



# Note

## The Role of Trade Policy in Plastic Waste Management

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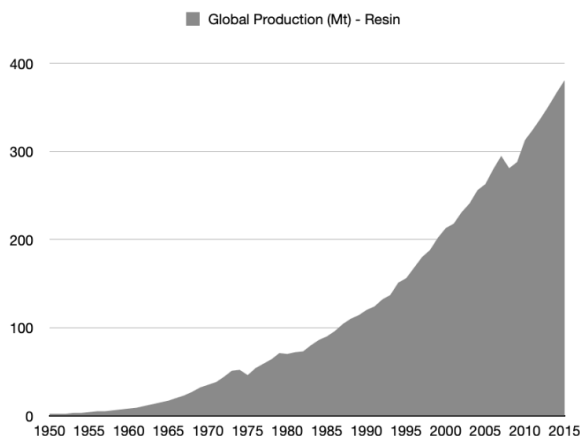
### Summary

With miniscule recycling of plastic waste that not only leads to hazardous health and environmental consequences but also its trade, both legal and illegal which has become a great challenge to the global economy; this paper aims to highlight the discussion on the issue of plastic waste trade and its global consequences. Starting with a brief introduction to plastics and the effect of plastic use and disposal to the environment, the paper shifts its focus to analysis of the existing trade policy around plastic waste trade, the reasons behind its current directionality as well as the challenges involved, especially for the countries importing plastic waste. It acknowledges the importance of various stakeholders and their role in addressing this issue, not only at the disposal stage of plastic value chain, but across it. The paper then concludes re-emphasising the crucial role trade policy can and should play while listing three key recommendations.

## Introduction

The etymology of the word plastic is hardly surprising. Originating from the Latin word ‘plasticus’, which means ‘pertaining to moulding or shaping’; plastics have gained immense popularity for being functionally versatile and extremely cost-effective.<sup>1</sup> Their use has increased by 20 times just in the last 50 years.<sup>2</sup> Figure 1 shows the steep increase in global plastic production, from 2 million tonnes in 1950 to almost 400 million tonnes in 2015.<sup>3</sup> The increasing production and consumption of plastic is also leading to greater accumulation, disposal and trade of plastic waste. Waste-trade in general and plastic waste trade in particular has become a massive global enterprise.

**Figure 1: Global Plastics Production**



Source: Geyer, Jambeck & Law (2017)

More recently, demand for single-use plastics for personal protective equipment (PPE) has become a global necessity due to Covid-19 pandemic. Reasonably so, this has led to increased complexity in both management and trade of plastic waste. In order to promote sanitation and slow the spread of covid-19, many governments the world over, have rolled back or postponed bans on single use-plastics. Tamil Nadu in India has suspended the ban on single-use plastic bottles and bags; UK has suspended the plastic bag charge on online deliveries and pushed back a ban on plastics straws and stirrers for the next six months; Scotland has postponed its deposit-return scheme for bottles until 2022; New Hampshire and Massachusetts, USA have ordered stores to utilise single-use plastic or paper bags and Starbucks has banned using reusable cups and food containers.<sup>4,5</sup> The potential consequences of these domestic policies on the international plastic trade will be added to the existing questions around environmental policy and quality, effectiveness of international environmental agreements (IEAs) as well as trade policy with regards to plastic scrap trade.

## Brief Introduction to Plastics

In 2018, the global plastic production was 359 million tonnes. Figures 2 and 3 indicate the distribution of global plastics production (in %) and per capita plastic consumption (in kilogramme). It can be seen that the major producers are developing nations; dominated by Asia (51%) wherein China captures 31% of the total world production; followed by North America (18%), Europe (17%) & remaining

<sup>1</sup> Etymologeek. 2020. *Plastic Word Origin*. [online] Available at: <<https://etymologeek.com/eng/plastic>>

<sup>2</sup> World Economic Forum, 2016. *The New Plastics Economy Rethinking The Future Of Plastics*. [online] WEF. Available at:

<[http://www3.weforum.org/docs/WEF\\_The\\_New\\_Plastics\\_Economy.pdf](http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf)>

<sup>3</sup> Geyer, R., Jambeck, J. and Law, K., 2017. Production, use, and fate of all plastics ever made. *Science Advances*, [online] 3(7). Available at:

<<https://advances.sciencemag.org/content/3/7/e1700782>>

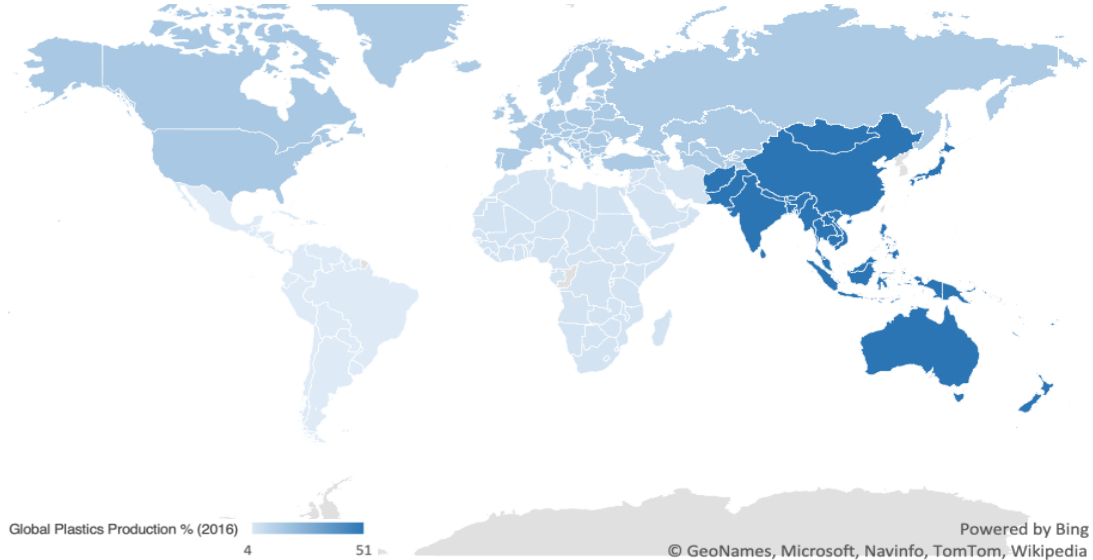
<sup>4</sup> Peszko, G., 2020. *Plastics: The Coronavirus Could Reset The Clock*. [online] World Bank Blogs. Available at: <<https://blogs.worldbank.org/voices/plastics-coronavirus-could-reset-clock>>

<sup>5</sup> Mehta, A., 2020. *The War On Plastics Runs Into A Perfect Storm With Covid-19 | Reuters Events | Sustainable Business*. [online] Reuters Events. Available at: <<https://www.reuters.com/sustainability/war-plastics-runs-perfect-storm-covid-19>>

Asia (17%). Despite being the dominant producers of plastic, in terms of per capita consumption, the developed countries demand far more plastic products than the developing ones; as can be seen in Figure 3.

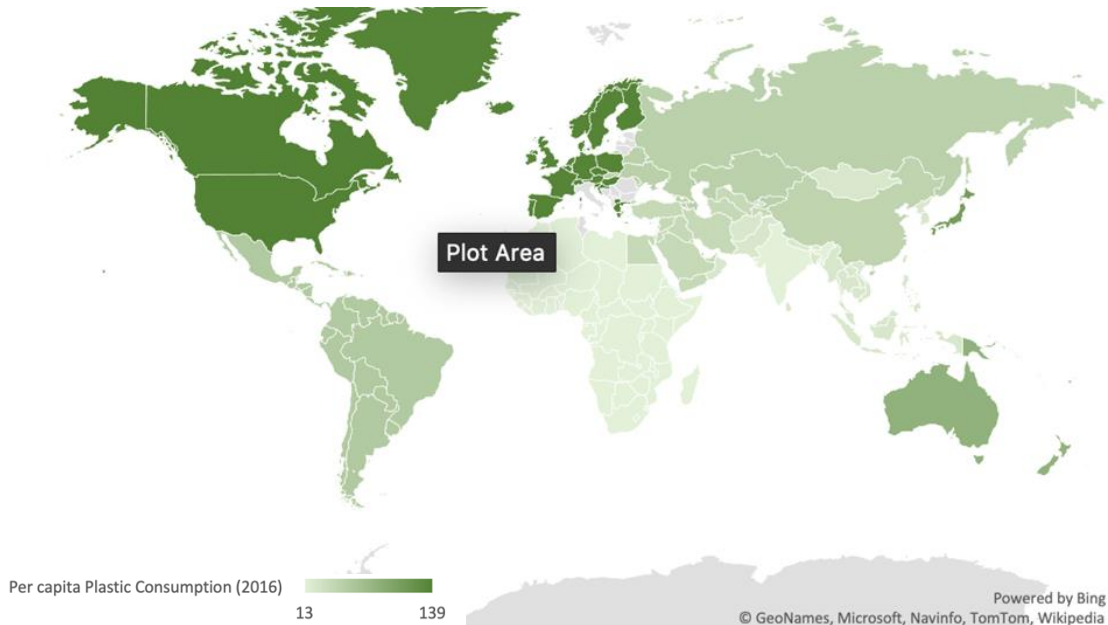
The darker shaded regions of North America, Western Europe and Japan all indicate consumption greater than 100kg per person.<sup>6</sup>

