and levels, is closely intertwined with earth system governance. As such, the relationship between these two governance systems has been identified to be of critical importance to the project, due to the impact of global economic development on the planet's biophysical systems.

Over the past decade, many researchers in the ESG community have investigated how the global economic system affects earth system governance. The issue of access and allocation has become a central focus of this burgeoning literature, as today's global economy appears to play a major role in many environmental hazards, leading to resource scarcity and redistribution of resources, benefits and burdens in both developed and developing countries (Guimaraes et al. 2011). What is the impact—both positive and negative—of the global economic system on access and allocation of environmental benefits and hazards among people and countries around the world? What are the causal mechanisms through which economic development leads to such impacts? And, which measures are needed to ensure equity and fairness in terms of access and allocation? In this paper, we assess how past studies developed within the ESG project have answered these questions and identify the gaps that are left in existing the ESG literature. To limit the scope of our review, we focus on trade and investment, as they are arguably the two most important mechanisms for economic development in the contemporary era of globalization. The main aim of this exercise is to analyze the extent to which this expanding body of scholarship addresses the impacts of trade and investment on access and allocation of environmental benefits and hazards, with a view toward developing a better understanding of the complex interplay between the global economic system (including its governance) and the distributional aspects of social-ecological sustainability.

Drawing on Gupta and Lebel (2010), we use a broad, interdisciplinary framework to define access and allocation: "access" includes the access to basic needs, but also to instruments that can be used to ensure these needs; "allocation" refers to the distribution of environmental resources, risks and burdens and responsibilities. Accordingly, we assess the impact of today's global economic system in three dimensions. First, we discuss the results reported in the ESG literature on the direct impact of trade and investment on people's access to and allocation of environmental resources, benefits and hazards. Second, we assess ESG project findings relating to the impact of economic empowerment—through trade and investment—on participation in decision making for earth system governance. Lastly, we also consider how ESG literature has examined the interplay between earth system governance systems and the global economic system to assess the extent to which the provisions of multilateral environmental agreements might indirectly affect access and allocation by regulating or otherwise imposing limits on trade and investment flows.

To delimit the scope of our review, we analyzed 361 articles and books contained in the official publication database of the ESG project between 2008 and 2017 provided by the special issue editors. These publications are categorized in the database according to

the ESG "analytical problems" that they relate to (i.e., Architecture, Agency, Adaptiveness, Accountability, and Access and Allocation).[1] Out of the 361 initial sources, we first selected those that were coded for "Access and Allocation" and then conducted a content analysis of their titles and abstracts to identify those that mentioned one of the following keywords: "trade," "investment," "economic governance," "economic development" and "economy." In addition, we ran the same keyword searches for publications that were not categorized under "Access and Allocation" and also read their titles and abstracts, in order to avoid the risk of overlooking pertinent sources due to errors in the database coding system. As a result, we identified 78 potentially relevant articles or book chapters. These publications were studied in depth, and a final list was then compiled, including 35 studies that were both relevant for access and allocation and trade and investment. We also expanded the review by analyzing (i) 11 additional sources not contained in the database, but closely associated with the ESG framework because they had been directly cited in works contained in the database and (ii) 5 extra sources outside of the ESG literature, but highly related to the topic, in order to provide further context.

Owing to the specific purpose of this article, we chose not to extensively consider additional literature outside of the ESG database, including works by authors associated with the ESG project but not listed therein. In some cases, this scholarship might be of significant importance for describing the interplay between the global economic system and issues of access and allocation, ranging from the study of the equity implications of certification schemes (e.g., McDermott 2013) to extensive works in the fields of political ecology, environmental economics or sociology (e.g., Giljum and Eisenmerger 2004; Jorgenson 2004; Rice 2007). By focusing on the ESG literature, including both empirical works and the agenda-setting analyses that contribute to the specific framing of access and allocation in the ESG scholarship, the goal of this paper—as part of this special issue for harvesting the ESG project's achievements over the past decade—is to synthesize the project's findings regarding the interplay between the global economic system and access and allocation while also identifying gaps and pointing to future research priorities in this area.

