



What goes around, comes around? Access and allocation problems in Global North–South waste trade

Benedetta Cotta¹

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Abstract

Infamous cases of toxic waste trade and research on its health and environmental implications have made the global waste trade a prominent environmental and social justice issue. Recently, such trade has shifted towards extracting resources from waste as recyclable components and used goods which could create income-generating opportunities and reduce the environmental burdens of waste trade from Global North to Global South countries. Nevertheless, studies highlight persistent problems in the access to these resources and allocation of responsibilities, risks and burdens from processing and disposal of traded waste in Global South countries. This article aims to contribute to the lessons learnt on access and allocation with respect to waste trade by focusing on issues of equity, fairness and distributive justice. Two cases are analysed: trade in discarded electronic and electric equipment (EEE) between the EU and Africa and trade in plastic materials between the UK and China. This study shows that exports of used EEE and recyclable plastic materials exacerbate the environmental burdens of Global South countries while also exporting new environmental risks and social burdens. At the same time, new demands for justice have emerged from Global South countries through waste ship back initiatives, and new international measures have also been adopted. While the access and allocation lens enabled the identification of persistent problems in Global North–South waste trade, directing future Earth System Governance research to the demands emerging from the Global South countries could offer insights into how to better address these problems and deal with growing global inequalities.

Keywords Access and allocation · Global North–South countries · Global waste trade · Discarded EEE · Recyclable plastic material

Abbreviations

BIOIS	BIO Intelligence Service
EC	European Commission
EEA	European Environmental Agency
EEE	Electrical and electronic equipment
EPR	Extended producer responsibility

✉ Benedetta Cotta
cotta@leuphana.de

¹ Leuphana University Lüneburg, Universitätsallee 1, 21335 Lüneburg, Germany

ESG	Earth System Governance
EU	European Union
HDI	Human Development Index
OECD	Organization for Economic Cooperation and Development
UK	United Kingdom
UNDP	United Nations Development Programme
WEEE	Waste from electrical and electronic equipment

1 Introduction

More than two billion tonnes of non-hazardous waste¹ is now generated in the world each year; this is projected to increase by 19% in Global North² countries and by more than 40% in Global South countries by 2050 (Kaza et al. 2018). Global hazardous waste generation has also increased by 12% between 2007 and 2015 (Secretariat of the Basel Convention 2018). When thinking of these increasing volumes, the bottom line question is: what to do with such waste? Global North countries have functioning systems of collection and “adequate waste disposal and treatment” (Kaza et al. 2018: 5). However, in Global South countries collection is generally undertaken only in urban areas, while waste is often disposed in illegal dump sites or burnt (Kaza et al. 2018). Considering the projections for 2050, it is clear that disparities in waste collection and treatment pose enormous challenges to the environment and human health, particularly in Global South countries. These challenges are exacerbated if we consider that Global South countries are often the final destination of internationally traded waste (Secretariat of the Basel Convention 2018; Gregson et al. 2015).

Waste exports³ from the Global North to Global South countries are not a new phenomenon. Since the 1980s, emblematic cases of toxic waste exports have been investigated by international organizations and researchers (e.g. Clapp 2001; Greenpeace 2010), resulting in an extensive literature on the topic. For environmental justice scholars, profligate consumption patterns and rapid obsolescence of products have created overconsumption in the Global North and generated massive quantities of waste which are often discarded in the

¹ The European Waste Framework Directive (2008/98/EC) defines non-hazardous waste as any object or substance that the waste producer or the one in possession of it “discards or intends or is required to discard” (Art. 3.1) and hazardous waste as a waste which can be explosive, oxidizing, flammable, irritant for eyes, toxic, corrosive, infectious, mutagenic, sensitizing and eco-toxic.

² This article uses the concepts of “Global North” and “Global South” to better highlight possible equity issues and power imbalances that may arise between these parts of the world (Gupta 2012). To assess the distribution of countries in one group or the other, the article takes as threshold the preliminary conditions for OECD membership: open and transparent market-based economy, pluralist democracy, rule of law and protection of human rights (OECD 2019). Therefore, “Global North” encompasses all OECD countries while “Global South” all non-OECD countries.

³ The article does not distinguish between waste “exports” and waste “shipments”, and these terms are used interchangeably. This choice is justified by the fact that international and European legislation do not clearly define the two terms. The Basel Convention defines who is considered country of waste export (or import) while “shipment” is used to indicate the action of transferring waste (Basel Convention 1998, art. 2.10 and Annex 5). The European Regulation 1013/2006 defines waste “exports” as occurring outside the EU (Art. 2.31) and waste “shipments” as occurring for recovery and disposal purposes (Art. 2.34). Moreover, the existing literature does not clearly distinguish between the two concepts (e.g. Vilcheck 1990; Williams 1991).

Global South (Gregson et al. 2015). Environmental and health burdens are thus unevenly distributed with Global North countries “trashing” the South by shipping polluting substances and materials which cause environmental degradation and expose people in the South to environmental and health risks (e.g. Schmidt 2006; Sonak et al. 2008). Global waste trade has also been seen as a by-product of manufacturing shifts from Global North to Global South countries and of the liberalization of international trade (e.g. Lepawski 2015; Lucier and Gareau 2015). International Relations and International Political Economy debates define the world system as stratified in a core that produces finite technological goods and a periphery that grants raw materials and cheap manpower (e.g. Wallerstein 1979; Cardoso and Faletto 1979). In such a vision, the global waste trade becomes a new form of colonialism or ecological imperialism with Global North countries exporting waste to the South to be treated by cheap manpower and following low environmental standards (Gregson et al. 2015; Stevenson 2018).

Recently, the conceptualization of waste has shifted from being a residue of post-production (Thompson 1979) to being a resource that inherently remains in the production cycle as dismantled components and raw materials (Stevenson 2018). Drawing from earlier ideas in industrial ecology and industrial metabolism (D’Amato et al. 2017), since the early 2010s several European Union (EU) policy documents and scholarly works have called for a change from a linear “take-make-use-dispose” (Iacovidou et al. 2017: 1279) to a “circular” economic model (Lazarevic et al. 2010). Such a perspective has also been envisaged by the business sector (McDonough and Braungart 2002; Braungart et al. 2007). This conceptualization has triggered new trade opportunities with Global North countries exporting used goods and scrap materials to the South where these are repaired and often sold back to Global North countries (Gregson et al. 2015). Nevertheless, an emerging number of studies have pointed out how the social and environmental burdens of such trading are unevenly distributed between Global North and Global South countries (e.g. Gregson et al. 2015; Gutberlet et al. 2017; Schröder et al. 2019).