**Figure 2: Global Plastics production (% , 2016)**



Source: Author's adaptation of data from Mapping of Global Plastics Value Chain, UNEP, 2018

**Figure 3: Global Plastics Consumption (2016)**



Source: Author's adaptation of data from Mapping of Global Plastics Value Chain, UNEP, 2018

<sup>6</sup> United Nations Environment Programme, 2018. Appendix 1. *Mapping of Global Plastics Value Chain and Plastics Losses to The Environment (With A Particular Focus on Marine Environment)*. [online] UNEP. Available

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<[https://wedocs.unep.org/bitstream/handle/20.500.11822/26745/mapping\\_plastics.pdf](https://wedocs.unep.org/bitstream/handle/20.500.11822/26745/mapping_plastics.pdf)>

Further narrowing down the plastic demand by sector, we see that in 2019, almost 40% of plastic is demanded by the packaging sector, followed by building and construction (19.8%) and automobiles (9.9%); as depicted in Table 1.

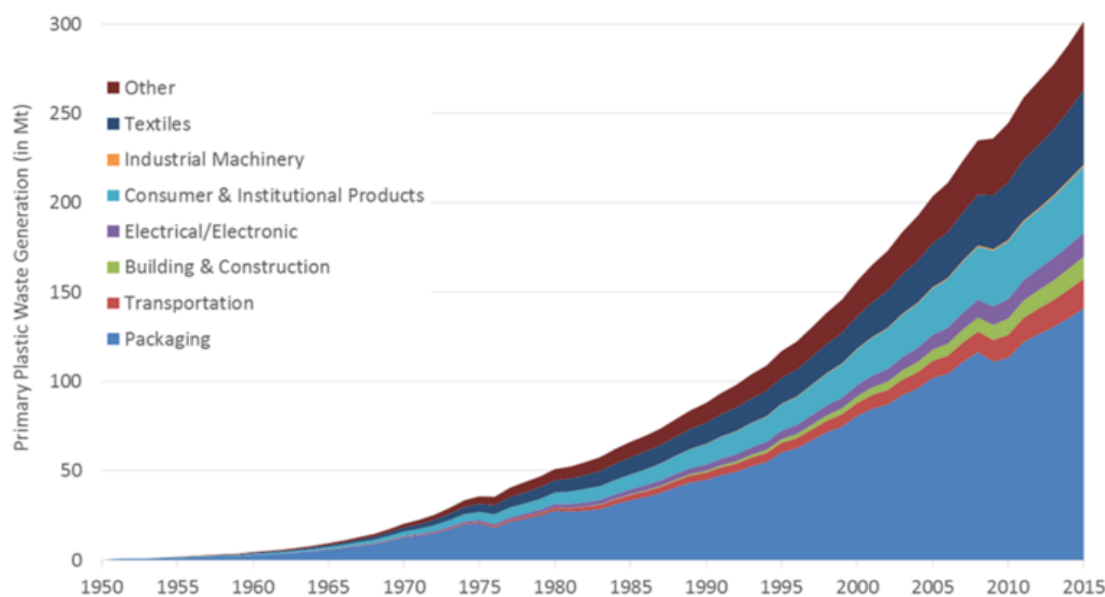
**Table 1. Sector-wise Plastic Demand**

Sector	Plastic Demand (in %)
Packaging	39.9
Building & Construction	19.8
Automotive	9.9
Electrical & Electronic	6.2
Household, Leisure & Sports	4.1
Agriculture	3.4
Others	16.7

Source : Plastics Europe & EPRO (2019)

Studies show that the packaging sector majorly employs Polyethylene (PE), Polypropylene (PP) and Polyethylene Terephthalate (PET) plastic polymers, all of which are thermoplasts, i.e. they can be remolded and recycled without negatively affecting the material's physical properties.<sup>7,8</sup> However, recycling for packaging is cumbersome. Naturally, being the largest sector demanding plastics, packaging also holds the largest share of primary plastic waste generation, as can be seen in Figure 4.

**Figure 4. Plastic Waste Generation by Sector**



Source: Geyer, Jambeck & Law (2017)

<sup>7</sup> PlasticsEurope, 2019. *Plastics – The Facts 2019*. [online] PlasticsEurope. Available at: <<https://www.plasticseurope.org/application/files/1115/723>

6/4388/FINAL\_web\_version\_Plastics\_the\_facts2019\_1410 2019.pdf>  
<sup>8</sup> UNEP, 2020. *Baseline Report on Plastic Waste*. UNEP/CHW/PWPWG.1/INF/4. UNEP.

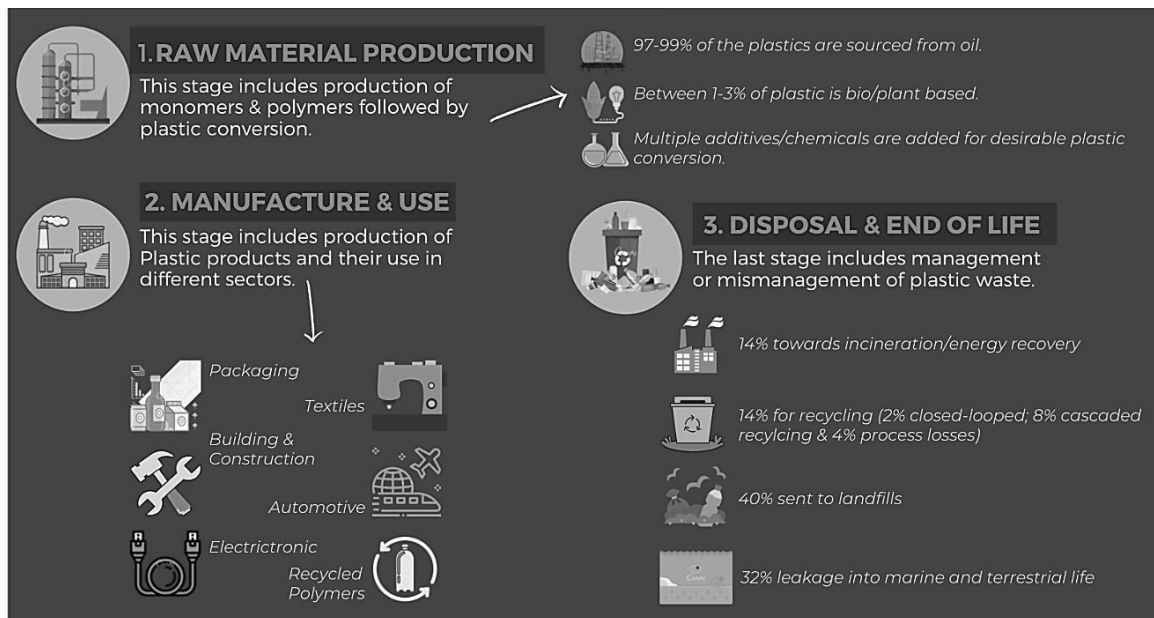
One of the main reasons why plastic waste management is such a herculean task is that it is not made of a single material; there are 30 different types of plastic polymers which are then mixed with several additives.<sup>9</sup> The main purpose behind compounding polymers is to improve performance or processing of plastic products. This complex property, however, also makes plastics resource-efficient. Plastic materials have varied sources of origin, ranging from fossil fuel, renewables or even mineral bases such as salts; thus, allowing certain kinds of plastic to be biodegradable or compostable.<sup>10</sup> However, the primary reason behind plastic's extensive usage is that it does not easily decompose, but it is precisely because of this characteristic that plastic accumulation in the environment is growing exponentially.