2 Impact on access

The issue of access in the ESG literature is framed broadly as the challenge of meeting the basic needs of humans to live a life of dignity in an era of globalization with growing inequalities (Biermann et al. 2009). The satisfaction of such needs is widely considered to be an essential precondition for sustainable development (Chowdhury et al. 1992). The problem of "meeting the basic needs of humans" can be seen from a range of disciplinary perspectives, including economic, legal, sociological and political ones. Each of these perspectives is concerned with a spectrum of distinctive, but interwoven, phenomena that together determine "the ability of individuals to secure a basic minimum of resources and ecospace" (Gupta and Lebel 2010: 379), including (but not limited to) those phenomena that are more readily associated with access to environmental resources themselves.

[1] In the latest 2018 Science and Implementation Plan of the ESG project (Earth System Governance Project 2018), these analytical problems are now defined "research lenses," and they have been updated to the following: Architecture and Agency; Democracy and Power; Justice and Allocation; Anticipation and Imagination; and Adaptiveness and Reflexivity.

The ESG project has recognized that different outcomes in terms of access are not only the result of environmental governance regimes that directly establish the rules of access to otherwise-scarce resources (e.g., water, emissions of greenhouse gases, land, timber, mining products, fisheries, clean air),[2] but also of the wider "interrelated and increasingly integrated system of formal and informal rules, rule-making systems and actor-networks" that govern the complex interactions between the global economic system and social-ecological sustainability (Biermann et al. 2009: 4). On one hand, inequalities in access to resources are often caused and maintained by underlying factors that originate in the realm of political economy and are, therefore, influenced by the broader landscape of global economic governance, from price fluctuations in commodity markets, to the equity implications of trade and investment agreements (Bohle et al. 2009; Galaz 2014; Biermann 2014: 160–4). At the same time, environmental change also "interacts with economic aspects of globalization to redistribute benefits and risks," while simultaneously creating "new vulnerabilities and adaptive capacities" (Biermann et al. 2009: 107–8). For example, as noted by O'Brien and Leichenko (2003), preexisting distributional inequalities in terms of costs and benefits of environmental degradation can prevent vulnerable communities from increasing their resilience and adaptive capacity by limiting their ability to access new markets and, thus, integrate into the global economic system. In addition, unequal access to resources can then perpetuate and foster environmental degradation, including greater levels of consumption and waste, and further resource depletion through unsustainable land use practices (Clapp 2010; Schroeder 2014; Wilkinson and Pickett 2009).

Acknowledging the importance of these mutual interactions for promoting integrated sustainability policies, research questions relating to the impact of trade and investment systems on access have represented a key aspect of the ESG research since the project's first Science and Implementation Plan (Biermann et al. 2009: 108). Although a definition of access in the context of trade and investment has never been explicitly advanced by scholars, it can be argued that the core of such a definition possibly lies in the notion of "ability" used by Gupta and Lebel (2010). More specifically, to the extent that inequitable levels of access to resources are fueled by wider socioeconomic inequalities or institutionalized through trade rules and investment agreements (Tienhaara 2009), the ability of humans to meet their basic needs and participate in the related decision-making processes and legal justice systems might be impaired. As a consequence, this section frames the global economic system and its governance as a focal point for understanding the issue of access along three crucial dimensions that had been explored by ESG scholars but never discussed systematically, which are: (i) the direct impact of trade and investment on access to resources; (ii) the indirect impact of trade and investment systems on participation in environmental decision-making and legal justice systems through their effects on social and economic justice; and (iii) the impact of multilateral environmental agreements (MEAs) on trade and investment and their implications for access.

2.1 Direct impact of trade and investment on access to resources

Trade and investment systems, including the rules and processes developed by the institutions governing them, can directly impact the ability of individuals to access the resources

[2] This aspect of access is what Biermann (2014: 147) links to "the allocation of the costs of environmental action" in governance regimes.

required to meet their basic needs, ranging from commodities and environmental resources themselves, to markets where such products can be sold and traded. The debate on the role played by the elimination of trade barriers and the liberalization of investments in "making everyone a winner" through increased economic efficiency is well known (O'Brien and Leichenko 2003). Even among proponents of globalization, the presence of increased economic vulnerabilities and adjustment costs for certain countries or social groups within countries as a consequence of trade liberalization is widely accepted (Deardorff and Stern 2000). In turn, these costs and vulnerabilities can have serious implications for access, either because they are directly related to environmental resources (i.e., an important aspect that is commonly known as environmental inequality),[3] or because they can exacerbate socioeconomic inequality by limiting opportunities of already vulnerable communities (and, potentially, both factors can be present at the same time).