Previous research has shown that global trade in waste, and recently in recyclable materials and used goods, often unevenly distributes its social and environmental consequences between Global North and Global South countries. Building upon the existing literature on the Global North–South waste trade, this article aims to investigate how complex distributional problems are dealt with in Global South countries. Focusing on issues of equity, fairness and distributive justice, the article aims to contribute to the lessons learnt on access and allocation as developed within the Earth System Governance (ESG) research (Biermann et al. 2009; Gupta and Lebel 2010) for this Special Issue on Access and Allocation. Access and allocation are analysed through two empirical cases: trade in discarded electronic and electric equipment (EEE) between the EU and several African countries and trade in plastic materials between the UK and China.⁴

The study of the two cases takes stock of published peer-reviewed literature, grey literature, secondary sources and newspaper articles retrieved through Google and Google Scholar searches.⁵ Reports and statistical databases by international and European

⁴ These trajectories are among the biggest for trade dimension: on the one hand, the EU and the UK generating, respectively, high amounts of WEEE and plastic waste but with inadequate treatment facilities, thus leading to export (BIOIS 2011; BIOIS 2013). On the other hand, several African countries and China which are final destinations for traded WEEE from the EU (Khan et al. 2014) and plastic waste from the UK (Velis 2014).

⁵ The article does not aim to be a systematic review of the literature on global waste trade although several search queries have been developed to retrieve publications on the topic. A search query with the terms

institutions (i.e. World Bank, the Basel Convention Secretariat, the European statistical office) and several European studies provided information on the international and European legislation on waste from electrical and electronic equipment (WEEE) and plastic waste as well as their main global trade trajectories. Secondary sources provided the empirical information on how WEEE and plastic waste had been managed in the EU, African countries and China. Recent online articles from international newspapers and reports from international environmental non-governmental organizations provided additional information on the social and environmental consequences of global WEEE and plastic waste trade.

This article first introduces the analytical framework and the concepts of access and allocation as defined in ESG research which are also operationalized in relation to the global trade of discarded EEE and plastic materials. Sections 3 and 4 investigate access and allocation in the trade of discarded EEE between the EU and Africa and the trade of plastics materials between the UK and China. Section 5 discusses and compares the key findings, while Sect. 6 concludes.

2 Access and allocation in Earth System Governance

Issues of justice, fairness and equity have been investigated by several disciplines of social sciences research such as political science, sociology, law and economics. While different concepts have been coined to address these issues, they all refer to similar problems (Biermann et al. 2009, 2010). Earth System Governance (ESG) research, in particular, has looked at two distinct faces of distributional problems, namely access to resources and allocation of risks, burdens and responsibilities.

Access to resources refers to the capacity to secure the minimum resources for survival (e.g. food and water) and also to allow every human to live in dignity (Biermann et al. 2009; Gupta and Lebel 2010; Bastos Lima and Gupta 2013). Access may also refer to accountable and more inclusive participation of marginalized people, countries and sectors in political decision-making arenas and economic processes (Bastos Lima and Gupta 2013; Gupta et al. 2015). Allocation in ESG research refers to the distribution of “benefits, responsibilities and involuntary risks between countries and actors” (Biermann et al. 2009: 60). It intersects with issues of distributive justice, fairness and equity in the allocation of social, economic and environmental costs and benefits between countries, different generations and groups in a society (Gupta and Lebel 2010; Burch et al. 2019). Furthermore, allocation refers to how environmental risks and burdens are distributed, and responsibilities for causing environmental hazards assigned between Global North and Global South countries (Biermann et al. 2009; Gupta and Lebel 2010; Bastos Lima and Gupta 2013).

This article analyses access and allocation in the global trade of discarded EEE between the EU and several African countries and recyclable plastic components between the UK

Footnote 5 (continued)

“waste trade” was run on Google Scholar returning 3,060,000 hits of which were selected several articles on e-waste and hazardous waste trade. The query was refined to “North–South waste trade” returning 74,200 hits of which were selected articles on recyclable waste including an annual review on the topic (i.e. Gregson et al. 2015) which provided additional references. International reports and European studies were retrieved through snowballing as well as through Google searches. Online news articles were retrieved through Google searches.

and China. These two cases are different in terms of waste type and final trade destinations, but they are also characterized by similarities when it comes to issues of access and allocation. Plastics waste comprises different products as plastics are considered a durable, cheap and versatile material (BIO Intelligence Service (BIOIS) 2011; European Commission (EC) 2018). WEEE (or e-waste) comprises different kinds of discarded electrical and electronic equipment (e.g. televisions, computers, mobile phones, refrigerators). Moreover, the Global South destinations of such trade differ in terms of their human development as measured by the Human Development Index.⁶

Despite these differences, both WEEE and plastic waste are valuable resources as secondary scrap materials and repaired goods. In this context, access to resources refers to the capacity of the local population to extract sufficient recyclable components from plastic waste and recover discarded EEE that can be sold on local markets or back to Global North countries and allow them to sustain their livelihood. In this way, they are also included in local (and global) economic processes of recycling materials. Moreover, WEEE and plastic waste pose severe challenges to human health and the environment if they are not properly managed and disposed of (Zoeteman et al. 2010; BIOIS 2013). Similar problems of allocation of responsibilities, risks and burdens may arise when plastics overconsumption, low recycling capacity and the replacement of used but functioning EEE in Global North countries result in the transfer of massive quantities of WEEE and plastic waste to Global South countries where proper waste management and treatment infrastructures are often missing (European Environmental Agency (EEA) 2012; Vergara and Tchobanoglous 2012). Hence, these two different cases allow for a comparison in the way access and allocation are dealt with in Global South countries.