The lifecycle of different kinds of plastics varies from sector to sector and becomes crucial while dealing with plastic waste

management. Some products have a very long life span, such as building and construction (35 years), industrial machinery (20 years), transportation (13 years); however, others such as packaging products have a brief existence – ranging from a day (disposable cups, takeaway boxes, plastic bags etc) to upto three years (food containers, cosmetics etc).<sup>11</sup>

Figure 5 provides a simplified description of the plastic value chain. It is interesting to note that there is a significant environmental impact at each of the three broad stages of the plastics value chain. The raw material extraction is almost entirely dependent on oil and feedstock; i.e. fossil-fuel hydrocarbons. Continued growth of plastic usage is predicted to increase plastic's share of global oil consumption to 20% in 2050 and increase plastic's share of carbon budget from 1% in 2014 to 15% in 2050.<sup>12</sup>

**Figure 5: Plastics Value Chain**



Source: Author's adaptation of the Value Chain referencing UNPRI, Basel-UNEP Report & WEF

<sup>9</sup> Ibid  
<sup>10</sup> PlasticsEurope, 2019. *Plastics – The Facts 2019*. (same as Footnote 7)  
<sup>11</sup> UNEP, 2020. *Baseline Report on Plastic Waste*.

UNEP/CHW/PWPWG.1/INF/4. UNEP.  
<sup>12</sup> World Economic Forum, 2016. *The New Plastics Economy Rethinking The Future Of Plastics*.

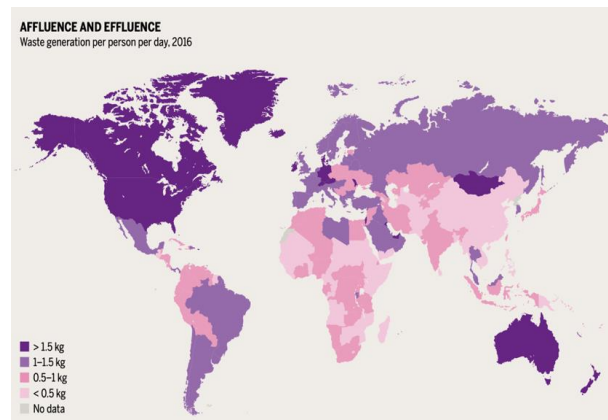
The manufacture of plastic feedstock and extraction of raw materials, especially from fracking techniques, releases greenhouse gases with natural capital costs of \$23 billion.<sup>13</sup> Almost 170 substances used in fracking can cause cancer, developmental, reproductive and immune disorders.<sup>14</sup> Studies show that expectant mothers living near fracking zones have higher risks of pregnancy complications.<sup>15</sup>

Unfortunately, 95% of the plastic packaging material value is lost to the economy after its first use. But, the last stage of the value chain related to plastic waste disposal and trade; which is the focus of this paper; also creates significant pressure on the environment. Incinerator design and operation as well as emission control technology influence the final environmental and health impact of this method of disposal.<sup>16</sup>

Alongside the environmental externalities ensuing from improper plastic-waste management for the planet as a whole, we also need to direct our attention towards the spatial distribution of the responsibility to manage the plastic-waste economy. Research indicates that in general, there is a strong positive correlation between waste generation and income per capita. High income countries have median waste-generation rates six-times greater than low-income countries.<sup>17</sup> This can be further seen in **Figure 6** showing the waste generated per person per day in 2016. Developing countries, specifically Asia and Africa have much lower levels of waste generation. In terms of waste trade particularly, developing countries have a waste-trade import share

2.5 times greater than their export share.<sup>18</sup>

## Figure 6. Waste Generation by Country



Source: Stiftung, Plastic Atlas, 2019

Although the exact numbers for plastic-waste generation are not available by income-groups, evidence indicates that high income countries have been the primary exporters of plastic waste since 1988; contributing to 87% of all exports.<sup>19</sup> 32% of all waste exports are from Europe and Central Asia, followed by 14% being exported from USA and Canada. East-Asia Pacific countries have imported 75% of plastic-waste since 1988.<sup>20</sup> This international trade in plastic-waste from wealthier nations, with more efficient and robust waste management systems to developing countries which struggle to establish even basic social infrastructure leads one to question this historical trend. In addition to creating a burden on developing countries' infrastructure, their lack of proper waste management systems creates further

<sup>13</sup> Valuing Plastics, UNEP

<sup>14</sup> Stiftung, H., 2019. *Plastic Atlas*. [online] Heinrich Böll Foundation & Break Free From Plastic. Available at: <[https://www.boell.de/sites/default/files/2020-01/Plastic%20Atlas%202019%202nd%20Edition.pdf?dimension1=ds\\_plastikatlas](https://www.boell.de/sites/default/files/2020-01/Plastic%20Atlas%202019%202nd%20Edition.pdf?dimension1=ds_plastikatlas)>

<sup>15</sup> Ibid

<sup>16</sup> Geyer, R., Jambeck, J. and Law, K., 2017. Production, use, and fate of all plastics ever made. *Science Advances*, [online] 3(7).

<sup>17</sup> UNEP, 2015. *Global Waste Management Outlook*. [online] UNEP. Available at:

<<https://www.uncclearn.org/wp-content/uploads/library/unep23092015.pdf>>

<sup>18</sup> Kellenberg, D., 2015. The Economics of the International Trade of Waste. *Annual Review of Resource Economics*, 7(1), pp.12.1-12.17.

<sup>19</sup> Brooks, A., Wang, S. and Jambeck, J., 2018. The Chinese import ban and its impact on global plastic waste trade. *Science Advances*, [online] 4(6). Available at: <<https://advances.sciencemag.org/content/advances/4/6/eaat0131.full.pdf>>

<sup>20</sup> Ibid

negative environmental externalities due to leakages and waste mismanagement.

This brief introduction segues into the main focus of the paper; i.e. international plastic waste trade and trade policy. The next section closely examines the environmental impact of plastic waste generation, especially on the major importing countries. The discussion then shifts to the current trade policy, environmental agreements and country-level measures centred on the issue of plastic waste. Challenges and opportunities faced by countries exporting and importing plastic waste are explored next, concluded by prevalent good practices and promising options to improve the current situation for all stakeholders of the plastic-waste economy.

## Environmental Impact of Plastic Waste Trade

Lately, serious attention is being directed towards the environmental and health impacts of plastics production, consumption and disposal. This section focuses on the impacts of plastic waste disposal that are being widely discussed and debated in the scientific community.

Despite having the highest recycling rate among plastic products, only 14% of the plastic packaging is collected for recycling.<sup>21</sup> Only seven percent of highly recyclable types of plastic, such as PET, are recycled bottle-to-bottle (closed-loop recycling).<sup>22</sup> Eight percent of plastic waste collected for recycling is downcycled (cascaded recycling). The complexity in recycling plastics is also attributable to the design of the processing equipment which is meant for feedstocks of virgin polymers. But the actual plastic products contain several impurities. It is

however interesting to note that *plastic can be recycled only a certain number of times* before it is finally disposed. Each recycle reduces the plastic quality until it cannot be used anymore. Thus, recycling is not a panacea for the plastics problem, merely a postponement of the final disposal.<sup>23</sup>

However, what is worse is the fact that 32% of the plastic packaging escapes collection systems only to end up in marine or terrestrial ecosystems, causing great damage, both environmentally and economically. Despite lack of sophisticated valuation systems, after-use externalities of plastic packaging along with the greenhouse gas emissions from its production processes is estimated to be \$40 billion annually – which is even greater than the packaging industry's profit pool.<sup>24</sup>

Another 14% of the plastic waste is incinerated or sent for energy recovery. However, health concerns have been raised with reference to the pollution generated in the process, especially in developing countries. Incineration releases dioxins and metals such as lead, cadmium and mercury. End products of burning, namely ash and sludge again pose long-term threats to the environment if deposited in landfills, wetlands or water bodies.

Eight million tonnes of plastics – equivalent to dumping one garbage truck per minute – is leaked into the ocean every year. Studies suggest that Asia account for 82% of the leakage into oceans due to inadequate collection systems and recovery infrastructure.<sup>25</sup> The annual damage of plastics to marine ecosystems is valued at least \$13 billion.<sup>26</sup> Moreover, microplastics in the ocean are known to interfere with the carbon sequestration process by impairing the ability of micro-organisms to fix carbon via photosynthesis. Within a decade, the amount

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<sup>21</sup> World Economic Forum, 2016. *The New Plastics Economy Rethinking The Future Of Plastics*. [online] WEF.