In the ESG literature, descriptions of forms of environmental inequality deriving from the global economic system have focused on a wide range of different situations in which access to environmental resources is limited or undermined by the rules and dynamics of international trade and investment. The two main issue areas that have been explored in this context are access to water and access to food. With respect to water, Vörösmarty et al. (2015) have suggested that overexploitation and pollution of water resources in small developing countries are largely determined by global patterns of water use and access rights enshrined in trade agreements for commodities. At the same time, Dellas (2011) has discussed how the facilitation of private sector involvement in the provision of water and sanitation services (including through public–private partnerships) has often failed to promote affordable access to marginalized groups and poorer consumers.

In regard to access to food, dimensions that have been explored in ESG literature include volatility in food prices caused by the financialization of global commodity trade on food security (Galaz 2014; UNCTAD 2011); loss of soil fertility and reorientation of food production toward export markets driven by diffusion of intensive agricultural methods (Schroeder 2014); negative influences on countries' economies and human security deriving from local environmental shocks (e.g., floods, droughts, disease outbreaks) triggered by patterns of trade and resource use (Biermann 2007); and extraterritorial effects of biofuel policies that incentivize the utilization of agricultural crops and resources in exporting countries for biofuel production (Bastos Lima and Gupta 2014).

Concerning the second category of factors (i.e., indirect impacts on access to resources through exacerbated socioeconomic inequalities), authors have instead conducted a number of case studies pointing to the market and financial risks faced by farmers and other low-income groups in both developed and developing countries. These risks, which include, *inter alia*, price volatility, overseas market requirements for selling domestic products, subsidy removal and export-led growth, can affect access by exacerbating socioeconomic vulnerabilities in sectors of the economy that are already subjected to a wide range of stressors. For example, Cradock-Henry (2017) studied the different dimensions of vulnerability faced by farmers engaged in the cultivation of kiwifruit in New Zealand, finding fluctuations in financial returns, overseas markets' requirements and trade liberalization to

[3] Environmental inequality can be defined as the dimension of inequality that "highlights the intersection between environmental assets and social hierarchies" (Earth System Governance Project 2018: 29). This dimension of inequality is driven by unjust distributive systems and ineffective governance of resource access and results in an "unfair distribution of environmental rights, duties, risks, hazards and harms" (Earth System Governance Project 2018: 29).

be among the most significant challenges after climatic conditions (and often compounding the latter). In a similar vein, Vakulabharanam (2010) analyzed emerging patterns of economic inequality in India and highlighted how increases in private consumption in that country have almost exclusively been fueled by export-led sectors, with peasants and other rural poor left reeling from lack of agricultural investments and reduction in farm wages.

Lastly, it has been emphasized that environmentally motivated restrictions contained in international trade and investment agreements can play a crucial role in limiting access to resources by the affected societal groups (Biermann (2014). Trade restrictions, it has been noted, are "powerful allocating mechanisms within earth system governance," because they can reduce market access for vulnerable producers in exporting countries and "force them to adjust their product designs and production processes" (Biermann 2014: 160). As a consequence, the legitimacy and legality of such measures are often contested, owing to their unilateral imposition by developed countries, and the potential accusation that they might be used to advance hidden protectionist agendas. This was the case of, *inter alia*, the complaints raised in 1997 by India, Malaysia, Pakistan and Thailand in front of the Dispute Settlement System of the World Trade Organization (WTO)[4] against the environmentally motivated import prohibitions on shrimp and shrimp products that had been adopted by the USA, which were considered to be potentially disruptive to local economies and the domestic shrimping industry (Biermann 2014; Spagnuolo 2011a).