3 Access and allocation in global discarded EEE trade

Discarded EEE is one of the fastest growing segments of waste in Global North countries (Ongondo et al. 2011; Lepawski 2015; Zoeteman et al. 2010) and is also growing in Global South ones (Baldé et al. 2017). However, only 20% of the globally generated WEEE is documented to be collected and recycled (Baldé et al. 2017). In Global North countries, the annual proportion of WEEE generated and that which is collected and recycled are particularly imbalanced (Ongondo et al. 2011; BIOIS 2013; Baldé et al. 2017). According to Eurostat data, the EU puts annually on the market high amounts of EEE but collects, reuses or recycles only a very small proportion of them.⁷ WEEE collection and recycling problems can partly be imputed to the fact that consumers store small obsolete appliances at home or dump e-waste in disposal sites as municipal waste (Oswald and Reller 2011; Zoeteman et al. 2010). Nevertheless, the vast majority of the WEEE generated and collected in the EU is exported to the Global South countries to be treated (Nordbrand 2009; BIOIS 2013; Khan et al. 2014).

⁶ The Human Development Index (HDI) developed by the United Nations Development Programme (UNDP) assesses the average achievement in key human development dimensions such as a long and healthy life, being knowledgeable and have a decent standard of living. The HDI trends for the period 1990–2018 rank China among the countries with a “high human development” while African countries such as Ghana and Nigeria as “medium human development” and “low human development” countries (UNDP 2019).

⁷ Eurostat estimates that in 2016 the EU has put 10 million tonnes of EEE on the market, but only approximately 4.5 million tonnes was collected and 3.8 million tonnes recovered and reused (Eurostat 2019).

3.1 Access to discarded EEE in Africa

Global North countries frequently justify WEEE trade by arguing that the access to second hand and cheap discarded electronics to be dismantled, repaired and sold on the market could represent “the sole secure source of livelihood for many people in developing countries” (Bisschop 2012: 240). In this logic, discarded EEE could help support local livelihoods, increase revenues, grant employment and close the ‘digital divide’ between Global North and Global South countries by making technology available to the local population (Secretariat of the Basel Convention 2011; Oswald and Reller 2011; Lepawski 2015). Several African countries have been importing used EEE from the EU (Nordbrand 2009; Secretariat of the Basel Convention 2011). Kenya, Nigeria, Ghana and Liberia, in particular, have bought second-hand computers, mobile phones and televisions to be repaired, refurbished and then sold locally (Secretariat of the Basel Convention 2011). However, much of the e-waste traded to Global South countries often “never makes it to [a] second hand market” (Bisschop 2012: 221) but enters an informal economy where informal waste collectors and scrap pickers dismantle discarded EEE to extract raw materials (Bisschop 2012). Although this informal market provides a source of living, incomes vary greatly between workers (Grant and Oteng-Ababio 2012).

EU countries often do not grant access to discarded EEE at fair conditions to African countries. Trading used branded EEE is considered more profitable in Africa because EU producers can sell EEE at higher prices there (Oswald and Reller 2011). European reports have also documented cases in which the EU has exported supposedly new televisions to Ghana, Nigeria and Egypt at an extremely low value per unit, which suggests that these were either used products or e-waste (EEA 2009; BIOS 2013). Furthermore, massive volumes of used EEE items traded to African countries are broken, unrepairable or cannot be reused and therefore they end up as e-waste in local landfill sites or burnt to recover materials (Fischer et al. 2012; Khan et al. 2014). In other cases, ‘near-end-of-life’ products are exported to Africa and despite being repaired locally they have a short lifespan (Secretariat of the Basel Convention 2011; Heacock et al. 2016). Here, the valuable components are disassembled and sold as scrap while the residual waste is abandoned without proper treatment or burnt in informal dumping sites, with substantial risks for the health of the e-waste workers and the environment (Grant and Oteng-Ababio 2012; Amankwaa 2013).

3.2 Allocation in the EU-Africa discarded EEE trade

The practice of exporting waste for disposal to Global South countries has been described as “an environmental injustice on global scale” (Ikeme 2003: 197). In 1989, the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal was adopted to regulate the trade of hazardous waste and later e-waste from Global North to Global South countries (BIOIS 2013). This Convention aimed “at remedying existing or imminent injustice in the distribution of

environmental costs and benefits” (Ikeme 2003: 197) by prohibiting hazardous waste trade for disposal purposes and by helping Global South countries to apply environmentally sound management principles in managing e-waste (BIOIS 2013). Subsequent decisions⁸ prohibited the export of hazardous waste to the Global South for all purposes although used EEE could still be traded if functioning or could be repaired (EEA 2012; BIOIS 2013; Lepawski 2015). The EU implemented this legislation through the Waste Shipment Regulations (Regulation 259/93 and Regulation 1013/2006) which banned the export of hazardous waste to Global South countries but allowed the export of some non-hazardous components at the same treatment conditions (Directive 2012/19/EU, art. 10) and upon the acceptance of the importing country (BIOIS 2013; Zoeteman et al. 2010).

Despite the existence of international and European legislation, trade in discarded EEE may often just be a form of waste dumping which allocates waste management responsibilities from North to South, while doing so in a cost-effective manner for the North. It is often believed that “high waste management costs in the global North are driving an unscrupulous and unethical e-waste trade with the global South” (Pickren 2014: 113). Profits in carrying out recycling operations in EU countries are low compared to the profitability of selling used EEE to Global South ones (Zoeteman et al. 2010). Hence, recycling companies often charge collection fees for used EEE in the EU but then outsource their management and treatment responsibilities by shipping them to Global South markets as charity donations or scrap material (Krikke 2008). Furthermore, they often mislabel containers to conceal the shipment of hazardous components or illegally ship e-waste and low-quality material to Africa (Oswald and Reller 2011; Bisschop 2012).