<sup>22</sup> Ibid

<sup>23</sup> Stiftung, H., 2019. *Plastic Atlas*. Heinrich Böll Foundation & Break Free from Plastic.

<sup>24</sup> World Economic Forum, 2016. *The New Plastics Economy Rethinking The Future Of Plastics*. [online] WEF.

<sup>25</sup> Ibid

<sup>26</sup> Valuing Plastics

of plastic litter in the Arctic Ocean has risen 20-fold.<sup>27</sup> In the Pacific Gyre, plastic waste has been contaminated with persistent bio-accumulative toxic pollutants (PBTs) due to plastic's chemical characteristics. PBTs degrade slowly and tend to accumulate in the tissues of organisms over time. Due to higher levels of plastic waste, the organisms are exposed to concentrated PBTs which can potentially drive hazardous chemicals from the ocean up to the food chain.<sup>28</sup>

Plastic pollution in the soil can be between 4-23 times higher than in the seas.<sup>29</sup> Microplastics accumulation in the soil can change the soil structure as well as affect soil fertility. Several chemical additives added to plastics can escape the material or be released during plastic recycling, contaminating our food, air and water. Exact information on losses during end of life treatment for plastics is missing, however Jambeck et al. estimated that 15%-40% of mismanaged plastic waste is lost to the environment.<sup>30</sup>

In addition to end of life treatment effects, the process of trading itself has a massive carbon footprint. Total sea freight carbon emissions from US plastic waste exports just in 2019 is estimated at 120 million kg of CO<sub>2</sub>, which is equivalent to emissions from 26,000 cars per year.<sup>31</sup> The ultimate aim is not for countries to 'divert' their waste from domestic management systems in an attempt to shift the burden of dealing with it altogether, but to reduce its production while simultaneously investing in appropriate waste-management

infrastructure.

## Plastic Waste Trade

In the Plastic Atlas, Stiftung describes plastic as 'A vehicle for globalisation, and the epitome of unregulated late stage capitalism - a system that externalises costs to people and the environment for the sake of profit'.<sup>32</sup>

The World Bank estimated that in 2016 alone, plastic waste comprised 12% (equivalent to 242 million tonnes) of all the municipal solid waste generated.<sup>33</sup> If current production and waste management trends continue, roughly 12,000 Mt of plastic waste will be in landfills or in the natural environment by 2050.<sup>34</sup> Only nine percent of the plastic waste generated is recycled globally, whereas 80% of the waste is either landfilled or contaminates the environment via leakage.<sup>35</sup>

The negligible attention that plastic waste trade has received until two-three years ago, is surprising. This can be partly attributed to the ubiquity of plastic and the ensuing lack of precise methods to record the waste trade. Plastics form integral components of everyday utilities, ranging from household appliances, takeaway food packs, clothes, paints, to even hygiene products. The use of blended polymers and additives to manufacture such kind of plastic products also increases the complexity of sorting and recycling plastics.

The plastic waste trade directionality as already described above, is primarily from

<sup>27</sup> Stiftung, H., 2019. *Plastic Atlas*. Heinrich Böll Foundation & Break Free from Plastic.

<sup>28</sup> UNEP, 2014. *Valuing Plastics: The Business Case For Measuring, Managing And Disclosing Plastic Use In The Consumer Goods Industry*. [online] UNEP. Available at: <https://wedocs.unep.org/bitstream/handle/20.500.11822/9238/>

<https://wedocs.unep.org/bitstream/handle/20.500.11822/9238/Valuing%20plastic%20the%20business%20case%20or%20measuring%20and%20disclosing%20plastic%20use%20in%20the%20consumer%20goods%20industry-2014Valuing%20plasticsF.pdf?sequence=8&isAllowed=y>

<sup>29</sup> Stiftung, H., 2019. *Plastic Atlas*. Heinrich Böll Foundation & Break Free From Plastic.

<sup>30</sup> Dell, J., 2019. *No 'Away': Why Is The U.S. Still Offshoring Plastic Waste Around The World?*. [online] Plastic Pollution Coalition. Available at:

<https://www.plasticpollutioncoalition.org/blog/2020/4/6/why-is-the-us-still-offshoring-post-consumer-plastic-waste-around-the-world>

<sup>31</sup> Ibid

<sup>32</sup> Stiftung, H., 2019. *Plastic Atlas*. Heinrich Böll Foundation & Break Free From Plastic.

<sup>33</sup> UNEP, 2020. *Baseline Report on Plastic Waste*. UNEP/CHW/PWPWG.1/INF/4. UNEP.

<sup>34</sup> Geyer, R., Jambeck, J. and Law, K., 2017. Production, use, and fate of all plastics ever made. *Science Advances*, [online] 3(7).

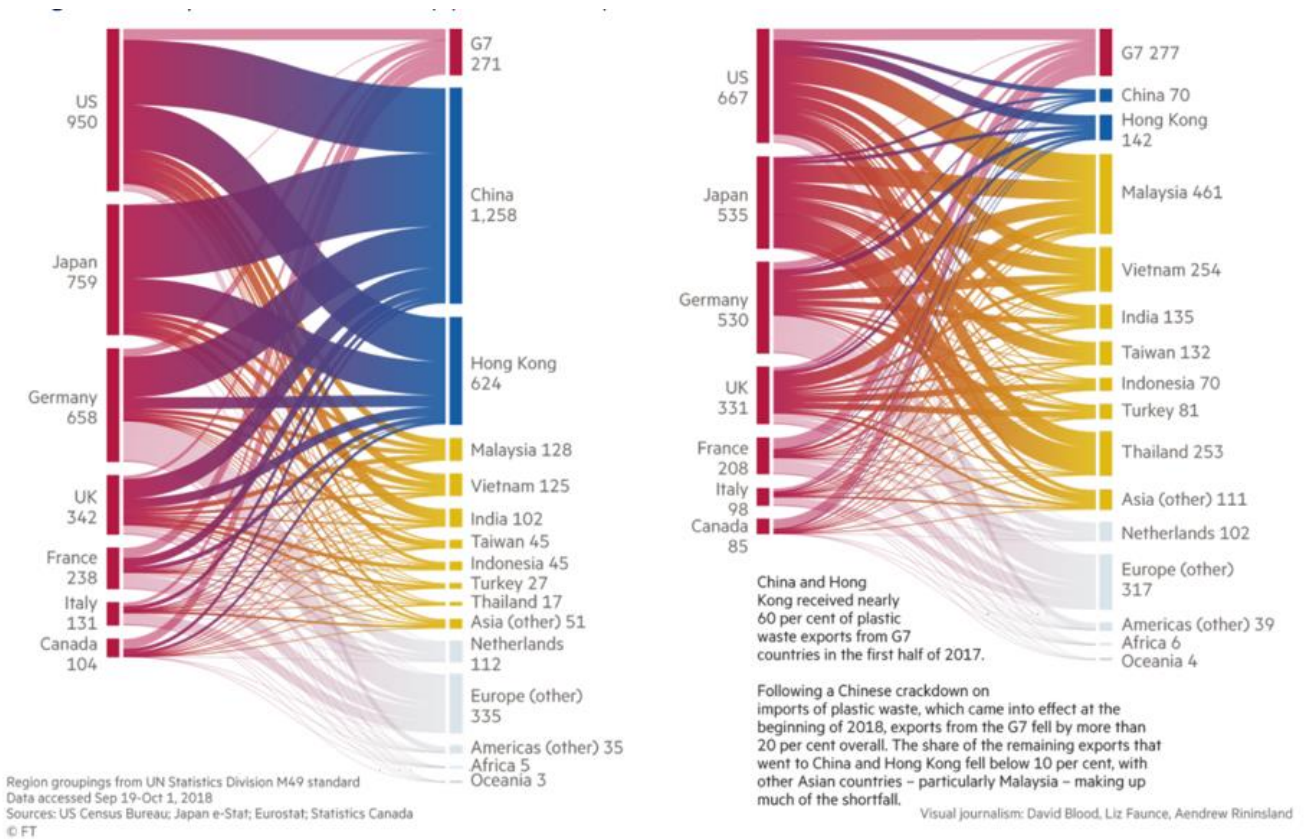
<sup>35</sup> Ibid



developed to developing countries. This can be further corroborated by Figure 7, which shows the global flow of plastic waste, parings and scrap from G7 countries in 2017 (left); and in 2018 (right), before and after China’s ban on import of nonindustrial plastic waste respectively.<sup>36</sup> USA, Japan, Germany and UK are the four biggest exporters of plastic waste. Both before and after the ban, East Asia