2.2 Impact of economic empowerment on participation in environmental decision making

A second, indirect way in which trade and investment systems may affect access is through their impact on the participation of vulnerable groups and communities in environmental decision-making processes and legal justice systems. In this context, socioeconomic inequalities cascade first into political inequalities (i.e., the varying capacity of individuals to influence decision making) and, subsequently, into environmental inequalities (i.e., unfair distribution of environmental rights, duties and harm) (Earth System Governance Project 2018). While some of this "capacity gap" can also play out at the interstate level through the varying forms of imbalances in the negotiating power and participation of developing countries in international negotiations (Schroeder et al. 2012), it is through effects on inequalities within countries that the global economic system can often undermine the relational and political inclusiveness that is essential to new notions of inclusive development (Pouw and Gupta 2016).

It has been noted that provisions strengthening the procedural rights of citizens to access information and participate in environmental decision-making and legal justice systems "are being increasingly granted by a number of global regulatory bodies dealing with sustainable use of natural resources" (Spagnuolo 2011a: 1875). Access to these rights is often crucial to ensure access to resources, because it allows potentially affected groups to, *inter alia*, contribute to standard-setting procedures and be consulted in the management of scarce resources, such as land, fish stocks or fresh water (Biermann et al. 2012; Anand 2004). Trade and investment systems, however, can often impose a "double burden"

[4] See the Report of the WTO Panel in *United States – Import Prohibition of Certain Shrimp and Shrimp Products* (WTO 1998).

on access of vulnerable populations (including indigenous groups) and other low-income stakeholders.

First, at a more formal level, international trade and investment agreements have traditionally remained more isolated from forms of public participation and access to justice in the context of investor-state dispute settlement procedures (Tienhaara 2006). As a consequence, they have often been seen as potentially "locking in existing inequalities" (Earth System Governance Project 2018: 30) and affecting the ability of local communities to voice concerns and defend their rights to land and natural resources, both within and outside the related investment regime. From this perspective, several indigenous groups impacted by mining projects in South America have complained about being excluded from foreign investment processes that directly threatened environmental resources on which they relied, with negative consequences going beyond access rights limitations themselves and including criminalization of community members, undermining of domestic legal remedies, and regulatory chill (Columbia Centre on Sustainable Investment and UN Working Group on Business and Human Rights 2018). In addition, the participation of indigenous groups has also remained weak in the context of climate finance, as illustrated by Schroeder (2010) with respect to the initial efforts to develop an international financing mechanism for Reducing Emissions from Deforestation and Forest Degradation (REDD) under the UN Framework Convention on Climate Change (UNFCCC).

Secondly, and in practice, global trade and investment patterns can also have a significant impact on the power and agency of vulnerable affected groups, causing socioeconomic inequalities to be embedded and even reinforced in those regimes that do grant procedural rights. For example, Spagnuolo (2011a) points to the World Bank's use of transparency and accountability standards in its Water Resources Sector Strategy, which have been used as a means of promoting economic liberalization in the provision of water and sanitation services in borrowing countries. Moreover, the same article also argues that measures seeking to enhance participation in the standard-setting procedures of the Codex Alimentarius Commission have generally resulted in an increased ability of powerful economic actors to hold the Commission to account, without simultaneously strengthening the involvement of interested constituencies in developing countries (Spagnuolo 2011a).

The effects that inadequate financial and human resources play in suppressing participation have been described by Coolsaet (2015), for example, in the context of agrobiodiversity governance, highlighting a vicious circle of environmental injustice, whereby a lack of access to resources hinders access to social processes that could, in turn, mitigate such deprivation. More generally, suggestions to focus on the concrete economic conditions under which access occurs, when promoting more inclusive procedural norms and principles, such as those of subsidiarity and hybrid participation (Spagnuolo 2011a), show that the issue of access in earth system governance cannot be seen in isolation from crucial questions of institutional architectures, agency and power (Spagnuolo 2011b; Earth System Governance Project 2018).

2.3 Impact of MEAs on access through trade and investment

A third mechanism through which access is affected exists due to the complex interplay between environmental governance regimes and trade and investment systems. In other words, beyond the direct access rules enshrined in MEAs, which are extensively explored in the ESG literature (Gupta and Lebel 2010; Biermann 2014: 150–4) and elsewhere, as

discussed in this special issue, many of such MEAs can also impact access by expanding or restricting trade and investment in environmental resources.