The EU often transfers the environmental and health “risks associated with this waste management” (Boudier and Bensebaa 2011: 37) to the South. In African countries, e-waste recovery and recycling is frequently carried out by unskilled workers coming from communities with scarce job possibilities and who are “desperate to feed themselves and their families” (Heacock et al. 2016: 551), and this necessity overrides personal health issues (Boudier and Bensebaa 2011). This can also impact the environment as these workers often are unaware of the environmental risks of improper recycling, recovery and disposal of hazardous components (Perkins et al. 2014). They generally disassemble and collect valuable components of discarded EEE following risky processing practices “without knowledge of or access to exposure minimizing technology” (Heacock et al. 2016: 551). The remaining parts are often dumped in disposal sites or burnt in open fires, leaking toxic substances into the ground, releasing toxins to the air and contaminating agricultural products. This pervades the daily life of the local residents as well as their basic source of livelihood (Heacock et al. 2016).

Global trade in discarded EEE also transfers and aggravates the burden of e-waste management and treatment, especially in Africa. African countries often lack specific legislation on how to properly manage e-waste and do not have effective enforcement of existing international legislation on hazardous waste management (Ongondo et al. 2011). Furthermore, when e-waste legislation is adopted, it often does not coherently relate to the waste management system in place (Khan 2018). Several scandals of e-waste dumping have also highlighted a general lack of collection and transport systems, as well as facilities and

⁸ For example, the OECD Decision on the Control of Transboundary Movements of Waste destined for recovery among OECD countries of 1992 [C(92)39/Final], the Basel Convention’s “Ban Amendment” of 1995 and the Bamako Convention ratified in 1998.

technology to treat hazardous components in an environmentally sound manner (Secretariat of the Basel Convention 2011; Ongondo et al. 2011). For example, Nigeria does not have proper WEEE recycling facilities but only some reuse activities to disassemble and retrieve components from obsolete phones (Ongondo et al. 2011). The remaining e-waste is generally managed as municipal waste that once collected is burnt “to reduce the waste volume before final disposal in unlined landfills that lack monitoring or leachate recovery systems” (Ongondo et al. 2011: 721). Another example is the Agbogbloshie dumpsite in Ghana, a “hub of e-waste activities” (Oteng-Ababio 2012: 153) for the millions of used EEE from the EU which are regularly dissembled and reassembled by informal workers (Bisschop 2012; Khan 2018). Such a hub is also famous for the poor working conditions and the environmental harm caused by untreated and abandoned waste (Amankwaa 2013; Khan 2018).

4 Access and allocation in global recyclable plastics trade

In the past 30 years, global plastics production has increased by a factor of 200% with a global generation of approximately 335 million tonnes of plastics in 2016 (Plastics Europe 2017). That year, Asia accounted for 50% of global plastic materials production followed by Europe with approximately 20% (Plastics Europe 2017). With economic growth in some Asian countries, their demand for plastic materials has increased, boosting the European plastics exports to these destinations (EEA 2012; Fischer et al. 2012).

4.1 Access to recyclable plastic materials in China

Plastic waste trade from the EU to Asia is often justified as a way to meet the need for resources of Asian economies (Fischer et al. 2012). The high price of raw materials from natural resources in China has triggered a high demand for secondary materials such as raw plastics (Velis 2014). This has substantially influenced the global recycling market of secondary recycling materials which in recent years has become an extremely profitable business, with an estimated turnover of around \$500 billion per year (Gregson et al. 2015). Chinese traders have harvested Global North countries for scrap plastic material to be exported to China (Gregson et al. 2015). At the same time, exports of plastic materials to China substantially increased in the last 2 decades, and more than 80% of these came from EU countries and the UK (Velis 2014; EC 2018).

However, this is only half of the story. Cost–benefit calculations by UK companies have often motivated plastic waste exports to Asian countries. Mixed plastics is a particularly challenging waste stream as the UK lacks adequate collection, sorting and treatment facilities to deal with such waste (Jones et al. 2013). At the same time, mixed plastics are characterized by low-quality materials which reduce “the economic viability of a recycling operation” in the UK (Jones et al. 2013: 34). Hence, exporting such waste to China has made the recycling business profitable for UK companies. However, the low quality of this waste has hampered the access to plastic recyclable components in China as these could neither be recovered nor recycled but ended up in landfills or incinerated in an environmentally unsound manner (Velis 2014; Gourmelon 2015). For this reason, China has recently decided to no longer accept shipments of mixed plastic waste from Global North countries (Velis 2014). Nevertheless, UK companies have found ways to overcome this decision by

shipping waste via Hong Kong where inspections of imported plastic waste destined for China are laxer (Velis 2014).

4.2 Allocation in the UK–China recyclable plastics trade

The accumulation of plastic waste is a growing global concern for the durability of plastic materials which can seriously damage biodiversity and ecosystems (EC 2018). Current international legislation assigns the costs of pollution prevention and control to the polluter, i.e. polluter pays principle (OECD Recommendation C(72)128), and through the “extended producer responsibility” (EPR) principle it extends to the post-consumer stage the producer’s physical and financial responsibility for the management of a product (OECD 2016). These principles have been transposed in EU treaties (e.g. consolidated versions of the Treaty of Rome) and several waste-related directives (e.g. Packaging and Packaging Waste Directive 94/62/EC and Waste Framework Directive 2008/98/EC).

Despite stringent international and EU legislation, shifting plastics recycling and recovery responsibilities to the South is common practice. Although between 2006 and 2016 plastics recycling has increased by almost 80%, energy recovery by 61% and landfilling has decreased by 43% (Plastics Europe 2017), plastics recovery and recycling requirements have been weakly and unevenly enforced in the EU countries (BIOIS 2011). Insufficient capacity, lack of financial resources and costly treatment technology have made landfilling a preferred option in many EU countries (Velis 2014; Plastics Europe 2017). In other cases, it has led to the export of plastics for treatment purposes. For the UK, shipping plastics to China “has provided an outlet for managing plastic waste” and prevented it from going to landfill (Brooks et al. 2018: 1). At the same time, such trade has been motivated by the cheap shipping costs and processing fees in China (BIOIS 2011; Velis 2014). In this way, costs and responsibilities of plastics recovery and recycling have been transferred to China.

Plastics trade to China comes also at the price of allocating environmental and health risks to Chinese workers and the general population. Increasingly, the recycling industry has flourished and “technology is improving” in many Chinese recycling industries (Velis 2014: 42). Nevertheless, companies still burn residual materials from plastics while externalizing social and environmental costs (Velis 2014) with some areas becoming dead zones (Minter 2014). Here, informal plastic recyclers, mostly socially and financially disadvantaged people sort piles of abandoned plastic items without any protective equipment while unrecyclable plastics are burnt overnight causing damage to soil, waterways and the atmosphere (Velis 2014). This also causes health problems to the informal workers and the local residents who inhale toxic fumes resulting from these unsound treatment operations (BIOIS 2011; Velis 2014).