Pacific (EAP) countries remain the biggest importers. However, the onus of waste management has now shifted majorly from China to Malaysia, Vietnam and Thailand. Suddenly finding them flooded with waste and incapacitated to manage it appropriately, EAP countries are sending back scrap to their source countries, hoping to avoid its negative consequences.<sup>37,38</sup>

**Figure 7: Flow of Plastic Waste Trade in 2017 and 2018**



Source: Birbeck , 2020

<sup>36</sup> Birkbeck, D., 2020. *Strengthening International Cooperation to Tackle Plastic Pollution: Options for the WTO*. Global Governance Brief No. 01. [online] Available at: [https://static1.squarespace.com/static/5b0520e5d274cbfd845e8c55/t/5e25683a556e15498ad1e73f/1579509842688/Plastic\\_Trade\\_WTO\\_Final.pdf](https://static1.squarespace.com/static/5b0520e5d274cbfd845e8c55/t/5e25683a556e15498ad1e73f/1579509842688/Plastic_Trade_WTO_Final.pdf)

<sup>37</sup> Sky News. 2020. *Malaysia Sends Plastic Waste Back to UK Insisting It Is Not World's 'Rubbish Dump'*. [online]

Available at: <https://news.sky.com/story/malaysia-sends-plastic-waste-back-to-uk-insisting-it-is-not-worlds-rubbish-dump-11913156>

<sup>38</sup> BBC News. 2019. *Why Some Countries Are Shipping Back Plastic Waste*. [online] Available at: <https://www.bbc.com/news/world-48444874>

Like all trade, trade of plastic waste is also happening in a globalised market, where both parties mutually agree to and find value in the exchange. However, the problem arises when inefficiencies in the market emerge, probably due to irresponsible exporting, local corruption or poor operating and regulatory practices.

The intention here is not to narrate plastic waste exchange as a discourse of neo-colonial geographies of inequality, but rather to objectively identify that a problem in the current practice exists, that there are larger consequences to the environment and global economies and that there is a need to discuss how countries can proceed to successfully tackle the challenges that this trade brings forth.

## Reasons behind the Current Pattern of International Waste Trade

China's ban on importing certain types of waste will leave 111 million metric tonnes of plastic waste stranded by 2030.<sup>39</sup> Until January 2018, right before the ban, China was importing plastic waste as a secondary resource material, which was recycled, usually by means of primitive and low-cost hand labour.<sup>40</sup> This raw material actually contributed in fulfilling the high demand of such products in China.<sup>41</sup> The recycled material could be used instead of the fossil fuel feedstock to generate plastic, leading to less environmental pollution than caused from extracting virgin feed. However, this 'recyclable wastes import' also incorporates 'garbage', post-consumer plastic waste at the end of its life which can cause significant environmental and health damage as

discussed above. The transboundary movement of plastic waste containing hazardous substances isn't necessarily the best way to create a clean economy.

Perhaps a more intriguing question is why the plastic waste trade is happening the way it is currently? According to the economics behind it, major exporters trade in waste because they produce and consume more and hence produce more waste for disposal. Major importers should agree to the trade because they either have a comparative advantage in waste disposal or they have more advanced recycling technologies which enable them to sift the useful components of the waste, allowing them to reuse the raw material in manufacture of other products.<sup>42</sup>

The real-world situation however is much more complicated than just the economics of it. We have already seen the effect of differences in income on waste trade, nonetheless, another crucial aspect is differences in environmental regulations. The *waste haven effect* (moving physical waste-by-products to low environmentally regulated countries) is analogous to pollution haven effect (shifting goods production with polluting by-products to low environmentally regulated countries). Empirical evidence on the international waste-haven effect has been established by Kellenberg (2012) wherein he uses bilateral waste trade data and environmental stringency index of 92 countries to find that an importing country whose environmental stringency index falls by 10% w.r.t. that of its trading partner faces a 3.2% increase in waste imports from that partner.<sup>43</sup> Another study by Baggs (2009) finds that GDP per capita has a negative and significant impact on imports of hazardous waste. Thus, the higher the country's income,

<sup>39</sup>Brooks, A., Wang, S. and Jambeck, J., 2018. The Chinese import ban and its impact on global plastic waste trade. *Science Advances*, [online] 4(6).

<sup>40</sup>Terazono, A., Yoshida, A., Yang, J., Moriguchi, Y. and Sakai, S., 2004. Material cycles in Asia: especially the recycling loop between Japan and China. *Journal of Material Cycles and Waste Management*, 6(2).

<sup>41</sup> Ibid

<sup>42</sup> Kellenberg, D., 2015. The Economics of the International Trade of Waste. *Annual Review of Resource Economics*, 7(1), pp.12.1-12.17.

<sup>43</sup> Kellenberg, D., 2012. Trading wastes. *Journal of Environmental Economics and Management*, 64(1), pp.68-87.

the higher the presumed level of environmental regulations, the less hazardous waste the country imports.<sup>44,45</sup> A study also finds that EU countries having greater hazardous waste regulations and greater taxes on plastic waste have higher tendency to export the same.<sup>46</sup>

These studies can be rationalised in the context of China's import ban as well. China was importing nearly half of the world's plastic waste to recycle it into other products; however, as its economy continues to grow, China declared a ban on plastic waste imports in efforts to clean its environment and improve the quality of life.<sup>47</sup> China's tremendous growth in GDP per capita in the last two decades<sup>48</sup> is paralleled by the increasing environmental regulations (Green Fence Operation, 2013; National Sword, 2017 and its subsequent implementation in 2018); and its ensuing decline in import of hazardous waste.<sup>49</sup>

These evidences point towards the prevalence of the waste haven effect in the trade of plastic waste. An average developing country has environment stringency regulations 39% lower than their developed peers.<sup>50</sup> This demonstrates the necessity of directing immediate attention to regulations around plastic waste trade and management. The following section explores the current regulation; or lack thereof; while simultaneously examining its consequences on major plastic waste importing countries.

## Regulations on Plastic Waste and its Effect on Importing Countries

Historically, plastic waste regulations have been most discussed in marine pollution prevention efforts, for example, with the *1972 Convention on the Prevention of Marine Pollution by Dumping of Waste and other Matter* (with its London Protocol) and the *1973 International Convention for the Prevention of Pollution from Ships* (Annex V of MARPOL).<sup>51</sup> In March, 2011 with the establishment of 'Honolulu Strategy' a global framework to prevent and manage marine litter was finalised.

Solely in the EAP region, APEC (Asia-Pacific Economic Cooperation) estimates the cost of ocean plastics to the tourism, fishing and shipping industries at \$1.3 billion annually.<sup>52</sup> During summer months, Mediterranean Sea sees a 40% surge in the amount of plastic litter being dumped into it. Despite tourism revenues being important to country's economies, it is directly linked to greater plastic pollution and in most cases, lack of proper waste management facilities.<sup>53</sup>

In mid-2010s, several countries adopted national legislations to ban or tax certain types of plastic bags or introduced binding targets for reduction and recycling.<sup>54</sup> As of 2018, 127 out of 192 countries had some legislation to regulate the use of single-use

<sup>44</sup> Kellenberg, D., 2015. The Economics of the International Trade of Waste.

<sup>45</sup> Baggs, J., 2009. International Trade in Hazardous Waste. *Review of International Economics*, 17(1), pp.1-16.

<sup>46</sup> Mazzanti, M. & Zoboli. 2013. International waste trade: impacts and drivers. Routledge.

<sup>47</sup> National Geographic. 2019. *How China's Plastic Waste Ban Forced A Global Recycling Reckoning*. [online] Available at:

<<https://www.nationalgeographic.com/magazine/2019/06/china-plastic-waste-ban-impacting-countries-worldwide/#:~:text=The%20ban%20is%20part%20of,such%20large%20volumes%20of%20recyclables>>

<sup>48</sup> World Bank Data. 2020. *GDP Per Capita (Current US\$), China*. [online] Available at:

<<https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CN>>

<sup>49</sup> A more detailed timeline can be found [here](#).

<sup>50</sup> Kellenberg, D., 2015. The Economics of the International Trade of Waste.