This issue has been particularly explored in the context of the regime complex for climate change, which has evolved to include norms and processes relating to, *inter alia*, the diffusion of climate mitigation technologies to developing countries, emission trading schemes and (potentially) unilateral trade measures, such as border adjustment actions (van Asselt and Zelli 2014). Similar trade-related measures, it has been noted, can have varying implications for the right of individuals in developing countries to emit a minimum amount of greenhouse gas emissions (Gupta and Lebel 2010; Biermann 2014: 154–7). Moreover, the design of domestic climate policy itself, whether carried out through market-based instruments or more regulatory approaches, has been discussed as potentially putting the burden of climate mitigation on lower-income groups through its influence on consumer incentives and costs (Schaffrin 2012). In the same vein, ecosystem conservation rules inspired by MEAs, such as the Ramsar Convention on Wetlands (1971), have been shown to present complex tradeoffs for the access of local communities wishing to pursue subsistence or cultural activities, while at the same time leading to the creation of new economic activities and changes in property rights (Barau and Stringer 2015). Finally, transnational and private forms of environmental governance, such as private standards, certification and labeling schemes, have also been discussed as presenting negative implications for access (Kalfagianni 2014).

One notable example of these dynamics is represented by the higher certification and compliance costs faced by small-scale suppliers as a precondition for access to markets in sectors covered by private governance schemes. In the context of forest governance, Pattberg (2006) has discussed how certification costs of small-scale forestry operations in the Global South (for instance, under the Forest Stewardship Council) tend to be significantly higher than those faced by industrial suppliers, thus limiting the former's ability to receive a premium for certification or to shift these costs to consumers and retailers. Similarly, other authors have analyzed private schemes in the agri-food sector, highlighting how voluntary standards that had become de facto compulsory after being endorsed by large retail chains ended up "pushing small farmers out of the market in favor of large agribusinesses and food processors" (Fuchs and Kalfagianni 2010: 8). As argued in Kalfagianni and Pattberg (2013) with respect to fisheries certification schemes such as the Marine Stewardship Council (MSC), not only are these limitations in access rights problematic in terms of their socioeconomic impacts, they can even lead to perverse environmental outcomes if entry barriers to high-value markets simply displace unsustainable fisheries efforts to non-certified areas.

3 Impact on allocation

Stark inequalities arising out of the global economic system and inadequate redistribution measures have also resulted in an unfair allocation of environmental rights, benefits and degradation within and between countries (Earth System Governance Project 2018). In turn, environmental agreements have also impacted the allocation of costs of environmental protection, as well as the power and authority of decision making (Biermann 2014).

The ESG project, therefore, engages with the question of how to allocate costs and benefits, "in financial terms as well as in terms of changing the quality and quantity of resources and ecosystem services" (Biermann and Zondervan 2009). In other words,

the project defines allocation in terms of allocation of benefits, risks and responsibilities among actors. It analyzes the outcome of divisions, governance processes through which allocation is realized, and reallocation (Biermann et al. 2009). Particularly with globalization, actions in one country can generate impacts in other countries. However, the benefits, burdens and risks of these actions are not allocated evenly among and within nations (Gupta and Lebel 2010).

Despite the importance of allocation, empirical research on the field is scarce. For instance, there is little research about allocation as an independent variable and consequences of allocation on earth system governance (Biermann 2007). This section analyzes the ESG literature on allocation under the same three sub-themes utilized in Sect. 2: (i) the direct impact of investment and trade on the allocation of environmental benefits and degradation; (ii) the impact of economic empowerment on participation in environmental procedures, which, in turn, influences allocation; and (iii) the impact of MEAs on allocation through trade and investment.

3.1 Direct impact of trade and investment on resource allocation

We now discuss the impact of trade and investment, respectively, on allocation. On trade, past studies generally suggest that the liberalization of trade significantly impacts environmental allocation. In fact, economic globalization increasingly links distant people and places through production and consumption activities, such that demand in one place might have environmental allocative impacts in another (Young 2017). For example, fish meal produced on the Norwegian coast might feed shrimp that are farmed in Thailand, which are later exported to the USA for consumption. However, while some Sustainable Development Goals (SDGs) are aimed at free trade, not all free trade measures are environmentally benign, and reconciling environment and trade objectives is not straightforward. For instance, the emerging principle of "mutual supportiveness," which aims to promote trade openness and environmental protection at the same time, can be interpreted as giving priority to protecting the environment only through creating certain thresholds, since the principle promotes both trade openness and environmental protection, meaning that environmental protection is promoted as long as the same policy also promotes trade openness (Kim 2016).