Trade in plastic materials also transfers the environmental burden resulting from it to China (BIOIS 2011). Although the import of plastic materials is allowed only for recycling purposes, plastic recycling is very low in China (Velis 2014). Most imported plastics is bought by private operators and sold to family-run companies which reprocess plastics using low technology in bad working conditions and without proper environmental controls (Velis 2014; Gourmelon 2015). Moreover, even if the number of factories with modern processing techniques has increased in recent years (Kaza et al. 2018), China follows low recovery standards resulting in low-quality recovered plastic products (Velis 2014). Furthermore, imported low-quality plastic waste is incinerated for energy recovery or ends up in landfills (Gourmelon 2015) which frequently lack “environmental requirements for safe disposal systems” (OECD 2005: 1). Landfilling plastic waste often also results from a

lack of “higher level technologies, sorting facilities and cheap disposal costs” (Velis 2014: 38).

To address some of the environmental and health risks and overcome the environmental burden of imported plastic waste, China has attempted several times to regulate foreign trade and impose controls over imported plastic waste (Yoshida 2005). Since the early 1990s, the Chinese government has regulated foreign waste flows by forbidding the dumping, storing or disposing of foreign waste, inspecting foreign cargoes and occasionally invoking the “ship-back regulations” returning wastes to the Global North waste exporters (Yoshida 2005). In 2013, China imposed another temporary restriction on waste imports (the “Green Fence Operation”) to improve the quality of “imported waste-derived secondary raw materials” (Velis 2014: 46) and reduce illegal plastic trade (Brooks et al. 2018). However, these measures had only temporary impacts and did not end informal flows of plastic waste trade in China (Yoshida 2005; Brooks et al. 2018). In early 2018, the Chinese government enacted a permanent ban on imports of plastic waste to overcome the environmental damage of the global plastic trade (Brooks et al. 2018). At first, Global North countries were unprepared to face the situation, but they found ways to shift again responsibilities, risks and burdens to the South by re-directing plastic waste exports towards other Southeast Asian countries (Greenpeace 2019; Reeves 2019). In particular, Malaysia has become the main destination of plastic waste from the UK (Ross 2018).

5 Comparing access and allocation in global trade of discarded EEE and recyclable plastics

Following a recent shift towards a circular economy model, products are designed to remain in the production cycle after their use by being reassembled and reused while materials recycled instead of becoming waste and being disposed of (EEA 2016). At the global level, this shift has seen an increasing trade between Global North countries that export used EEE and scrap plastics materials to Global South countries where these are recovered, repaired and sold in local and global markets (Gregson et al. 2015). In this way, while waste generation in the Global North countries is reduced because goods and materials remain in the production cycle, global trade of used EEE and recyclable plastics components may offer new social and economic opportunities to the population of Global South countries by increasing their livelihoods and reducing their environmental burden from unsound waste disposal.

Despite its potential, the global circular economy model has important limitations in terms of equity, fairness and social justice (on this point see also Murray et al. 2017). The access and allocation lens has enabled the identification of these limitations in the two cases of global trade in discarded EEE between EU and Africa and recyclable plastics between the UK and China. Access to resources should provide opportunities to local populations to sustain their livelihood and be included in economic processes. However, the unethical behaviour of Global North firms has hampered a fair access to these resources. Seeking only higher profits at the lowest cost, EU producers have sold to African countries used branded EEE at higher prices, traded non-functioning or unrepairable items or shipped used “near-to-end” EEE which soon ceased to function. This deprived African countries not only of a fair access to resources but made them dumping sites of Northern e-waste. Similarly, UK plastic recyclers exported to China low-quality plastic components which could not be recycled and ended up untreated in landfill sites.

Global trade of discarded EEE and plastic materials has also come at the price of equal and fair allocation of responsibilities, risks as well as social and environmental burdens. Mislabelling containers and perpetuating other illegal practices, EU producers have managed to transfer the costly recovery and recycling operations of e-waste to African countries. Furthermore, UK companies have exported plastics to be recovered and recycled to China because of relatively cheap shipping costs and processing fees. Outsourcing recovery and recycling responsibilities have also aggravated the environmental burden of African countries where e-waste legislation is often inadequate and collection and treatment facilities are lacking. Similarly, exports in plastics materials exacerbated the environmental situation in China where recovery is generally carried out without proper environmental controls while low-quality plastics is incinerated or landfilled in an unsound manner. Moreover, trade in used EEE and recyclable plastics exported new social burdens and environmental risks to the South by creating informal collection, recycling and recovery markets. To make a living, African workers dismantle unrepairable EEE to retrieve valuable raw materials, while Chinese recyclers separate plastic and scrap components without using protection equipment. With no access to technology and unaware of sound treatment operations, these workers have also caused severe environmental damages by leaking hazardous substances in the ground while disassembling obsolete EEE items or burning discarded EEE and plastic materials and releasing toxic smoke.

Global trade in discarded EEE and recyclable plastics thus perpetuates social and distributive injustices. The core problem is that there is a thin line between what is considered a resource and what waste in global EEE and plastics trade. This has allowed Global North countries to find ways to export unrecyclable materials and end-of-life EEEs in Global South countries. However, new demands for justice and allocation have recently emerged from Global South countries. Increased environmental awareness in China has led to “ship back” initiatives and a permanent ban on the import of plastic materials from Global North countries. After the Chinese ban, several Southeast Asian countries have rapidly become destinations of Global North’s plastic waste trade and its social and environmental consequences. However, since the early 2019, many of these countries have promoted a “regional pushback” by returning waste to their Global North exporters (Marks 2019). Indeed, with each country in the South that adopts such measures, there are more that can be used as a destination by unscrupulous Global North traders. Nevertheless, these new demands have triggered a global reflection on the matter which resulted in the approval of a ban on plastic waste trade to Global South countries as well as the establishment of a partnership within the Basel Convention to prevent and minimize the generation of plastic waste and supervise its sound management (Basel Action Network 2019).