<sup>51</sup> UNEP, 2014. *Valuing Plastics: The Business Case for Measuring, Managing and Disclosing Plastic Use in The Consumer Goods Industry*.

<sup>52</sup> Ibid

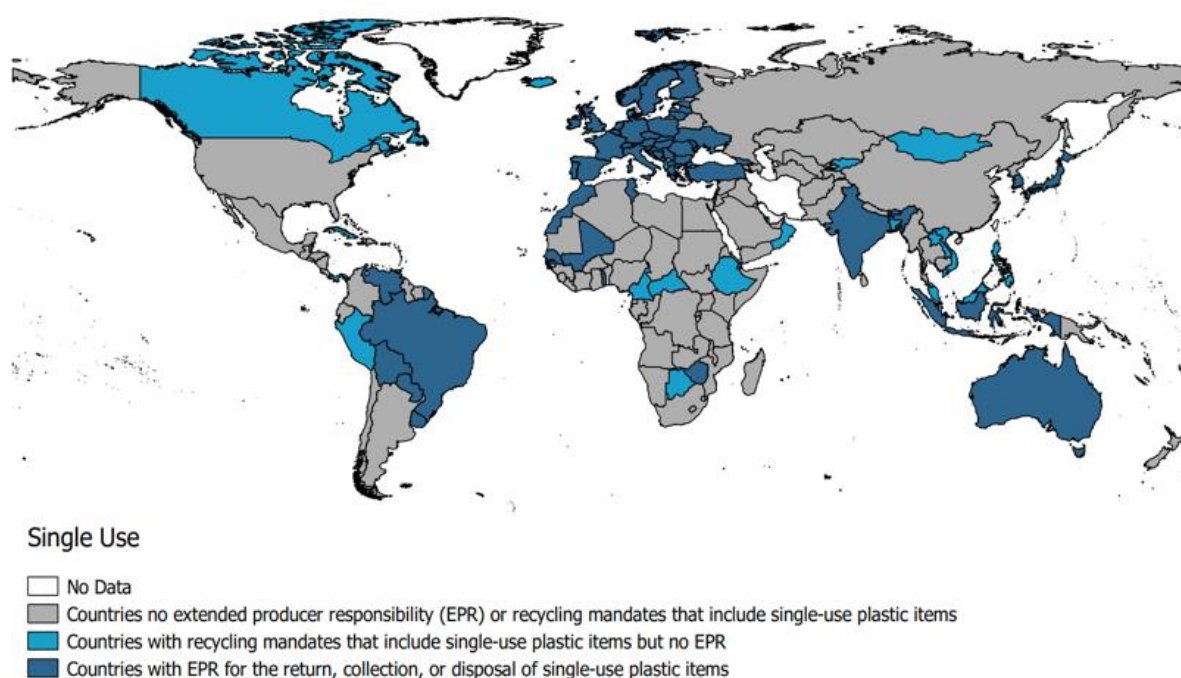
<sup>53</sup> Stiftung, H., 2019. *Plastic Atlas*. [online]. Heinrich Böll Foundation & Break Free from Plastic.

<sup>54</sup> UNEP, 2014. *Valuing Plastics: The Business Case for Measuring, Managing and Disclosing Plastic Use In The Consumer Goods Industry*,

plastic bags.<sup>55</sup> However, regulation on disposal of single-use plastics are less widespread. Only one-third of the countries have Extended Producer Responsibility (EPR) mandates for single-use plastics; approximately one-fourth have recycling mandates and a mere 12% have mandated deposit-refund schemes.<sup>56</sup> The geographic distribution of these regulations can be seen in Figure 8, with Western Europe having the

strongest uptake. South-East Asia, Latin America and a few African countries are also pushing for such regulations. However, these rules are more relevant for domestic production and disposal of single-use plastics. For the purpose of international plastic waste trade, there needs to be a stricter and more universal approach.

**Figure 8. Global Regulations for Single-use Plastics**



Source: UNEP & WRI, 2019

One of the International Agreements most relevant to plastic waste trade is the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*. The most recent development has been the 'Basel Convention 2019 – Plastics Amendment' which takes effect on January 1, 2021. It essentially disallows countries to ship plastic waste under the category of

'green waste'; but creates an obligation requiring exporting countries to obtain prior consent from the importing countries to export certain types of plastic waste.<sup>57</sup> It is interesting to note that USA, a major plastic-waste exporter has not yet ratified the Basel Convention.

In addition to the Convention, other direct/indirect efforts at the international

<sup>55</sup> UNEP, 2020. *Legal Limits on Single-Use Plastics And Microplastics: A Global Review Of National Laws And Regulations*. [online] UNEP. Available at: <[https://wedocs.unep.org/bitstream/handle/20.500.11822/27113/plastics\\_limits.pdf?sequence=1&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/27113/plastics_limits.pdf?sequence=1&isAllowed=y)>

<sup>56</sup> Ibid  
<sup>57</sup> 2020. *Basel Convention Plastic Waste Amendments*. [online] Available at: <<http://www.basel.int/Implementation/Plasticwaste/PlasticWasteAmendments/Overview/tabid/8426/Default.aspx>>

level include UN SDG Goal 12, Paris Agreement, Stockholm Convention as well as several Marine focused initiatives to prevent plastic pollution.<sup>58</sup>

From 2009-18, WTO members have notified 128 measures affecting trade in plastics for environmental reasons. Attention to the environmental aspect is fairly recent since 71 of the 128 measures were received between 2015-18.<sup>59</sup> 80% of these measures were from developing countries and were largely notified under the WTO Agreement on Technical Barriers to Trade (TBT).<sup>60</sup> A key insight from this trend is that firstly, due to the lack of any international agreement focusing primarily on plastic waste trade, countries have no option but to voice their concerns regarding proper waste management, import licensing schemes etc under TBT. This underscores the need for a clear, detailed and standardised framework on plastic waste trade. Secondly, these requests are coming overwhelmingly from developing countries – the major importers of plastic waste – indicating that the plastic waste trade is creating particular environmental challenges for these countries, to the extent that it has become a barrier to trade.

At the moment, there are several initiatives, commitments and laws addressing different aspects of plastic pollution, but none of them are holistic or focused specifically to deal with the challenges arising from plastic waste trade. There are discussions on building capacity to support waste management; a push for a circular plastics economy and voluntary commitments rather than

regulatory obligations.<sup>61</sup> Much of the focus of the circular economy is on ‘more recycling’ or ‘better designing for easy recycling’; but it is important to remember that there is a reason why only 10% of all plastic waste has been recycled to date.<sup>62</sup> Recycling poses massive technical and economic barriers and even after a few cycles of downcycling plastic, it ultimately has to be landfilled or incinerated; posing serious environmental and health challenges.

Some of these adverse consequences have already been seen in various countries, mostly major importers of plastic waste. Just to highlight the gravity of the environmental adversities, Interpol declared pollution as a ‘crime’, claiming that illegally dumped waste contaminates soil, water and air.<sup>63</sup> In its 2017 Project ‘30 Days of Action’ across 43 countries to gather more information on waste crimes, they uncovered 1.5 million tonnes of illicit waste<sup>64</sup> and reported that 62% of all illicit waste trade occurred along transboundary routes, mainly at the interregional scale.<sup>65</sup> Figure 9 represents waste trafficking routes that they discovered, suggesting that this illicit activity is becoming a global menace. Interpol’s latest report indicates that since January 2018; right around the time when China banned its imports; there has been a ‘considerable increase in rerouting of illegal waste shipments to South East Asia via multiple transit countries to camouflage the origin of waste shipment’.<sup>66</sup>

<sup>58</sup> Birkbeck, D., 2020. *Strengthening International Cooperation To Tackle Plastic Pollution: Options For The WTO*. Global Governance Brief No. 01.

<sup>59</sup> Ibid

<sup>60</sup> Ibid

<sup>61</sup> Barrowclough, D. and Birkbeck, C., 2020. *Transforming the Global Plastics Economy* GEG Working Paper 142.

[online] Available at: <[https://www.geg.ox.ac.uk/sites/geg.ox.ac.uk/files/2020-05/GEG%20WP%20142%20Transforming%20the%20Global%20Plastics%20Economy%20Diana%20Barrowclough%20and%20Carolyn%20Deere%20Birkbeck\\_0.pdf](https://www.geg.ox.ac.uk/sites/geg.ox.ac.uk/files/2020-05/GEG%20WP%20142%20Transforming%20the%20Global%20Plastics%20Economy%20Diana%20Barrowclough%20and%20Carolyn%20Deere%20Birkbeck_0.pdf)>

<sup>62</sup> Stiftung, H., 2019. *Plastic Atlas*. Heinrich Böll Foundation & Break Free from Plastic.