Heated disagreements exist between scholars about the impact of free trade on environmental allocation. First, the scholars in favor of market economics tend to contend that trade efficiently allocates resources, which ultimately results in less depletion of those resources. In addition, trade barriers, such as subsidies and quotas, might underprice resources, which, in turn, cause their overconsumption (Clapp 2010).

Those taking a middle ground regarding the environmental impacts of trade tend to argue for the preferential treatment of certain production processes, such as the use of clean technology (van Asselt and Zelli 2014; Biermann et al. 2012; Biermann 2014). Jinnah and Lindsay (2015) argue that, when managed properly, trade in certain goods, such as wastewater treatment and clean energy technologies, might reduce pollution and combat climate change. Environmentally motivated restrictions in international trade can be powerful allocation tools that force countries to change their production processes and product designs. They can encourage exporting countries to adopt the environmental standards, processes and technologies of their trading partners (Biermann 2014). Similarly, Biermann et al. (2012) maintain that changes in international trade law are necessary to "discriminate between products on the basis of production processes if investment in cleaner

products and services is to be encouraged." However, they also argue that such discrimination should be based on mutual consent and multilateral agreements. In addition, in order to prevent carbon leakage resulting from carbon pricing policies, the adoption of border adjustment measures is promoted without distorting WTO rules. Such measures are seen as a way both to reassure the trade community that protectionist measures will not be implemented and to smoothen the transition to full carbon pricing around the world (van Asselt and Zelli 2014).

Lastly, critics of the impacts of free trade on the environment warn that increased trade results in more transport and its associated environmental impacts (Conca 2000). They also suggest that a potential "race to the bottom" might occur, due to different environmental regulations and pressures for competitiveness (Daly and Farley 2003). Similarly, Vörösmarthy et al. (2015) maintain that, in terms of water governance, local water pollution problems might not be as local as they seem, given trade's impact and the fact that much of the world's water use and pollution occurs due to production for global trade and embodies flows of virtual water. As a result, the water pollution problem is outsourced to countries with lenient environmental regulations. Furthermore, trade agreements might increase the vulnerability of local farmers by increasing their exposure to global competitiveness in a sector that is already sensitive to climatic changes. For example, kiwifruit growers in New Zealand describe the financial exposure resulting from the trade agreements and reduction of subsidies as doubling the impacts of climate exposure and thereby "double exposing" growers (Cradock-Henry 2017).

Along with the rise of international trade, rapid industrialization, liberalization of capital markets and consolidation of global supply chains have multiplied domestic and foreign investment over the last century, which may, in turn, have important consequences for the environment. The majority of the environmental allocation issues is subject to market mechanisms and ownership rules (Gupta and Lebel 2010). A consensus seems to emerge in this debate: rapid fluctuations in the markets impact how farmers, cooperatives, fishermen and companies manage environmental goods and services and ultimately have consequences for land degradation, sea and river pollution and biodiversity (Galaz 2014). Apart from this conclusion, how investment impacts environmental allocation has generated diverse perspectives. On the one hand, advocates of the environmental Kuznets curve have contended that higher incomes and economic growth are instrumental in ensuring the sustainable use of resources and eliminating poverty, as illustrated by the environmental trajectory of industrialized countries. Hence, significant improvements in water and air quality, as well as a reduction in industrial pollutants, can occur under the conditions of increased wealth and welfare due to investment (Ehresmen and Okereke 2015). Transnational businesses and foreign direct investment can also help to diffuse clean technologies and bring about environmental improvements (GreenInvest 2016).