While it is too early to evaluate the new measures within the Basel Convention, the Global South’s ship back operations provide a useful input for future work on justice issues. The access and allocation lens has enabled the identification of persistent equity, fairness and justice problems in Global North–South trade of recycling materials and used goods that, when not tackled, led to waste ship back operations to Global North countries. Indeed, to properly address justice issues, future research within ESG could expand the access and allocation lens to include the demands for justice and allocation emerging from the Global South countries. This could offer new insights into how to address persistent equity, fairness and justice problems and deal with the growing number of global inequalities (Burch et al. 2019) towards a more just and fair distribution of social and environmental burdens and risks between Global North and Global South countries.

6 Conclusions

This article focused on problems of access to resources and allocation of responsibilities, risks and burdens in the global trade of discarded EEE and plastic materials between Global North and South countries. Despite the potential of the circular economy model, it concludes that Global North countries are continuing to export their plastic waste and e-waste to the South instead of resources. Furthermore, it points out limitations to this model in terms of fair access to recyclable plastics and discarded EEE and allocation of responsibilities in Global South countries. This is due to the unethical behaviour of Global North producers who also found ways to transfer their responsibilities for waste recovery and recycling to the South. These exports exacerbated also the environmental burden of Global South countries while creating new environmental risks and social burdens, especially for informal workers. However, new demands for allocation and justice are emerging with some Southern countries protesting through waste ship back initiatives. Directing future ESG research towards the demands emerging from Global South countries could provide insights to address persistent justice, equity and fairness problems and deal with growing global inequalities.

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References

- Amankwaa, E. F. (2013). Livelihoods in risk: Exploring health and environmental implications of e-waste recycling as a livelihood strategy in Ghana. *The Journal of Modern African Studies*, 51(4), 551–575.
- Baldé, C. P., Forti V., Gray, V., Kuehr, R., & Stegmann, P. (2017). *The global E-waste monitor—2017*. United Nations University (UNU), International Telecommunication Union (ITU) & International Solid Waste Association (ISWA), Bonn/Geneva/Vienna.
- Basel Action Network. (2019). *The Norwegian Amendments: Implications for recyclers*. https://wiki.ban.org/images/3/3e/Norwegian_Implications.pdf.
- Bastos Lima, M. G., & Gupta, J. (2013). The policy context of biofuels: A case of non-governance at the global level? *Global Environmental Politics*, 13(2), 46–64.
- Biermann, F., Betsill, M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., et al. (2009) *Earth System Governance. People, places and planet. science and implementation plan of the Earth System Governance Project*. IHDP Report No. 20. IHDP: Bonn.
- Biermann, F., Betsill, M. M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., et al. (2010). Earth system governance: a research framework. *International Environmental Agreements: Politics, Law and Economics*, 10(4), 277–298.
- BIO Intelligence Service. (2011) *Plastic waste in the environment*. Revised Final Report prepared for European Commission—DG Environment. <https://ec.europa.eu/environment/waste/studies/pdf/plastics.pdf>. Accessed 15 January 2020.
- BIO Intelligence Service. (2013). *Equivalent conditions for waste electrical and electronic equipment (WEEE) recycling operations taking place outside the European Union*. Final Report prepared for

- European Commission—DG Environment. https://ec.europa.eu/environment/waste/weee/pdf/Final%20report_E%20C%20S.pdf. Accessed 15 January 2020.
- Bisschop, L. (2012). Is it all going to waste? Illegal transports of e-waste in a European trade hub. *Crime, Law and Social Change*, 58(3), 221–249.
- Boudier, F., & Bensebaa, F. (2011). Hazardous waste management and corporate social responsibility: Illegal trade of electrical and electronic waste. *Business and Society Review*, 116(1), 29–53.
- Braungart, M., McDonough, W., & Bollinger, A. (2007). Cradle-to-cradle design: Creating healthy emissions—A strategy for eco-effective product and system design. *Journal of Cleaner Production*, 15(13–14), 1337–1348.
- Brooks, A. L., Wang, S., & Jambeck, J. R. (2018). The Chinese import ban and its impact on global plastic waste trade. *Science Advances*, 4(6), EAAR0131.
- Burch, S., Gupta, A., Inoue, C., Kalfagianni, A., Persson, A., Gerlak, A. K., et al. (2019). New directions in earth system governance research. *Earth System Governance*, 1, 100006.
- Cardoso, F. H., & Faletto, E. (1979). *Dependency and development in Latin America (Dependencia y desarrollo en América Latina, engl.)*. Berkeley, Los Angeles: University of California Press.
- Clapp, J. (2001). *Toxic exports. The transfer of hazardous wastes from rich to poor countries*. Ithaca, London: Cornell University Press.
- D'Amato, D., Droste, N., Allen, B., Kettunen, M., Lähinen, K., Korhonen, J., et al. (2017). Green, circular, bio economy: A comparative analysis of sustainability avenues. *Journal of Cleaner Production*, 168, 716–734.
- European Commission. (2018). *A European strategy for plastics in a circular economy* (SWD (2018) 16 Final. <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018DC0028&from=EN>). Accessed 15 January 2020.
- European Environmental Agency. (2009). *Waste without borders in the EU? Transboundary shipments of waste* (No. 1). EEA. <https://www.eea.europa.eu/publications/waste-without-borders-in-the-eu-transboundary-shipments-of-waste>. Accessed 10 January 2020.
- European Environmental Agency. (2012). *Movements of waste across the EU's internal and external borders*. EEA Report No 7/2012 <https://www.eea.europa.eu/publications/movements-of-waste-EU-2012>. Accessed 10 January 2020.
- European Environmental Agency. (2016). *Circular economy in Europe. Developing the knowledge base*. EEA Report 2/2016. <https://www.eea.europa.eu/publications/circular-economy-in-europe>. Accessed 20 January 2020.
- Eurostat. (2019). *Waste statistics—electrical and electronic equipment*. https://ec.europa.eu/eurostat/statistics-explained/index.php/Waste_statistics_-_electrical_and_electronic_equipment#EEE_put_on_the_market_and_WEEE_collected_in_the_EU. Accessed 20 January 2020.
- Fischer, C., Juncker H., Mazzanti M., Paleari S., Wuttke J., & Zoboli R. (2012). *Transboundary shipments of waste in the European Union. Reflections on data, environmental impacts and drivers*. ETC/SCP working paper 2/2012. <https://www.eea.europa.eu/publications/waste-without-borders-in-the-eu-transboundary-shipments-of-waste>. Accessed 20 January 2020.
- Gourmelon, G. (2015). Global plastic production rises, recycling lags. *Worldwatch Institute*. https://worldwatch.net/sites/default/files/vital_signs_trend_plastic_full_pdf.pdf. Accessed 15 January 2020.
- Grant, R., & Oteng-Ababio, M. (2012). Mapping the invisible and real" African" economy: Urban e-waste circuitry. *Urban Geography*, 33(1), 1–21.
- Greenpeace. (2010). *The toxic ships. The Italian hub, the Mediterranean area and Africa Greenpeace Italy report*. <https://www.dieselduck.info/library/05%20environmental/2010%20Greenpeace%20Toxic%20Ships.pdf>. Accessed 23 May 2019.
- Greenpeace. (2019). *Data from the global plastics waste trade 2016–2018 and the offshore impact of China's foreign waste import ban. An analysis of import-export data from the top 21 exporters and 21 importers*. https://secured-static.greenpeace.org/eastasia/Global/eastasia/publications/campaigns/toxic/s/GPEA%20Plastic%20waste%20trade%20-%20research%20briefing-v2.pdf?_ga=2.15646198.1780188481.1558407095-1006420900.1539052287. Accessed 30 March 2020.
- Gregson, N., Crang, M., Fuller, S., & Holmes, H. (2015). Interrogating the circular economy: The moral economy of resource recovery in the EU. *Economy and Society*, 44(2), 218–243.
- Gupta, J. (2012). Changing North-South challenges in global environmental politics. In P. Dauvergne (Ed.), *Handbook of global environmental politics* (pp. 97–112). Cheltenham: Edward Elgar.
- Gupta, J., & Lebel, L. (2010). Access and allocation in earth system governance: Water and climate change compared. *International Environmental Agreements: Politics, Law and Economics*, 10(4), 377–395.
- Gupta, J., Pouw, N. R., & Ros-Tonen, M. A. (2015). Towards an elaborated theory of inclusive development. *The European Journal of Development Research*, 27(4), 541–559.