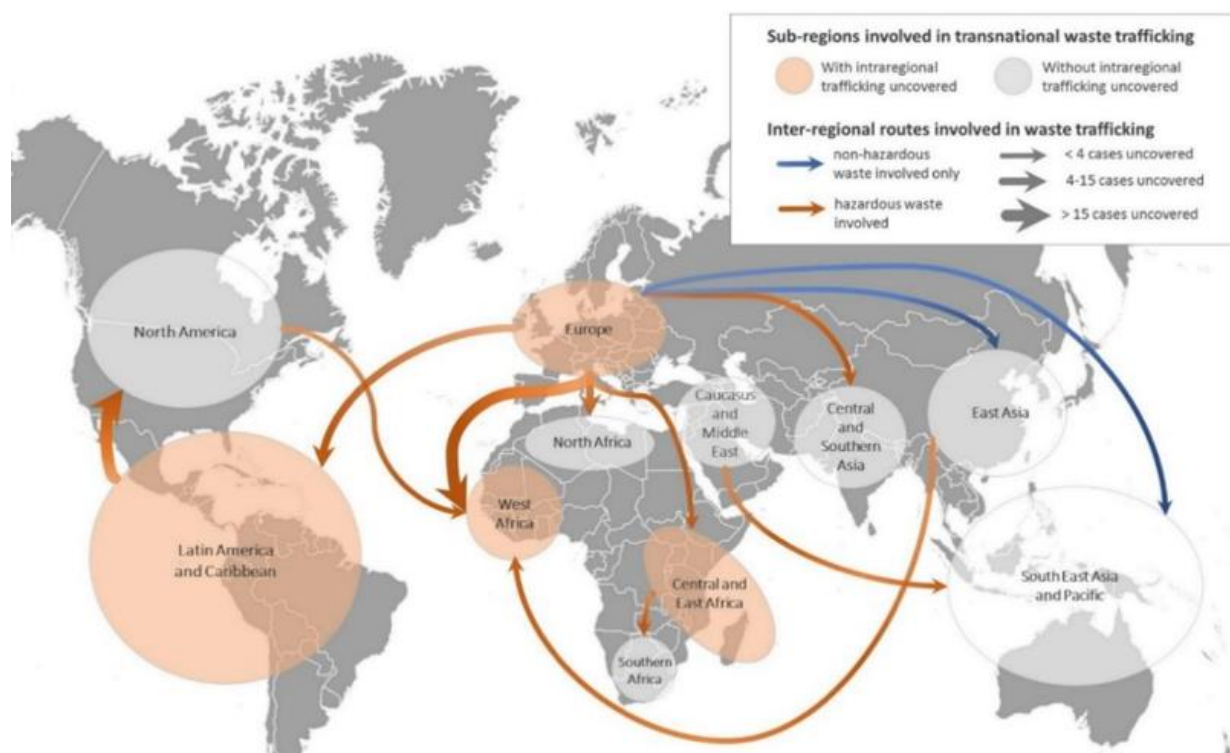
<sup>63</sup> Interpol. 2020. *Pollution Crime*. [online] Available at: <<https://www.interpol.int/en/Crimes/Environmental-crime/Pollution-crime>>

<sup>64</sup> This waste was not limited to plastic but included other categories as well.

<sup>65</sup> Interpol. 2020. Operation 30 Days of Action Final Report. Available at: <<https://www.interpol.int/en/Crimes/Environmental-crime/Pollution-crime>>

<sup>66</sup> Interpol. 2020. ‘*Interpol’s strategical analysis on emerging criminal trends in the global plastic waste market since January 2018*’.

**Figure 9: Waste Trafficking Routes**



Source: Interpol, 30 Days of Action, 2017

Thailand’s plastic waste imports increased by 640% from January to June 2018 as compared to the previous year.<sup>67</sup> Malaysia experienced 273% increase in imports in the first six months of 2018.<sup>68</sup> US exports in the first quarter of 2018 to Vietnam rose 277%, +191% to Indonesia and +165% to India.<sup>69</sup>

This situation undoubtedly presents business opportunities in these countries, especially for the informal economy, which is dependent on plastic scrap for their living, but the sudden inflow also poses pollution challenges. Between 400,000 and one million people in

the developing world die annually because of mismanaged waste and their constant interaction with it.<sup>70</sup>

Locals of the Bangun village in Indonesia have since long complained of respiratory illnesses and irritation in the eyes;<sup>71</sup> plastic-picking residents of East Java are worried about microplastics contaminating the drinking water they consume, which has already contaminated 80% of their fishes;<sup>72</sup> for the first time, a study found food chain contamination in an Indonesian region, where plastic waste is burnt for fuel to run tofu

<sup>67</sup> Wang, C., Zhao, L., Lim, M. K., Chen, W.-Q., & Sutherland, J. W. (2020). *Structure of the global plastic waste trade network and the impact of China’s import Ban. Resources, Conservation and Recycling*, 153, 104591. doi: 10.1016/j.resconrec.2019.104591

<sup>68</sup> Ibid

<sup>69</sup> Interpol. 2020. ‘Interpol’s strategical analysis on emerging criminal trends in the global plastic waste market since January 2018’.

<sup>70</sup> Phys.org. 2020. *Can We Stop Offshoring Our Plastic Problem?* [online] Available at: <<https://phys.org/news/2020-02-offshoring-plastic-problem.html>>

<sup>71</sup> CNA. 2019. *The Indonesian Village Being Buried By The Developed World’S Waste.* [online] Available at: <<https://www.channelnewsasia.com/news/asia/plastic-waste-recycling-indonesia-bangun-environment-11688000>>

<sup>72</sup> Ibid

factories. Just consuming a single free-range chicken egg from the nearby factories exceeds the tolerable daily intake of chlorinated dioxins as defined by the European Food Safety Authority by *seventy-times*. This transfer of toxins via the food chain can cause serious human illnesses, including cardiovascular, reproductive problems, cancer and diabetes.<sup>73,74</sup>

A study conducted by Greenpeace in Malaysia found 30% increase in respiratory diseases between 2018 and 2019.<sup>75</sup> Activists in Thailand were protesting against the increased inflow of plastic waste because disposing plastic also leads to contaminated ground water run-off causing serious diseases.<sup>76</sup> Vietnam also reported labour issues, since most of these processing facilities are informal, poor working conditions prevail with workers barely having protective equipment.<sup>77</sup> Studies have also found that importing countries mismanaged majority of their own plastic waste. Malaysia mismanaged 55% of its plastic waste, Indonesia: 81% and Vietnam 86%.<sup>78</sup>

Keeping these pernicious consequences in mind, many South East Asian countries have announced strict trade measures to deal with the plastic waste menace. Details of the major trade policy changes by largest South East Asian importers are listed in Table 2.

**Table 2. Trade Policy Changes on Plastic Waste Imports**

Country	Date	Measure
Vietnam	May 2018	Temporary ban on scrap plastic imports
	June 2018	Stopped issuing plastic recycling import licenses
Thailand	June 2018	Temporary ban on scrap plastic imports
	August 2018	Announce complete ban by 2021
Malaysia	September 2018	Announced tax on plastic scrap import
India	March 2019	Announces a ban on all plastic imports but the implementation delayed
Indonesia	June 2020	Quality restrictions (allowing maximum of 2% contamination)

Source: Resource Recycling, 2020

The direct impact of plastic trade on importing countries as well as its ripple effects on the environment at large are clearly grave and need serious attention. This segues into the final section of the paper – what can be done about it, specifically the role of trade policy in addressing this sudden uncertainty in plastic scrap trade.

## Recommendations and Way Forward

The way ahead for plastic waste trade is surely bumpy, but before moving onto the role of trade, it is important to recognise that despite trade policy’s power to significantly contribute to the solution to this problem, different sectors and stakeholders share an equal responsibility to pave the way for a cleaner plastic waste trade.

One of the most important actors are the manufacturers and producers themselves.