On the other hand, environmental advocates dispute these arguments by claiming that a growth-oriented market economy is too insensitive to environmental concerns. Increased welfare and income levels might cause a surge in emissions due to changes in lifestyles and increased levels of luxury consumption (Michael and Vakulabharanam 2016). Firms might relocate to different countries in order to benefit from lower environmental standards, a phenomenon called "industrial flight." Similarly, Pouw and Gupta (2016) contend that the inclusiveness of the market economy is confined to market participation, job creation for the poor and economic efficiency, which do not assign value to social and environmental sustainability. As such, theories based on distributive justice reject the environmental efficiency of resource privatization, valuation of nature with monetary terms and the growth of private sector involvement in global environmental governance (Anderson 2015). Instead,

they stress the unevenness of environmental risks and burden allocation within countries, between countries, or from an intergenerational perspective (Biermann et al. 2012; Ehresmen and Okereke 2015).

First, from a domestic allocative point, investment-led industrialization may not necessarily result in better municipal infrastructure, services or improvements in sanitation and living conditions for everyone in a particular country or city. Especially in the rapidly developing cities of low-income countries, industrial pollution and infrastructural deficiencies negatively impact the living standards and health of the population (Biermann et al. 2016). In addition, investments in modern fertilizer-intensive agriculture, which created a decline in global food prices and benefited consumers, have actually increased soil degradation, made agricultural producers in the Global North dependent on government subsidies and pushed small-scale local farmers in the Global South out of the market (Schroeder 2014). Moreover, the type of investment also matters: Dellas (2011) argues that private sector involvement in water partnerships is disputed regarding the provision of water that is affordable to all, and to commercially unattractive areas. Phelan, McGee and Gordon (2012) contend that businesses governed cooperatively by members may be better for producing in an ethical and ecologically sustainable way.

Second, from an international allocative perspective, foreign investment in resource extraction in the Global South is likely to support a wasteful consumption-based economy in the Global North (Ehresmen and Okereke 2015). Moreover, regarding climate change, foreign investment in mitigation and adaptation measures often cannot meet the current need of developing countries, as the impact of climate change has become increasingly costly in lower-income regions like Africa (Habtezion et al. 2015). Additionally, investment choices also play a role in the allocation of environmental degradation. For instance, although celebrated by some as a climate-friendly energy source, large investments in biofuel expansion might increase international food prices, impact food security, freshwater resources, soil fertility and deforestation in the producer country (Bastos Lima and Gupta 2014).

Third, from a temporal perspective, climate change and the extraction of finite resources are questions of intergenerational justice. Specifically, investment can generate enduring hazardous wastes, such as nuclear waste, greenhouse gas emissions, the depletion of certain resources and extinction of species, which have consequences for future generations (Earth System Governance Project 2018). Likewise, Schroeder (2014) argues that, although unsustainable fishing practices or large-scale industrial production is increasing yields in the short term, benefitting both suppliers and consumers, these practices are causing long-term ecosystem degradation through the decimation of genes, species and biological traits.

3.2 Impact of economic empowerment on participation in environmental decision making

The ESG project not only deals with the question of allocation from an outcome-based perspective, but also studies the governance processes that lead to these outcomes. Most environmental governance processes today promote the inclusion of stakeholder participation. Hence, stakeholders are not only confined to lobbying or implementation processes, but also participate in decision making (Biermann et al. 2009). Nevertheless, Coolsaet (2015) stresses that participation does not "just happen," but rather, it requires financial and human resources that may not be equally accessible to participants and can exacerbate

inequalities. Here, meaningful participation is inhibited when the participating actors do not possess the same level of financial capabilities, human resources or information. In other words, the initial distribution of material conditions and economic empowerment of participants, which is usually shaped by previous patterns of trade and investment, has an impact on the influence of each actor in the decision-making process, even when such a process tends to be participatory. In turn, these varying levels of influence affect the outcome of the process, consisting in this case of the specific allocation of environmental benefits and hazards. For instance, using the official data on the size of country delegations to the Conferences of Parties to the UNFCCC, Schroeder et al. (2012) has showed that small developing countries have often downsized their delegations due to financial constraints and lack of expertise, while G8 countries, notwithstanding the recent reversal of the USA, have consistently increased their own delegations. This result implies that inequitable allocation of environmental benefits and burdens is likely to exist in some United Nations' institutions as wealthy countries dominating the global economic system participate more actively in global environmental policy-making than developing countries.