- Gutberlet, J., Carenzo, S., Kain, J. H., Martiniano, M., & de Azevedo, A. (2017). Waste picker organizations and their contribution to the circular economy: Two case studies from a global south perspective. *Resources*, 6(4), 52.
- Heacock, M., Kelly, C. B., Asante, K. A., Birnbaum, L. S., Bergman, Å. L., Bruné, M. N., et al. (2016). E-waste and harm to vulnerable populations: A growing global problem. *Environmental health perspectives*, 124(5), 550–555.
- Iacovidou, E., Millward-Hopkins, J., Busch, J., Purnell, P., Velis, C. A., Hahladakis, J. N., et al. (2017). A pathway to circular economy: Developing a conceptual framework for complex value assessment of resources recovered from waste. *Journal of cleaner production*, 168, 1279–1288.
- Ikeme, J. (2003). Equity, environmental justice and sustainability: Incomplete approaches in climate change politics. *Global environmental change*, 13(3), 195–206.
- Jones, M., Palfrey D., Patterson K., Crichton L., Hollinshead G., Mitchell, P., et al. (2013). *Approaches to using waste as a resource: Lessons learnt from UK experiences*. European Topic Centre on Sustainable Consumption and Production. https://www.researchgate.net/profile/Peter_Mitchell21/publication/n/284187722_Approaches_to_using_waste_as_a_resource_lessons_from_the_UK_experience/links/564f4b6e08ae4988a7a82817.pdf?origin=publication_list. Accessed 20 January 2020.
- Kaza, S., Yao, L., Bhada-Tata, P., & Van Woerden, F. (2018). *What a waste 2.0: A global snapshot of solid waste management to 2050*. *Urban Development Series*. Washington, DC: World Bank. doi:<https://doi.org/10.1596/978-1-4648-1329-0>. Accessed 20 January 2020.
- Khan, S. A. (2018). Struggles and actions for legal space in the urban world: The case of informal Economy E-waste workers. *Canadian Journal of Law & Society*, 33(2), 115–135.
- Khan, S. S., Lodhi, S. A., Akhtar, F., & Khokar, I. (2014). Challenges of waste of electric and electronic equipment (WEEE): Toward a better management in a global scenario. *Management of Environmental Quality: An International Journal*, 25(2), 166–185.
- Krikke, J. (2008). Recycling e-waste: The sky is the limit. *IT Professional*, 10(1), 50–55.
- Lazarevic, D., Aoustin, E., Buclet, N., & Brandt, N. (2010). Plastic waste management in the context of a European recycling society: comparing results and uncertainties in a life cycle perspective. *Resources, Conservation and Recycling*, 55(2), 246–259.
- Lepawski, J. (2015). The changing geography of global trade in electronic discards: Time to rethink the e-waste problem. *The Geographical Journal*, 181(2), 147–159.
- Lucier, C. A., & Gareau, B. J. (2015). From waste to resources? Interrogating ‘race to the bottom’ in the global environmental governance of the hazardous waste trade. *Journal of World-Systems Research*, 21(2), 495–520.
- Marks, D., (2019) Southeast Asia’s plastic waste problem. *East Asia Forum*. <https://www.eastasiaforum.org/2019/06/26/southeast-asias-plastic-waste-problem/>. Accessed 15 January 2020.
- McDonough, W., & Braungart, M. (2002). *Remaking the way we make things: Cradle to cradle*. New York: North Point Press. ISBN, 1224942886, 104.
- Minter, A., (2014). Plastic, poverty and pollution in China’s recycling dead zone. *The Guardian*. <https://www.theguardian.com/lifeandstyle/2014/jul/16/plastic-poverty-pollution-china-recycling-dead-zone>. Accessed 5 June 2019.
- Murray, A., Skene, K., & Haynes, K. (2017). The circular economy: An interdisciplinary exploration of the concept and application in a global context. *Journal of business ethics*, 140(3), 369–380.
- Nordbrand, S. (2009). Out of control: E-waste trade flows from the EU to developing countries. *SwedWatch*. https://swedwatch.org/wp-content/uploads/2016/12/swedwatch_make_it_fair_-_out_of_control.pdf. Accessed 30 May 2019.
- OECD. (2005). *Waste management in China: Issues and recommendations*. Urban Development Working Papers East Asia Infrastructure Department, Working paper No. 9 <https://documents.worldbank.org/curated/en/237151468025135801/pdf/332100CHA0Waste1Management01PUBLC1.pdf>. Accessed 5 June 2019.
- OECD. (2016). *Extended producer responsibility: Updated guidance for efficient waste management*. Paris: OECD Publishing. <https://doi.org/10.1787/9789264256385-en>. Accessed 20 January 2020.
- OECD. (2019). *List of OECD Member countries—Ratification of the Convention on the OECD*. <https://www.oecd.org/about/document/list-oecd-member-countries.htm>. Accessed 20 January 2020.
- Ongondo, F. O., Williams, I. D., & Cherrett, T. J. (2011). How are WEEE doing? A global review of the management of electrical and electronic wastes. *Waste Management*, 31(4), 714–730.
- Oswald, I., & Reller, A. (2011). E-waste: A story of trashing, trading, and valuable resources. *GAIA-Ecological Perspectives for Science and Society*, 20(1), 41–47.
- Oteng-Ababio, M. (2012). Electronic waste management in ghana - issues and practices, sustainable development. In: S. Curkovic (Ed.), *Authoritative and leading edge content for environmental management*. IntechOpen. <https://www.intechopen.com/books/sustainable-development-authoritative-and-leadi>