<sup>73</sup> BBC News. 2019. *Western Plastics 'Poisoning Indonesian Food Chain'*. [online] Available at: <<https://www-bbc-co-uk.cdn.ampproject.org/c/s/www.bbc.co.uk/news/amp/science-environment-50392807>>

<sup>74</sup> The Guardian. 2019. *Indonesia's Food Chain Turns Toxic As Plastic Waste Exports Flood In*. [online] Available at: <[https://www.theguardian.com/global-development/2019/nov/15/indonesias-food-chain-turns-toxic-as-plastic-waste-exports-flood-in?CMP=share\\_btn\\_tw](https://www.theguardian.com/global-development/2019/nov/15/indonesias-food-chain-turns-toxic-as-plastic-waste-exports-flood-in?CMP=share_btn_tw)>

<sup>75</sup> Greenpeace Malaysia. 2020. *THE RECYCLING MYTH 2.0: The Toxic After-Effects Of Imported Plastic Waste In Malaysia - Greenpeace Malaysia*. [online] Available at: <<https://www.greenpeace.org/malaysia/publication/3349/the-recycling-myth-2-0/>>

<sup>76</sup> The Straits Times. 2019. *Protesters In Thailand Urge Asean Leaders To Ban Trash Imports*. [online] Available at: <<https://www.straitstimes.com/asia/se-asia/protesters-urge-asean-leaders-to-ban-trash-imports>>

<sup>77</sup> Nguyen, A., 2019. *Here's What Happens To Our Plastic Recycling When It Goes Offshore*. [online] The Conversation. Available at: <<https://theconversation.com/heres-what-happens-to-our-plastic-recycling-when-it-goes-offshore-110356>>

<sup>78</sup> Dell, J., 2019. *157,000 Shipping Containers Of U.S. Plastic Waste Exported To Countries With Poor Waste Management In 2018*. [online] Plastic Pollution Coalition. Available at: <<https://www.plasticpollutioncoalition.org/blog/2019/3/6/157000-shipping-containers-of-us-plastic-waste-exported-to-countries-with-poor-waste-management-in-2018>>

95% headquarters of the top 20 plastics and resins manufacture are in the USA and Europe. 85% headquarters of the top 20 Fast Moving Consumer Goods (FMCG) companies are again headquartered in the USA & Europe.<sup>79</sup> Being the influential players of plastic production, selling consumers a convenient ‘throwaway lifestyle’, producers cannot just ignore the need to *reduce* plastic production and shift responsibility towards the consumers to recycle all their waste. Industrial lobbyists focusing on policies of recycling or changing consumer behaviour is required but the first of the 3R’s is ‘Reduce’. The concept of *Extended Producer Responsibility (EPR)* must be deeply embedded in their core activities. Products need to be designed keeping their end disposal in mind.

Individual governments are encouraged to create policy incentives at the domestic level to promote responsible plastic production and waste disposal. Employing behavioural nudges or pushing for proper labelling, educating people via awareness campaigns regarding the complexity of plastic waste disposal, reduction targets and earmarking greater investment in physical infrastructure as well as research and development for efficient sorting, collection and recycling methods will be imperative. They should also thoroughly investigate the plastics waste industry to minimise illegal activities by unlicensed operators.

In addition to different country measures and efforts to coordinate policy at the international level, one can observe an uncoordinated and disjointed approach of within-country efforts. A lot of small NGOs and social innovation enterprises are coming up with new ideas to solve plastic-waste

problems locally, however unless there is coordinated policy action within them, first at the local level and then at the national level, these potential solutions and their positive results cannot be scaled up. Organisations like *Mother Earth Foundation*, Philippines; *Trash Free Seas Alliance* and International Coastal Cleanup are successfully working at the global scale to mobilise change. However numerous other local efforts at the city level in various countries must be recognised, appreciated and scaled up to the national level. Some good Zero Waste practices being carried out in global south are listed in Box 1.<sup>80,81,82</sup> Coordinated civil society engagement will lead to more effective results.

## Box 1. Good practices to deal with Plastic Waste

### What can we do as individuals?

- 1 San Fernando, Philippines**
  - Diverted 80% of their waste away from landfills to cooperatives who recycled it.
  - Banned plastic shopping bags and imposed heavy levies on single-use plastic packaging.
  - Massive awareness campaigns house-to-house information, a regular radio show, dialogue with business groups, and individual meetings.
- 2 Thiruvananthapuram, Kerala, India**
  - The Municipal Corporation launched door-to-door campaigns and provided subsidies to set up residential composting facilities since 72% of their total waste generated comprised organic waste.
- 3 Vaalpark, South Africa**
  - Waste-pickers cooperative launched a community recycling program promoting segregation-at-source efforts.
  - Running awareness campaigns via a 30-minute slot on the community radio as well as handing out brochures and holding events in public areas.

<sup>79</sup> World Economic Forum, 2016. *The New Plastics Economy Rethinking The Future Of Plastics*.

<sup>80</sup> Stiftung, H., 2019. *Plastic Atlas*. Heinrich Böll Foundation & Break Free from Plastic.

<sup>81</sup> Zero Waste. 2020. *Zero Waste Cities: A Key Solution to The Climate Crisis*. [online] Available at: <<https://zerowasteworld.org/zwclimate/>>

<sup>82</sup> WIEGO. 2020. *Growing A Dream: The Vaal Park Recycling Centre* | WIEGO. [online] Available at: <<https://www.wiego.org/blog/growing-dream-vaal-park-recycling-centre>>



Finally, the following three main action points for trade policy at the international and domestic level are recommended:

### Domestic Trade Policy

Countries facing institutional and infrastructural inadequacies or challenges of illegal disposal of plastic waste; as most developing countries do; can consider imposing import tariffs to increase social welfare.<sup>83</sup> This however should not be viewed as a protectionist measure, but solely to build domestic waste management systems while simultaneously promoting innovation in addressing mounting plastic waste. Import bans on the other hand could potentially worsen the problem of illegal trade. Countries can also reduce tariffs on technologies for waste management processes as well as keep environmental services sectors open to foreign players to encourage greater flow of knowledge and information.

### Standardised Plastic Waste Trade Framework

The globalised nature of even the end-stage of the plastics value chain demands standardisation. Country level differences in standards, either on recycled plastic production, labelling or contamination criteria create difficulties in the final disposal. Missing information on properties can for instance complicate recycling. Data on two of the most common polymers, PET and PP, is lacking because trade codes for these materials are not harmonised.<sup>84</sup>

Additionally, there is certain ambiguity regarding the legal aspect of existing laws on plastic waste trade. China has shipped back

several exports from Japan because the consignments were either falsely labelled or failed to conform to Chinese standards.<sup>85</sup> Who holds the responsibility in such a case is not clarified. Even the Basel Convention does not spell out clearly who holds responsibility for the returned shipments if a country is not a signatory to the convention or the good under question is not listed as hazardous by law.<sup>86</sup> Thus, a globally accepted and standardised protocol is required to ensure just and fair trade for all parties involved.

### Transparency

A comprehensive database on each country's infrastructural ability to properly handle imported waste would ensure that waste is flowing into those countries which can effectively manage it.<sup>87</sup> This can also assist countries in combating the waste-haven effect.

Plastics are an almost indispensable part of our lives, however greener and more affordable alternatives to it need to be found; or at least production and consumption of avoidable plastics should be discouraged, instigating a shift to more sustainable alternatives. Currently the so-called biodegradable plastics available also pose challenges since they are compostable only under certain conditions, such as industrial composters.<sup>88</sup> While the research and innovation on more eco-friendly plastics continues, this study appeals to all stakeholders to reassess their current practices and take immediate action.

<sup>83</sup> Kellenberg, D., 2015. The Economics of the International Trade of Waste. *Annual Review of Resource Economics*, 7(1), pp.12.1-12.17.

<sup>84</sup> Brooks, A., Wang, S. and Jambeck, J., 2018. The Chinese import ban and its impact on global plastic waste trade. *Science Advances*, [online] 4(6).

<sup>85</sup> Yoshida, A., n.d. China: the World's Largest Recyclable Waste Importer. [online] Available at: <<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.627.2458&rep=rep1&type=pdf>>

627.2458&rep=rep1&type=pdf>

<sup>86</sup> Ibid

<sup>87</sup> Brooks, A., Wang, S. and Jambeck, J., 2018. The Chinese import ban and its impact on global plastic waste trade. *Science Advances*, [online] 4(6).

<sup>88</sup> World Economic Forum, 2016. *The New Plastics Economy Rethinking The Future Of Plastics*.



## **CUTS International, Geneva**

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