3.3 Impact of MEAs on allocation through trade and investment

In addition to the direct influence of MEAs on environmental governance, they also have a secondary impact on environmental allocation through their impacts on trade and investment. Using the example mentioned above, the Ramsar Convention on Wetlands (1971) has boosted tourism sector investments in Malaysia's Pulau Kukup Island. Nevertheless, Barau and Strigner (2015) also underline the likelihood of long-term negative impacts on the ecological integrity of the island, due to the influx of tourists. Moreover, Gupta (2014) contends that the "advanced informed agreement" principle incorporated into the Cartagena Protocol on Biosafety and transgenic crops works as market-facilitating, despite an evident democratic push to empower the importing countries to be informed about the risks associated with genetically modified organisms. Here, due to the limited scope of agreed disclosure and the resource-intensive transparency infrastructures required to render disclosure actionable, the Cartagena Protocol is rather market-following than market-forcing.

4 Conclusion

In an era when human actions have become major drivers of environmental changes, the global economic system continues to interact with earth system governance. However, the past research conducted under the ESG framework has rarely investigated in an explicit way the impact of the global economic system such as trade and investment on the access to and allocation of environmental resources, benefits and degradation. To better understand such impact, the relevant causal mechanisms and the measures needed to ensure equity and fairness through economic development, we systematically review the literature on the impact of trade and investment on access and allocation of environmental benefits and hazards developed in the ESG project. Our analysis shows how today's global economic system has caused unequal access to and allocation of benefits and burdens related to earth system governance. While some assert that strategies of economic development

such as trade and investment liberalization, by design, hold the promise to improve the efficiency of resource use without intention to harm any social groups, empirical studies conducted under the ESG framework suggest that these often have negative consequences for vulnerable populations, sectors and countries.

More specifically, a growing strand of the ESG research has sought to explore the extent to which trade and investment regimes can directly impact the ability of individuals and groups to secure access to, and equitable allocation of, environmental resources and related socioeconomic opportunities (for example, access to markets for commodities). Meanwhile, the ESG scholarship has been also interested in the role played by certification schemes and environmentally motivated restrictions in international trade and investment regimes in limiting access and allocation among affected producers and consumers. Finally, a smaller and less cohesive subset of publications has tried to address the contribution of trade and investment rules to the unfair distribution of environmental rights, duties and harm through the indirect effects on economic empowerment and participation in decision-making processes. By highlighting specific cases of unfair access and allocation deriving from the transnational dynamics of trade and investment, the research conducted within this body of the literature provides some initial findings to the debate on the implications of the global economic system for justice and equity in earth system governance.

However, more research is needed to identify under what conditions, and through which means, trade and investment can promote more equal access to and allocation of environmental resources. From this perspective, our review identifies several gaps in the existing ESG literature. Many studies that we reviewed have situated their analysis at the global or national level and therefore lack attention to the on-the-ground impact of the global economic system on certain communities and groups (Biermann et al. 2010). But in order to better design institutions of economic development for ensuring equal access and allocation, it is crucial to study *who* are those made vulnerable due to trade and investment, and *what are potential pathways* to more equitable sharing of benefits and burdens with these groups. Relatedly, while the existing ESG literature has identified various causal mechanisms through which the global economic system can affect earth system governance in terms of access and allocation, empirical research that systematically assesses the actual impact on different groups remains scant. Therefore, in order to more effectively help stakeholders and decision makers, future studies need to explore how these interactions play out in practice, including through a greater use of case studies, quantitative and qualitative analyses, impact evaluations and multi-disciplinary approaches.

In sum, the ESG research in the last decade has suggested that the global economic system is closely linked to various arrangements for earth system governance and has profound implications for access to and allocation of environmental resources. Moreover, as indicated by the new directions in earth system governance, such complex interplay is likely to be a critical contextual condition in the future, such that the issue of justice and allocation remains as a key research theme in the ESG project (Burch et al. 2019). Therefore, scholars concerned about sustainability of the earth system need to devote more efforts to understanding the drivers and consequences of the interaction between the global economic system and systems governing global environmental change in order to design better institutions and processes for equal access to and allocation of resources and burdens among different countries and groups in the world.

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