- [ng-edge-content-for-environmental-management/electronic-waste-management-in-ghana-issues-and-practices](#). Accessed 1 May 2020.
- Perkins, D. N., Drisse, M. N. B., Nxele, T., & Sly, P. D. (2014). E-waste: a global hazard. *Annals of Global Health*, 80(4), 286–295.
- Pickren, G. (2014). Political ecologies of electronic waste: Uncertainty and legitimacy in the governance of e-waste geographies. *Environment and Planning A*, 46(1), 26–45.
- Plastics Europe. (2017). *Plastics—The facts*. <https://www.plasticseurope.org/en/resources/publications/274-plastics-facts-2017>. Accessed 5 June 2019.
- Reeves, S. (2019). *China's ban plastic waste imports throws global recycling chaos*. Hong Kong Free Press. <https://www.hongkongfp.com/2019/04/24/chinas-ban-plastic-waste-imports-throws-global-recycling-chaos/>. Accessed 15 January 2020.
- Ross, A. (2018) UK household plastics found in illegal dumps in Malaysia. *Greenpeace*. <https://unearthed.greenpeace.org/2018/10/21/uk-household-plastics-found-in-illegal-dumps-in-malaysia/>. Accessed 15 January 2020.
- Schmidt, C. W. (2006). Unfair trade—E-waste in Africa. *Environmental Health Perspectives*, 114(4), A232–A235.
- Schröder, P., Anggraeni, K., & Weber, U. (2019). The relevance of circular economy practices to the sustainable development goals. *Journal of Industrial Ecology*, 23(1), 77–95.
- Secretariat of the Basel Convention. (2011). *Where are WEEE in Africa? Findings from the Basel Convention—Waste Africa Programme*. https://www.basel.int/Portals/4/Basel%20Convention/docs/pub/WhereAreWeeInAfrica_ExecSummary_en.pdf. Accessed 23 May 2019.
- Secretariat of the Basel Convention. (2018). Waste without frontiers II. Global trends in the generation and transboundary movement of hazardous wastes and other wastes. *Basel Convention and UN Environment*. <https://www.basel.int/Portals/4/Basel%20Convention/docs/pub/WasteWithoutFrontiersII.pdf>. Accessed 20 January 2020.
- Sonak, S., Sonak, M., & Giriyan, A. (2008). Shipping hazardous waste: Implications for economically developing countries. *International Environmental Agreements: Politics, Law and Economics*, 8(2), 143–159.
- Stevenson, H. (2018). *Global environmental politics. Problems, policy and practice*. Cambridge: Cambridge University Press.
- Thompson, M. (1979). *Rubbish theory: The creation and destruction of value*. Oxford: Oxford University Press.
- United Nations Development Programme. (2019). *Human Development Report 2019. Beyond income, beyond averages, Beyond today: Inequalities in human development in the 21st century*. https://hdr.undp.org/sites/default/files/hdro_statistical_data_table2.pdf. Accessed 20 January 2020.
- Velis, C. A. (2014). *Global recycling markets—plastic waste: A story for one player—China*. Report prepared by FUELogy and formatted by D-waste on behalf of International Solid Waste Association - Globalisation and Waste Management Task Force. ISWA, Vienna, September 2014. https://www.iswa.org/fileadmin/galleries/Task_Forces/TFGWM_Report_GRM_Plastic_China_LR.pdf. Accessed 15 January 2020.
- Vergara, S. E., & Tchobanoglous, G. (2012). Municipal solid waste and the environment: A global perspective. *Annual Review of Environment and Resources*, 37, 277–309.
- Vilcheck, M. V. (1990). The controls on the transfrontier movement of hazardous waste from developed to developing nations: The goal of a "Level Playing Field". *Northwestern Journal of International Law & Business*, 11(3), 643–674.
- Wallerstein, I. (1979). *The capitalist world-economy*. Cambridge: Cambridge University Press.
- Williams, J. D. (1991). Trashing developing nations: The global hazardous waste trade. *Buffalo Law Review*, 39(1), 275–312.
- Yoshida, A. (2005). China: The world's largest recyclable waste importer. *World*, 3(4,000), 4–500.
- Zoeteman, B. C., Krikke, H. R., & Venselaar, J. (2010). Handling WEEE waste flows: On the effectiveness of producer responsibility in a globalizing world. *The International Journal of Advanced Manufacturing Technology*, 47(5–8), 415–436.